

Project:

Large-scale Residential Development at Ross Road, Killarney, Co. Kerry

Report Title

Engineering Services Report

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1.0 INTRODUCTION

OSL Butler Consulting Engineers (OSL) has prepared this Engineering Services Report on behalf of Homeland Projects Ltd., for a proposed Large-Scale Residential Development at Ross Road, Killarney, County Kerry on a circa 3.8-hectare site.

The site is located to the southwest of Killarney Town Centre, centred at grid reference E: 496243, N: 589941 (ITM) as highlighted in Figure 1 below.

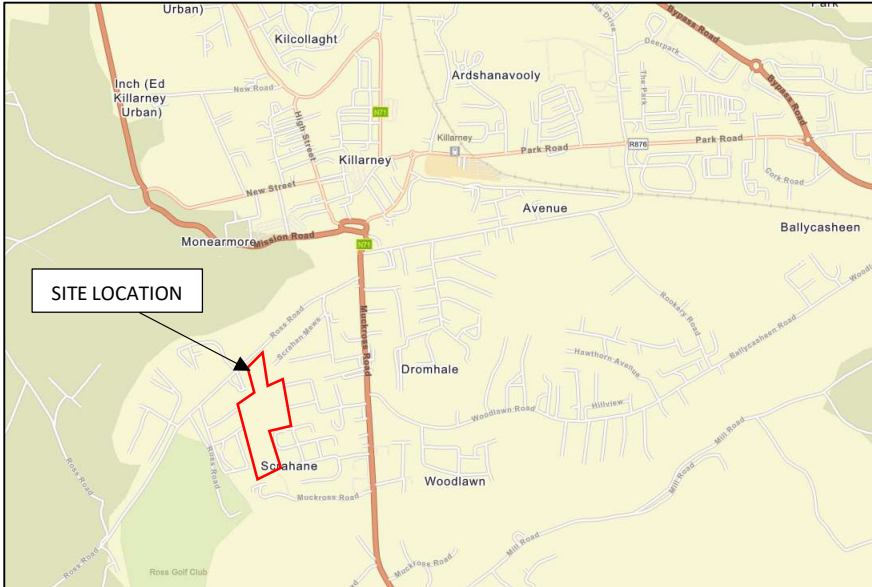


Figure 1: Site Location (Site boundary shown indicatively)

The lands are bound to the north by Ross Road and then to the west, south and east by existing residential neighbourhoods (Castle Falls, Cahernane Meadows and King's Park).

To summarise, the proposed development will consist of a largescale residential development (LRD), comprising of 134no. residential dwellings as follows: 65no. houses consisting of 10no. 4-bed dwellings and 55no 3-bed dwellings; 51no. townhouses consisting of 32no. 3-bed units and 19no. 2-bed units; and 18no. apartments consisting of 12no. 2-bed units and 6no. 1-bed units.

The proposed development also includes crèche (585sqm) with capacity to accommodate 102no. children, and all ancillary site development works including 2no. vehicular and pedestrian accesses onto the Ross Road.

Access to the proposed development will be via a proposed vehicular and pedestrian access to the existing Ross Road.

2.0 TRAFFIC AND TRANSPORTATION

The Design Manual for Urban Roads and Streets (DMURS) Quality Audit Report 25012-MHL-Ross Rd, Killarnery LRD- Doc02-QAR has been included with this planning application under separate cover.

The Traffic and Transport Assessment, 25012-Ross Rd LRD-TTA DOC 03, has been included with this planning application under separate cover.

The Outline Construction Traffic Management Plan, 24041-OSL-00-RP-C-0003, has been included with this planning application under separate cover.

3.0 ROADS

For effective road design in Ireland, compliance with Transport Infrastructure Ireland's (TII) Design Manual for Roads and Bridges (DMRB) and the Design Manual for Urban Roads and Streets (DMURS) is critical, alongside adherence to legislative requirements such as the Roads Act and Planning and Development Act. Incorporating road safety, sustainability, and environmental considerations ensures designs meet modern standards.

The following guidelines and standards (non-exhaustive list) formed the basis of the road design for this proposed development:

- Design Manual for Roads and Bridges (DMRB), TII Publications
- Traffic Management Guidelines, Department of Transport, TII and the National Roads Authority
- Geometric Design of Major/Minor Roads and Junctions, TII Publications
- Design Manual for Urban Roads and Streets (DMURS), Department of Transport Tourism and Sport
- Pavement Design Guidelines, TII Publications
- Road Safety Audit Guidelines, TII Publications
- Environmental Impact Assessment (EIA) Guidelines, Environmental Protection Agency
- Recommendations for Site Developments Works for Housing Areas (October, 1998)

3.1 COMPLIANCE WITH DMURS

The development layout has been designed in accordance with the Design Manual for Urban Roads and Streets (DMURS) as published by the Department of Transport, Tourism and Sport. Strong pedestrian connectivity, slow vehicle speeds and good visibility for road users is integral to the design of the development street network.

The development has placed pedestrians at the top of the hierarchy. Footpath widths throughout the site are 2m and several shared spaces for pedestrians have been provided. On cul-de-sacs in the site, a "shared surface" will be provided on which vehicles, bicycles and pedestrians share the same surface. This will assist in giving pedestrians priority and in reducing vehicle speeds.

The internal roads within the estate have sightlines of 23m (2.4m setback) for a given design speed of 30km/hr which is consistent with the forward visibility requirements as stated within DMURS.

The minimum level of forward visibility required along a street for a driver to stop safely, should an object enter its path, is based on the Stopping Sight Distances (SSD). The SSD has 3 constituent parts:

- Perception Distance: The distance travelled before the driver perceives a hazard.
- Reaction Distance: The distance travelled following the perception of a hazard until the driver applies the brakes.
- Braking Distance: The distance travelled until the vehicle decelerates to a halt.'

Although the internal roads within the estate have been design for Forward Visibility design speeds of 30km/hr, the actual speeds within the estate will be much less due to the additional traffic management measures (horizontal and vertical deflection) that have been incorporated into the site to ensure reduced speeds within the site.

Road widths in the proposed development are 5.5m for main estate routes and links, and 4.8m for shared surface roads, cul-de-sacs and minor arms.

The DMURS Statement of Compliance 24041-OSL-00-RP-C-0004 has been included with this planning application under separate cover.

3.2 LOCAL AUTHORITY CONCERNS, ADVICE AND RECOMMENDATIONS

During a formal meeting, scheduled as a formal request under Section 32(b), Kerry County Council provided advice and recommendations as well as raised specific concerns with respect to road elements. The concerns raised were included in the formal LRD Opinion received. These concerns are addressed in the sub-headings that follows.

3.2.1 Concerns; road widths and turning movements

The Design Manual for Urban Roads and Streets (DMURS) provides clear guidance regarding the accommodation of larger vehicles (such as refuse trucks or fire tenders) on roads where their presence is infrequent.

The key points include:

1. **Reduced Road Widths and Kerb Radii** - For streets not regularly used by large vehicles, road widths and kerb radii may be reduced. This encourages slower speeds and improves pedestrian safety and comfort, supporting the overall goal of creating more people-friendly urban environments.
2. **Swept Path Flexibility** - Where larger vehicles are not expected to use a road regularly, it is acceptable under DMURS for them to encroach slightly into the opposite lane or overrun pedestrian areas (e.g., mountable kerbs or reinforced verges) when turning or manoeuvring, as long as it does not present a significant safety risk.
3. **Design Approach** - DMURS promotes a context-sensitive and balanced approach to street design. Rather than over-designing for infrequent vehicle movements, the manual encourages designers to prioritize the needs of pedestrians and cyclists, especially in residential or low-speed environments.
4. **Turn Movements and Lane Crossings** - The manual explicitly states that in low-traffic or residential areas, some minor encroachment into the oncoming lane for large vehicle turning movements is permissible, provided that this occurs at low speeds and in predictable locations (e.g., junctions) and does not compromise overall safety.

Based on the DMURS (Design Manual for Urban Roads and Streets), the guidance on accommodating infrequent use by large vehicles—such as reduced road widths, tighter kerb radii, and acceptable short encroachment into opposing lanes—is addressed in several specific clauses and sections:

- Kerb Radii and Turning Movements, Section 4.4.3 – Junction Design (pg. 96)

“The use of tighter corner radii (4–6m) is generally desirable as it reduces pedestrian crossing distance and encourages slower vehicle speeds. Larger radii (up to 9m) may be considered where there is a requirement to accommodate larger service or emergency vehicles.”

This indicates that tighter radii are preferred and only increased if there's regular need for large vehicle turning—implying that infrequent use does not justify larger radii.

- Swept Path and Occasional Encroachment, Section 3.3.2 – Design Vehicles (pg. 52)

“Swept path analysis should be used to ensure that larger vehicles can negotiate tight turns where necessary. In certain cases, where large vehicles will only infrequently use a particular route, some encroachment into the opposing lane may be considered acceptable.”

This explicitly supports occasional lane encroachment when large vehicles use the route infrequently.

- Flexible Approach to Street Design, Section 3.3.3 – Movement and Place Context (pg. 53)

“The need to accommodate large vehicles should not lead to the over-design of streets. A balanced approach is required, which may include solutions such as overrun areas, shared spaces, or controlled access points.”

- Road Width Design Philosophy, Section 4.4.1 – Corner Radii and Junction Geometry (pg. 94)

“Over-designing junctions to accommodate large vehicles can significantly compromise pedestrian safety and comfort... It is preferable to adopt tighter geometry and allow occasional encroachment or to use overrun areas where necessary.”

Reinforces that streets shouldn't be over-designed for infrequent large vehicle access—favouring pedestrian-friendly geometry instead.

In summary, DMURS supports designing narrower, safer streets even where occasional large vehicle access is required, and provides for controlled, low-speed encroachment into opposing lanes or onto verge areas as a practical solution.

3.2.2 Ross Road Active Travel

OSL Butler has liaised with David Doyle, Senior Engineer, and Pdraig O’Donoghue, Executive Engineer, of Kerry County Council dealing with Active Travel, in relation to the design of the junction of the service road with Ross Road. Kerry County Council requested that the applicant assess and demonstrate the possible implementation of an Active Travel Facility along Ross Road. The findings and recommendations of the aforementioned assessment was reviewed by and agreed with Kerry County Council.

The new development junction and associated features, which includes the Active Travel Facility as agreed with Kerry County Council, to be provided by the developer (within the site red line boundary as presented) as part of this development is shown on the Proposed Roads Layout, 24041-OSL-11-DR-C-1110, and Proposed Roadmarking and Signage Layout, 24041-OSL-11-DR-C-1117.

The Proposed Future Active Travel Provision along Ross Road, as reviewed by and agreed with Kerry County Council and to be delivered by Kerry County Council (outside the site red line boundary as presented), has been shown on the Proposed Future Active Travel Provision layout, 24041-OSL-11-DR-C-1117.

The layouts referenced above has been included as part of this planning application submission.

4.0 SITE SPECIFIC FLOOD RISK ASSESSMENT

OSL commissioned the services of IE Consulting, on behalf of Homeland Projects Ltd., to undertake a Site Specific Flood Risk Assessment in support of planning application for the proposed development at Ross Road, Killarney, County Kerry.

The Site Specific Flood Risk Assessment, IE3115 Report 6479, has been included with this planning application under separate cover.

In summary, through considering the findings within the Site Specific Flood Risk Assessment and analysis, the following conclusions were made in respect of the development as proposed;

- A Site Specific Flood Risk (SSFRA) assessment, appropriate to the type and scale of development proposed, and in accordance with 'The Planning System and Flood Risk Management Guidelines – DoEHLG-2009' and the Killarney Town Development Plan (2022 –2028) has been undertaken.
- The proposed development site has been screened, scoped, and assessed for flood risk in accordance with the above guidelines.
- The primary potential flood risk to the proposed development site can be attributed to an extreme fluvial flood event in the River Flesk located 175m beyond the southern boundary of the proposed development site.
- The screening assessment undertaken as part of this SSFRA indicates that the site is not at risk of pluvial or groundwater flooding.
- A detailed Digital Terrain Model (DTM) has been developed for the area of the proposed development site.
- A detailed hydrological assessment and analysis has been undertaken in order to determine the 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) peak flood flows in the River Flesk at this location.
- A linked 1D-2D hydraulic model has been developed of the River Flesk utilising the Flood Modeller Pro software. The model has been developed utilising surveyed watercourse cross sectional data and LiDAR data for the area.
- The hydraulic model developed for this Site Specific Flood Risk has incorporated the proposed permitted single residential units (Planning Reference 23/60005) located within the northern portion of the proposed development site.
- The hydraulic model developed for this Site Specific Flood Risk Assessment is considered to provide an accurate and site specific delineation of the predictive 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) flood zone at the location of the proposed development site.
- A small limited portion in the northern area of the proposed development site falls within a predictive Flood Zone 'B'.
- The vast majority of the proposed development site, including the area of the proposed residential units and proposed crèche falls within Flood Zone 'C'.
- In order to ensure a sustainable development, and to ensure that the potential flood risk to the portion of the proposed access road that falls within the delineated predictive 0.1% AEP (1 in 1000 year - Flood Zone 'B') fluvial flood zone is mitigated to an acceptable level, it is proposed to raise the finished ground level of the proposed access road to a level of **23.50m OD** which will ensure that the maximum potential flood depth along this portion of the access road will not exceed 0.3m during the occurrence of an extreme 0.1% AEP (1 in 1000 year) fluvial flood event.
- Vehicular access to and egress from the proposed development site and the permitted single residential unit would not be impeded during the occurrence of an extreme 0.1% AEP (1 in 1000 year) fluvial flood event.
- The development as proposed is considered to comply with the requirement of the 'Justification Test'
- As illustrated in *Figure 30* within the Site Specific Flood Risk Assessment, the finished ground floor level of the proposed residential units and the proposed crèche shall be constructed to a minimum level of 0.3m above the predictive 0.1% AEP fluvial flood level.

- In consideration of findings and output of the Site Specific Flood Risk Assessment, the potential flood risk to and from the development as proposed is considered to be LOW. The development as proposed is not predicted to result in an adverse impact to the existing hydrological regime of the area or increase flood risk elsewhere and is therefore considered to be appropriate from a flood risk perspective.

5.0 WATER

5.1 EXISTING SERVICES

There is an existing 100mm diameter Asbestos watermain located in Ross Road. This main is serviced/supplied via the existing 200mm diameter network located in Muckcross Road (N71) to the east of the subject site.

Please refer to Appendix A for the Existing Services Layout.

5.2 PROPOSED SERVICES

A pre-connection feasibility enquiry was made to Uisce Éireann to confirm whether there is adequate capacity in the public network to accommodate the proposed Large-scale Residential Development (CDS 24008215). The proposed connection was deemed feasible with upgrades. The upgrade works required includes the upsizing of approximately 280m of the existing 100mm diameter (in Ross Road) to a 150mm diameter water main.

It is proposed that this development will be serviced by 150mm and 100mm diameter watermains and will include the provision of new fire hydrants and relevant infrastructure throughout the site. Using the Uisce Éireann guidelines and parameters, the estimated peak demand from the development has been calculated as 4.37 l/s with the average daily demand being 0.63 l/s.

A bulk water meter will be provided at the connection to the site. The supply arrangements will be carried out to the requirements of Uisce Éireann.

All connections, valves, hydrants, meters etc. have been designed and are to be installed in accordance with Uisce Éireann 'Standard Details for Water Infrastructure', 'Code of Practice for Water Infrastructure' and the Department of the Environment's Building Regulations "Technical Guidance Document B - Fire Safety (2020)".

Please refer to Appendix B for the UÉ Correspondence.

Please refer to Appendix G for the Water Demand Calculations.

Please refer to drawing no. 24041-OSL-11-DR-C-1140.

6.0 FOUL SEWER

6.1 EXISTING SERVICES

There is an existing 525mm diameter foul line located within the subject site. This foul line is located in close proximity to the northern site boundary, adjacent to Ross Road. This existing foul line services the lands adjacent to Ross Road as well as the neighbourhoods and estates adjacent to the proposed development.

This existing foul line and receiving network eventually discharges to the Killarney Wastewater Treatment Plant.

There is an existing 200mm diameter foul sewer that cross the subject site. This sewer will be diverted in coordination with the Uisce Éireann Diversions Team.

Please refer to Appendix A for the Existing Services Layout.

6.2 PROPOSED SERVICES

A pre-connection feasibility enquiry was made to Uisce Éireann to confirm whether there is adequate capacity in the public network to accommodate the proposed Large-scale Residential Development (CDS 24008215). The proposed connection was deemed feasible with upgrades. The upgrade works required includes the upsizing of approximately 450m of the existing 525mm diameter to a 750mm diameter foul sewer.

It is proposed that this development will be serviced internally by 150mm and 225mm diameter foul sewers and will include the provision of services connections, inspection chambers etc. throughout the site.

Foul sewers have been designed in accordance with the Uisce Éireann 'Standard Details for Wastewater infrastructure' and 'Code of Practice for Wastewater Infrastructure'. In addition, foul sewers have been designed to the Building Regulations 1997, as amended, (referred to within as 'the Building Regulations') and specifically in accordance with the principles and methods set out in EN 752:2008 and DOE 'Recommendations for Site Development Works' (1998).

In addition, HR Wallingford 'Tables for the Hydraulic Design of Pipes, Sewers and Channels' and Water UK/WRc 'Sewers for Adoption – 6th Edition' have been applied. Values for roughness of uPVC pipes were obtained from Wallingford "Tables for the Hydraulic Design of Pipes, Sewers and Channels" and Wavinsewer systems catalogue.

Using the Uisce Éireann guidelines and parameters, the estimated peak discharge from the development has been calculated as 4,61 l/s with the average discharge being 0,77 l/s.

Foul sewer shall be constructed to comply with the requirements of the Building Regulations 1997 in accordance with the recommendations contained in the Technical Guidance Documents, Section H (revised 2005) and the Uisce Éireann Code of Practice and Standard Details for Wastewater Infrastructure.

Please refer to Appendix B for the UÉ Correspondence.

Please refer to Appendix C for the Foul Sewer Calculations.

Please refer to drawing no. 24011-OSL-11-DR-C-1130 to 1139.

7.0 SURFACE WATER

7.1 EXISTING SERVICES

There is no formal surface water network within the subject lands. There is an existing 300mm diameter surface water sewer to the north of the site, within Ross Road. This surface water sewer drains westward and eventually discharges into Lough Leane.

Further investigations and surveys on site, together with Stephen Sheehan, Executive Engineer, and other officials of Kerry County Council, has confirmed the existence and location of the existing surface water sewer noted above.

7.2 PROPOSED SERVICES

It is proposed to service the proposed development by means of a connection to the existing 300mm diameter surface water pipe to the north, as mentioned previously.

Interception, treatment, attenuation, and discharge control of surface water run off generated by, or as a result of this development is elaborated on further in the text and headings that follow.

Surface water management for the proposed development is designed to comply with the 'Greater Dublin Strategic Drainage Study (GSDSDS) Regional Drainage Policies Technical Document - Volume 2, New Developments, 2005' and the 'Greater Dublin Regional Code of Practice for Drainage Works, V6.0 2005'. CIRIA Design Manuals C753, C697 and C609 have also been consulted to design the surface water drainage system within the site.

The GSDSDS guidelines require the following 4 main criteria to be provided by the development's surface water design;

- Criterion 1: River Water Quality Protection - satisfied by providing interception storage and treatment of run-off within the SuDS features e.g. permeable paving, tree pits, swales and detention basins.
- Criterion 2: River Regime Protection – satisfied by attenuating run-off with flow control device prior to discharge to the outfall.
- Criterion 3: Level of Service (flooding) for the site – satisfied by the site being outside the 1000 year coastal and fluvial flood levels. Pluvial flood risk addressed by development designed to accommodate a 100-year storm as per GSDSDS. Planned flood routing for storms greater than 100-year level considered in design and development run-off contained within site.
- Criterion 4: River flood protection – attenuation provided within the SuDS features e.g. permeable paving construction, swales, tree pits and detention basin

7.2.1 Sustainable Drainage Systems

It is proposed to use a Sustainable Urban Drainage System (SuDS) approach to stormwater management throughout the site where possible. The overall strategy aims to provide an effective system to mitigate the adverse effects of urban stormwater runoff on the environment by reducing runoff rates, volumes and frequency, reducing pollutant concentrations in stormwater, contributing to amenity, aesthetics and biodiversity enhancement and allow for the maximum collection of rainwater for re-use where possible. In addition, SuDS features aim to replicate the natural characteristics of rainfall runoff for any site by providing control of run-off at source and this has been achieved by the current proposals.

SuDS are a requirement under the 'Regional Code of Practice for Drainage Works' and 'The Greater Dublin Strategic Drainage Study'. Additionally, these systems are recommended under the 2009 guidelines, 'The Planning System and Flood Risk Management'.

A number of SuDS features are proposed as part of this development. These have been designed in accordance with CIRIA documents C753, C697 and C609 as follows:

- **Petrol Interceptors:** A proprietary oil/water separator which prevents hazardous chemical and petroleum products from entering watercourses and public sewers. Where deemed appropriate, petrol interceptors have been included and adequately sized as part of the design proposal.
- **Swales:** Broad, shallow drainage channels covered in grass which can treat, convey and attenuate runoff, at source, and can infiltrate to the ground where the subgrade is suitable. Swales also can promote biodiversity. These are located adjacent to roads and shared surfaces.
- **Bioretention Raingardens:** Bioretention Raingardens employs an engineered topsoil and is used to manage polluted urban rainfall runoff in street locations and car parks. These features can contribute significantly to the urban scene and will be designed to meet urban design standards.
- **Tree Pits:** Trees can be planted within a range of infiltration SuDS components to improve their performance, as root growth and decomposition increase soil infiltration capacity. Alternatively, they can be used as standalone within soil-filled tree pits, tree planters or structural soils, collecting and storing runoff and providing treatment via filtration and phytoremediation. Tree pits and planters will be designed to collect and attenuate runoff by providing additional storage within the underlying structure. The soils around trees can also be used to filter out pollutants from runoff directly.

Tree pits are proposed to be in green space areas to treat and control runoff, while at the same time providing amenity value to adjacent pedestrian, and residential zones. It is also proposed, where possible to fit tree pits along the estate road to drain and treat surface water runoff from the road network. This will allow for treatment of first flush and low flows while high flows will discharge into the surface water network during extreme rainfall events. Rainwater gullies will still be provided downstream of any tree pit to drain runoff during an extreme rainfall event.

- **Permeable Pavers:** Porous surfacing (paving block or open graded material) which can treat rainwater, at source, and allow infiltration through to an underlying porous subbase where water can be stored within the voids of the subbase before being slowly released to the drainage collection system through natural flow via the porous medium. Partial infiltration systems are proposed and includes a permeable geotextile at its base as well as an outlet to the surface water system. These systems will allow some form of storage for small rainfall events and will result in infiltration, water evaporation and adsorption in small quantities, therefore there will be less runoff from these areas in small rainfall events thus mimicking the natural response for this catchment. Permeable Pavers are proposed for the public car park areas (e.g. creche, amenity parking) as well as in private driveways.
- **Rainwater Harvesting:** In relation to rainwater harvesting, an option is to provide a rainwater butts at each individual dwelling. This could be located to the rear of each unit. This rainwater butt will only have the ability to catch the rear sloping side of the dwelling and the reuse would be for watering plants. The intention would be that these are provided retrospectively by the homeowner.
- **Cellular Attenuation System:** Proprietary modular block or arch structure with a maintenance/inspection tunnel for providing underground surface water attenuation storage and can infiltrate run off to the ground where subgrade is suitable.

The site has a number of the existing trees which are to be retained. This has reduced the amount of open space in the development, therefore careful consideration was required in the location of the attenuation systems. There are 3no. Attenuation systems proposed throughout the proposed development, each responsible for managing a sub-catchment within the larger development.

- **Basins, wetlands and ponds:** Basins, wetlands and ponds on any site allows safe and contained storage for excess rain and storm water as it allows for its release over time into the sewer system at a controlled rate. This removes much of the potential flooding risk caused by the inability for excess water to drain safely. Furthermore, basins, wetlands and ponds can treat, convey and attenuate runoff, at source, and can infiltrate to the ground where the subgrade is suitable. It can also promote biodiversity.

It is proposed to incorporate detention basins in green spaces to compliment the SuDs strategy. These are vegetated depressions designed to store runoff on the surface and infiltrate it gradually into the ground. They are dry except in periods of heavy rainfall.

The detention basins proposed will be located in green areas and will cater for some runoff from adjacent roadways but primarily the open spaces areas where they are situated. The surface water design includes for 2 no detention basins as an initial interception measure, prior to entering the main network, for surface water run off management of some of the sub-catchments within the larger development.

In response to the local authority's concerns regarding the risk of drowning associated with detention basins, we confirm that the design has been undertaken with due regard to safety and risk mitigation, in accordance with the principles and best practices set out in the CIRIA SuDS Manual (C753). The design incorporates features that align with the guidance outlined in Section 36.5 of the manual, which emphasizes the importance of shallow side slopes (not steeper than 1 in 3), appropriate landscaping, controlled access where necessary, and clear visibility to deter unsafe behaviour. These measures ensure the detention basins are safe for all users while still fulfilling their function in surface water management.

- **Flow Control Device:** It is proposed to provide a flow control device at strategic locations within the sub-catchments (described above) to restrict the outflow of water from the subject site. The flow control devices will be fitted with a pull cord bypass and a penstock valve, installed on the inlet to the manhole for maintenance purposes.

Surface water runoff will be treated by means of the measures discussed above prior to entering the below ground attenuation system. A manhole with a 450mm deep sump will be provided to intercept and trap silt/sediment, located upstream of each of the attenuation tanks and detention basins.

The proposed SuDS features will reduce the runoff volume through evaporation, transpiration, infiltration and depression storage of the water within each system.

Please refer to Appendix D for the SuDS calculations and SuDS summary.

Please refer to drawing no. 24041-OSL-11-DR-C-1120 to 1123.

7.2.2 Long-term Storage

In addition to limiting the runoff rate through attenuation, the GDSDS requires that runoff volume from the site is limited in extreme events. The objective is to match the runoff volume discharged to the downstream receiving watercourse after development to that which occurred prior to development. This volume is calculated by comparing the 100-year 6-hour event for 'pre' and 'post' development as is referred to as "Long-Term Storage".

Where long-term storage is provided, this has a direct effect on the permissible site discharge rate from the site. Due to the large extent of development within the site, it is not proposed to provide long-term storage, this effects the permissible site discharge and resulting attenuation volumes required.

7.2.3 Site Investigation

OSL has conducted a high-level desktop study/review of the existing site characteristics.

A review of nearby site investigations recently conducted, as well as local knowledge and site visits indicate that the stratigraphy can be described in general as being topsoil of approximately 350mm with orange boulder clay with gravel and medium sized stones underlain.

EPA Maps describes the expected subsoils based on GSI Quaternary sediment types as Sandstone sands and gravels (Devonian).

A detailed Site Investigation will be conducted at detailed design stage.

7.2.4 Permissible Site Discharge

According to the GSDSDS, the method used for determining peak flow rates for small greenfield catchments is the UK 'Institute of Hydrology Report 124, Flood Estimation for Small Catchments'. This method calculates $QBAR_{rural}$ which is the mean annual flood flow from a rural catchment.

Where long-term storage can be provided or is not necessary, surface water can be discharged at a higher value than $QBAR_{mrai}$, this discharge rate ($QBAR_{growth}$) is dependent on the design return period and the corresponding growth factor from the GSDSDS Table 6.6. However, if longterm storage cannot be provided, the on-site the discharge rate from the site should be kept to $QBAR_{rural}$ or 2 l/s/ha, which is the case for this development.

The IH124 method calculates $QBAR_{rural}$ which is the mean annual flood flow from a rural catchment. As the subject site area is less than 50 hectares, the calculated $QBAR$ is to be linearly interpolated from the calculated value to produce a reduced allowable outflow based on the actual site area, as per GSDSDS section 6.6.1.

$$QBAR_{rural} = 0.00108 \times (\text{Area})^{0.89} (\text{SAAR})^{1.17} (\text{SOIL})^{2.17}$$

Where:

$QBAR_{rural}$ = Mean Annual Flood (m3/s)

Area = Catchment Area (km2)

SAAR = Standard Average Annual Rainfall (mm)

SOIL = SOIL index from Flood Studies Report

The soil value can be determined from the Flood Studies Report - Winter Rainfall Acceptance Maps (WRAP). A more accurate approach is to use the 'The Classification of Soils from Winter Rainfall Acceptance Rate, Flood Studies Report Table 4.5' to determine soil type and determine the soil value from Table 6.7 from the GSDSDS. The latter method is adopted for this site.

Permissible site discharge for the site has been determined as follows:

- Total Application Site Area/Drainage Area = 3.861 Ha
- SAAR = 1537.1mm
- SOIL Value= 0.30 (for soil type 2 from Table 6.7 from the GSDSDS)

The permissible site discharge for the development ($QBAR_{rural}$) was calculated as 17.7 l/s.

Please refer to Appendix E for the Permissible Site Discharge Calculations.

7.2.5 Surface Water Runoff Coefficients

As a large proportion of runoff is routed through SuDS features these will have an attenuating effect which reduce the rate of stormwater runoff for every rainfall event. Also, SuDS features would reduce the runoff volume through evaporation, transpiration, infiltration and depression storage of the water within each system.

Surface Water Runoff coefficients utilised for this site has been applied as follows:

- Roofs - Type 1 (Draining to traditional gullies) = 1.00
- Roads and Footpaths - Type 1 (Draining to traditional gullies) = 0.80
- Road and Footpaths – Type 2 (Draining to SuDS features) = 0.70
- Landscaped Areas = 0.10
- Grassed Areas – Open Space non-contributory = 0.00

7.2.6 Surface Water Catchment Management

The proposed development catchment has been subdivided into 6 sub-catchments. A diagram, Figure 2, has been included below to illustrate the surface water network catchment locations, flow routes, attenuation features and controls.

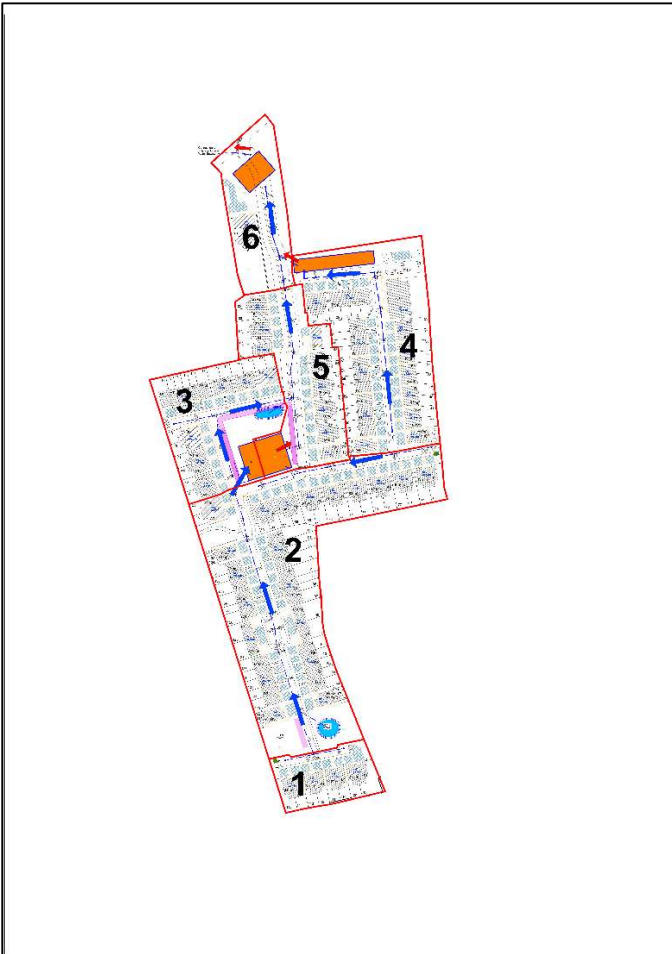


Figure 2: Surface Water Sub-Catchments

Figure 3 below provides a schematic of the flow and control routes through the catchments.

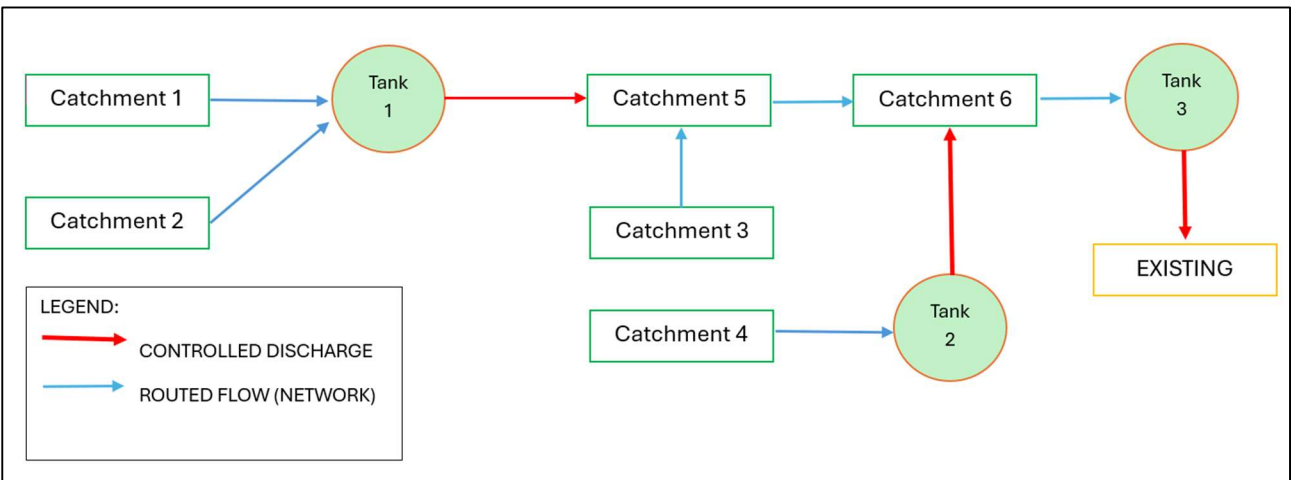


Figure 3: Surface Water Flow and Control Schematic

7.2.7 Interception Volume

The GDSDS requires that no run-off should directly pass to the receiving watercourse for rainfall depths of up to 5mm, therefore interception should be provided at source where practicable. The volume of interception required is based on 5mm of rainfall depth from 80% of the runoff from impermeable areas as defined in the GDSDS (Appendix E section E2.1.1).

The interception volume attributable to each SuDS feature (swales, tree pits, bioretention raingardens etc.) consists of the volume of water that can infiltrate to the ground, what will evaporate into the atmosphere and what can transpire through plants and vegetation. Additionally, there will some losses of water due to absorption and wetting of stone and soil media.

Not all SuDS features will be able to achieve infiltration, evaporation, transpiration and losses due to absorption/wetting. The limits for each SuDS feature type are considered when calculating interception volumes. The interception storage attributable to the losses in stone and soil media, such as the stone media used in filter drains was not included in the calculations.

The total interception volume required (as calculated) for the site is 85.50 m³. The volume provided for the site by means of swales, tree pits and bioretention areas, permeable paving etc. are 109.50 m³.

Please refer to Appendix F for the Interception Volume Calculations.

Please refer to Appendix D for the SuDS calculations and SuDS summary.

7.2.8 Treatment Volume

The GDSDS requires that a “treatment volume” (Vt) be provided in order to prevent any pollutants or sediments discharging into river systems, additionally a ‘treatment train’ stormwater runoff management system is required.

According to CIRIA document C697 the following treatment train approach is necessary:

- Roofs – 1 Treatment Stage
- Road Areas – 2 Treatment Stages
- Paved Areas excluding Roads - 1 Treatment Stage

The treatment volume is based on treatment of 15mm of rainfall depth from 80% of the runoff from impermeable areas as defined in the GDSDS (Appendix E section E2.1.2).

All run-off areas will pass through the required number of treatment stages prior to discharging to the downstream outfall.

The total treatment volume required (as calculated) for the site is 256.45 m³. The volume provided by means of swales, tree pits and bioretention areas, permeable paving etc. are 385.20 m³.

Please refer to Appendix F for the Interception Volume Calculations.

Please refer to Appendix D for the SuDS calculations and SuDS summary.

7.2.9 Surface Water Sewers

Surface water from the proposed development will be discharged, after attenuation and discharge control, to the existing 300mm diameter surface water sewer mentioned previously.

Surface water sewers are designed in InfoDrainage using the Modified Rational Method. The return period for sizing pipes was based on the following:

- Department of Environment and Local Government - Recommendations for Site Development Works for Housing Areas (1998), Table 3.1.
- GSDSDS - Regional Drainage Policies - Volume 2 - New Development (2005), Section 6.5;
- IS EN 752:2008 - Drain and Sewer Systems Outside Buildings, Table 2
- Building Regulations (2005) - Section H - Drainage and Wastewater Disposal, Section 1.5.7.

The surface water network was assessed for the 5, 30- and 100-year return periods (+20% climate change) where no flooding from manholes was encountered. The surface water network has been designed for the 5-year return period and assessed for the critical storm to minimise the risk of flooding.

The following parameters applied for the design ;

- Return Period 5 year (+20% climate change)
- Time of Entry 5 minutes
- Pipe Ks 0.6mm (Concrete), 0.15mm (uPVC)
- Minimum velocity 0.75m/s
- Maximum velocity 3.0m/s

Effective runoff coefficients for each pipe catchment have been determined based on the runoff characteristics for each surface contributing to flows within the catchment.

The minimum pipe diameter for public surface water sewers is 225mm. Freeboard of 500mm has been provided for in the design between top of water level during a 100 year (+20% Climate Change allowance) event and the proposed building floor levels.

Values for roughness of uPVC pipes were obtained from Wallingford "Tables for the Hydraulic Design of Pipes, Sewers and Channels" and Wavinsewer systems catalogue.

All gullies will be positioned and designed in accordance with 'The recommendations for site development works for housing areas' published by the Department of the Environment'.

Please refer to Appendix H for the Surface Water Network Calculations.

7.2.10 Surface Water Attenuation

The GSDSDS requires flood waters for a 100-year return period to be managed on-site, therefore this return period (+20% Allowance for Climate Change) has been adopted for attenuation calculations.

The surface water runoff from the catchments will be restricted to greenfield runoff rates using flow control devices as described under heading 7.2.4 above.

This surface water system has been hydraulically modelled in InfoDrainage to ensure that the overall discharge at the end of the hydraulic system (i.e. the outlets to the existing surface water network) is at, or below, the greenfield runoff rate.

The InfoDrainage Simulation uses the Wallingford Procedure, time/area full hydrograph methodology, including energy and momentum equations for dynamic analysis of surface water networks. The site drainage network is modelled as one system where all flows, capacities, water levels, surcharged manholes etc are determined throughout the network for each critical storm duration. Therefore, the final combined discharge rate to the existing sewer from the outlet will be kept at (or below) the total permissible discharge rate defined above.

Maximum rainfall data from Extreme Rainfall Return Period values produced by Met Eireann was used to input into InfoDrainage to determine maximum flood volumes. Rainfall data for the site was sourced from an Annual Average

Rainfall (AAR) Grid (1981-2010) and a Depth Duration Frequency model produced by Met Eireann (Available from: <http://www.met.ie/climate/products03.asp>). This data was input into InfoDrainage to determine the maximum flood volume for the 1 in 100-year rainfall event;

- SAAR = 1537.1 mm
- Ratio R = 0.242
- M5-60 = 21.40 mm

As previously illustrated, the proposed development has been subdivided in 6 sub-catchments, with these sub-catchments being managed to, as far as possible, attenuate and/or control the discharge generated within.

Table 1 below summaries the attenuation facilities provided and discharge control proposed.

Table 1: Attenuation and Discharge Control Summary

Sub-Catchment	Sub-Catchment Size (Total) m ²	Sub-Catchment Size (Effective) m ²	Sub-Catchment Effective Runoff Coefficient	Facility Provided	Volume of Attenuated Provided m ³	Flow Controlled (via Flow Control Device) l/s	Calculated Permissible Discharge (l/s)
1	2119	1241	0.59	Detention Pond 1	92.519		0.97
2*	13947	7347	0.53	Attenuation Tank 1	634.708	7.5	6.38
3	5233	2652	0.51	Detention Pond 2	42.131		2.39
4	8533	4894	0.57	Attenuation Tank 2	286.306	7.5	3.90
5**	5160	2818	0.55				2.36
6***	3615	1295	0.36	Attenuation Tank 3	248.217	17.7	1.65

*Conveys run-off generated from Sub-Catchment 1 and 2

**Conveys control discharge from Sub-Catchment 1 and 2 as well as run-off generated from Sub-Catchment 3, 4 and 5

***Conveys controlled discharge and run-off generated from all other Sub-Catchments

It should be noted that attenuation volumes required are based on the results of the InfoDrainage hydraulic simulation summary of Critical Results by Maximum Level. Hydrobrake maximum head and discharges are based on results of InfoDrainage hydraulic simulation summary of Critical Results by Maximum Outflow. A minimum freeboard of 500mm has been provided above the 1 in 100-year flood levels to all building floor levels.

The InfoDrainage design summary reports have been included within Appendix H and I of this report. This includes a full set of calculations for the Tanks, Basin and Swales proposed as part of the SuDS Strategy for the development.

A Surface Water Drainage Impact Assessment, 24041-OSL-00-RP-C-0002, has been included as part of this application under separate cover.

Please refer to drawing no. 24041-OSL-11-DR-C-1120 to 1123.

8.0 UTILITIES

8.1 EXISTING UTILITIES

A request for existing utility records from all major utility providers in Ireland has been made for the purpose of application. The following information is based on record information to hand, at the time of preparing the report.

Please refer to Appendix A for the Existing Services Layout.

8.1.1 ESB

ESB records indicate that there are existing Low/Medium Voltage ESB infrastructure within the vicinity of the proposed development.

The overhead lines running through the site will be replaced with underground services. Ducting will be provided to allow for these to be brought underground, in full consultation with the service provider.

8.1.2 Eir

EIR records indicate that there is telecom infrastructure located in the vicinity, including within Ross Road to the north, of the proposed development.

8.1.3 Virgin Media

OSL is yet to receive a response on from Virgin Media with regards to existing services records. It is not anticipated that there are any Virgin Media services located within the subject site.

8.1.4 Gas Networks Ireland

Gas Networks Ireland records indicate that there are no existing infrastructure within or in close proximity to the site.

9.0 SUMMARY

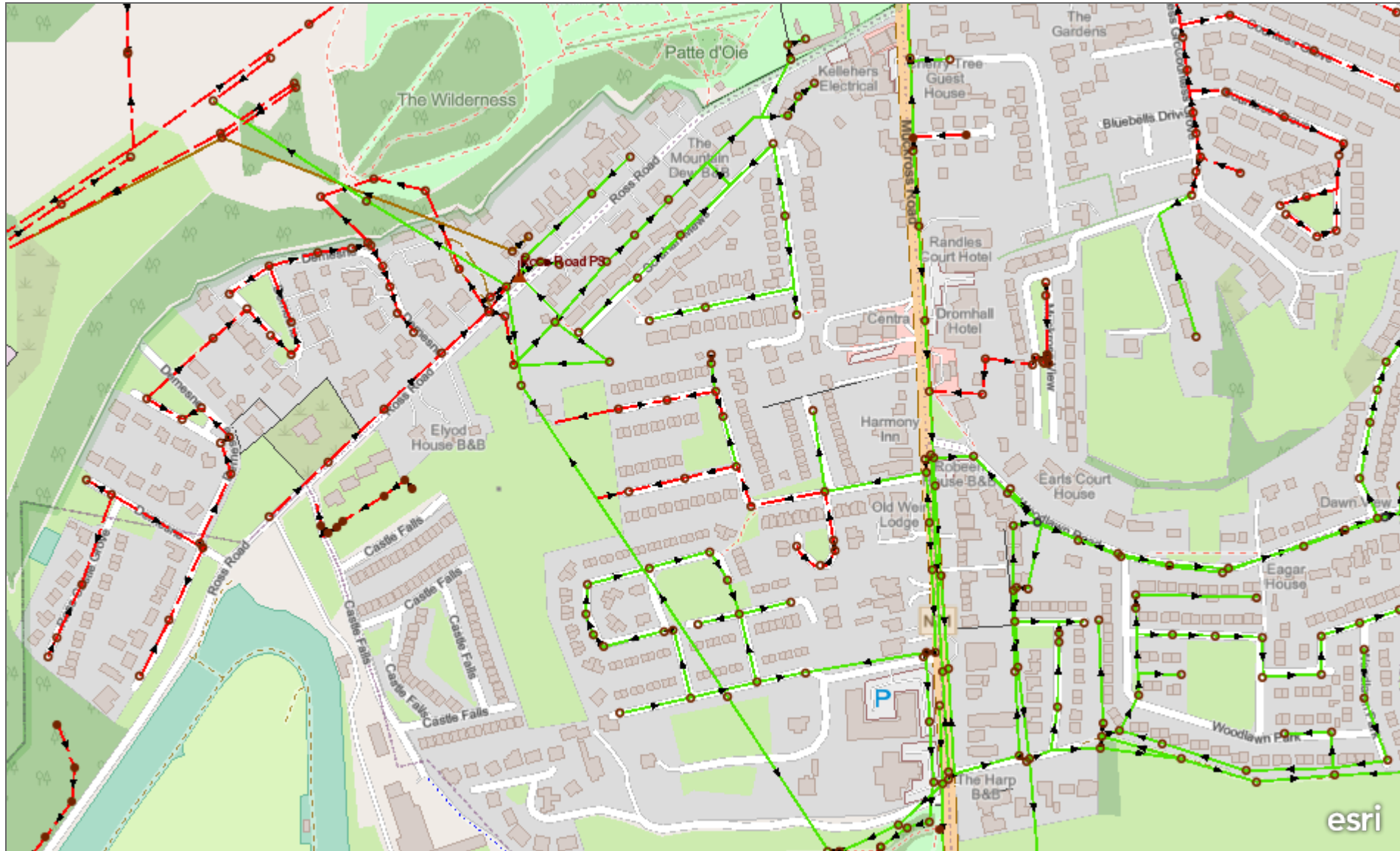
This report has outlined the engineering proposals associated with Homeland Projects Ltd.'s application for a Large-scale Residential Development at Ross Road, Killarney, County Kerry on a circa 3.8-hectare site.

The findings are summarised as follows:

- The proposed development will be served by a new water supply network. The water supply network to serve the development will be constructed in accordance with Uisce Éireann Code of Practice and Standard Details for water infrastructure.
- The proposed development will be served by new foul infrastructure. The foul network to serve the development will be constructed in accordance with Uisce Éireann Code of Practice and Standard Details for wastewater infrastructure.
- The surface water management regime will be based on SuDS principles.
- Surface water from the site will be collected and attenuated on site, with a peak discharge rate of 17,7l/s (Q_{BAR}) for the 1 in 100 Year rainfall event (including an allowance of 20% for climate change). As part of the development, a number of different SuDS measures will be provided to minimise the impact on water quality and water quantity of the runoff and maximise the amenity and biodiversity opportunities within the site.
- There are a number of utility providers with infrastructure within the vicinity of the development.

Appendix A – Existing Services

SewerStormWaterNetwork

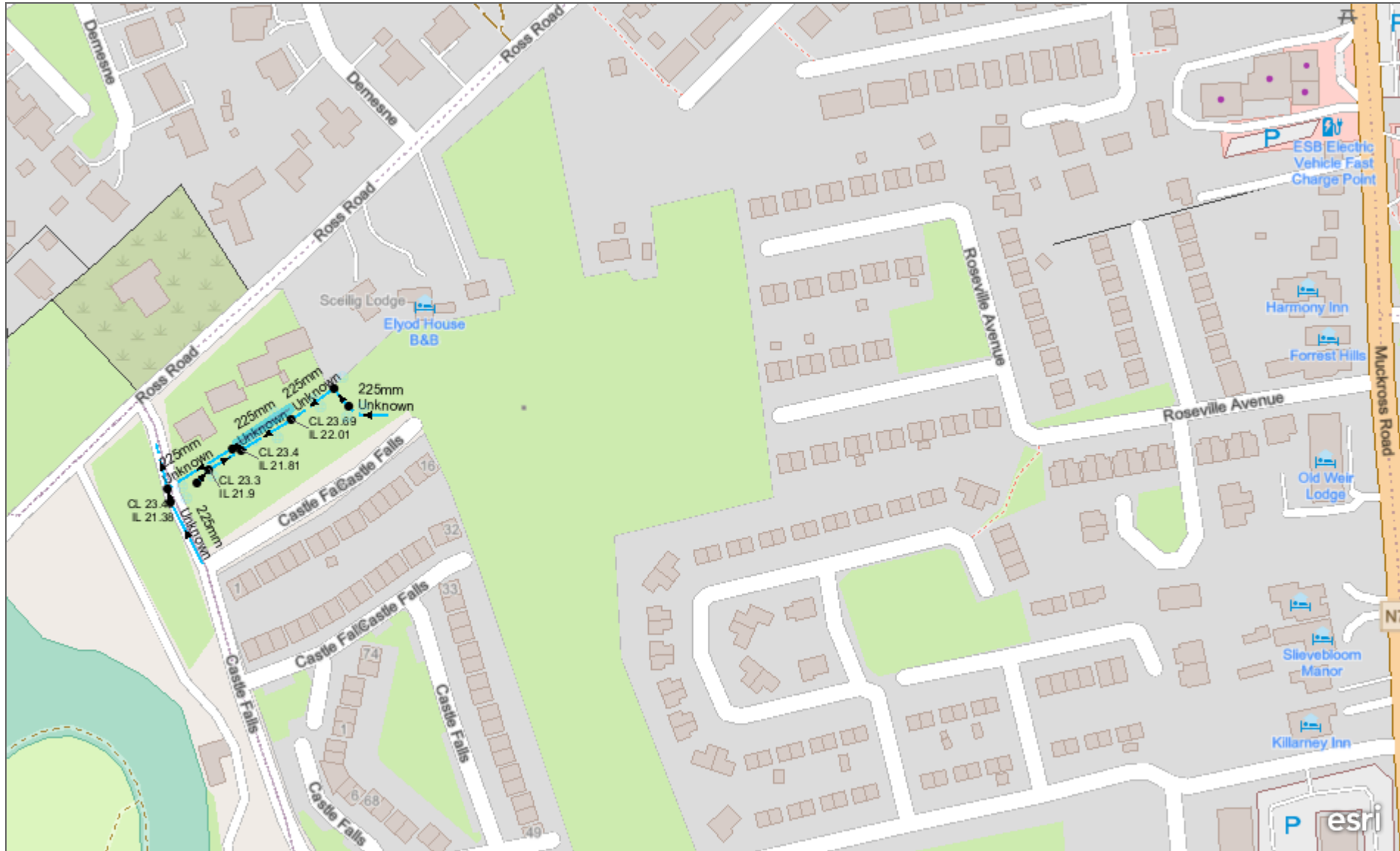


Sewer Storm Water Network

200m

Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

StormWaterNetwork

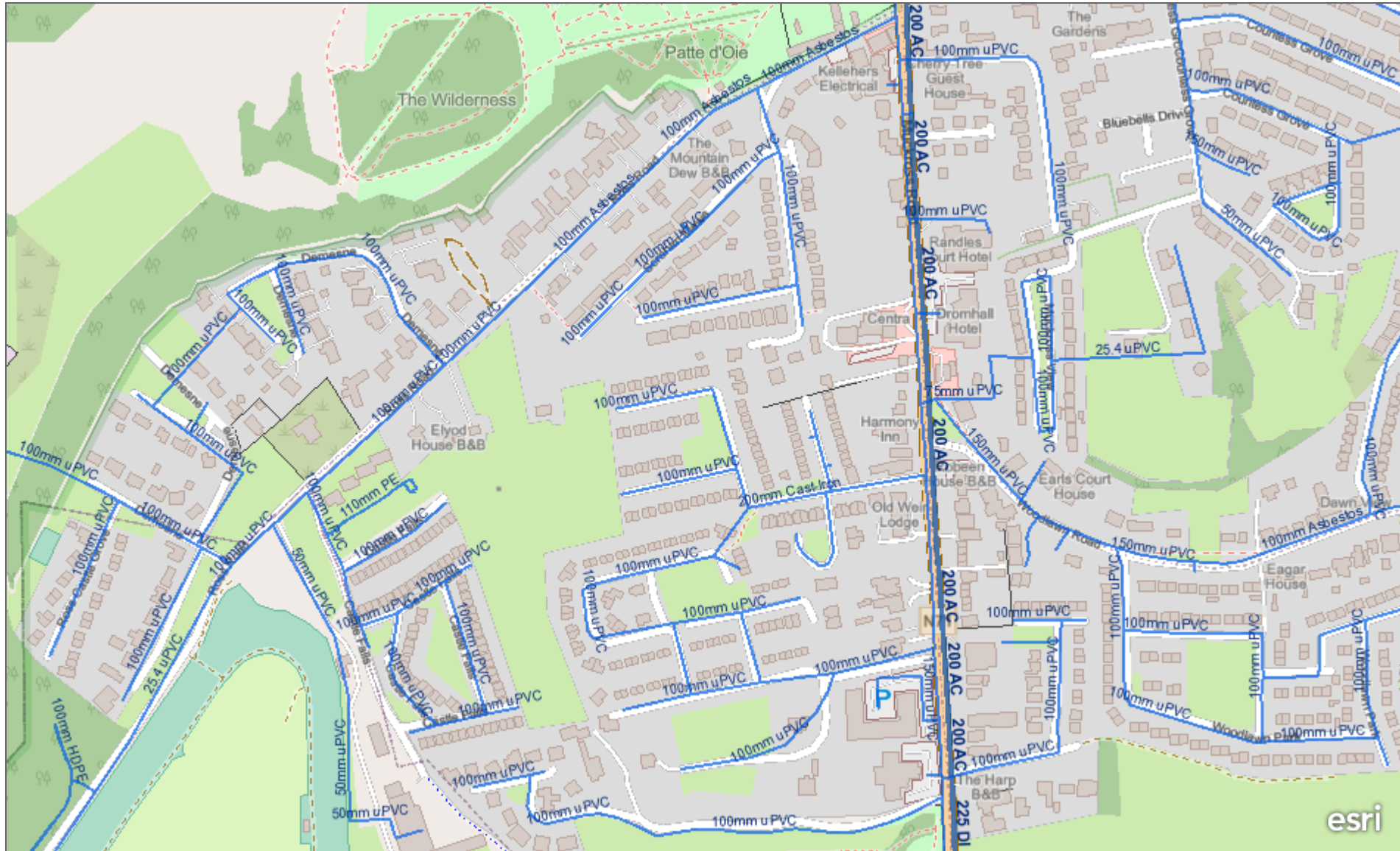


Storm Water Network

60m

Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

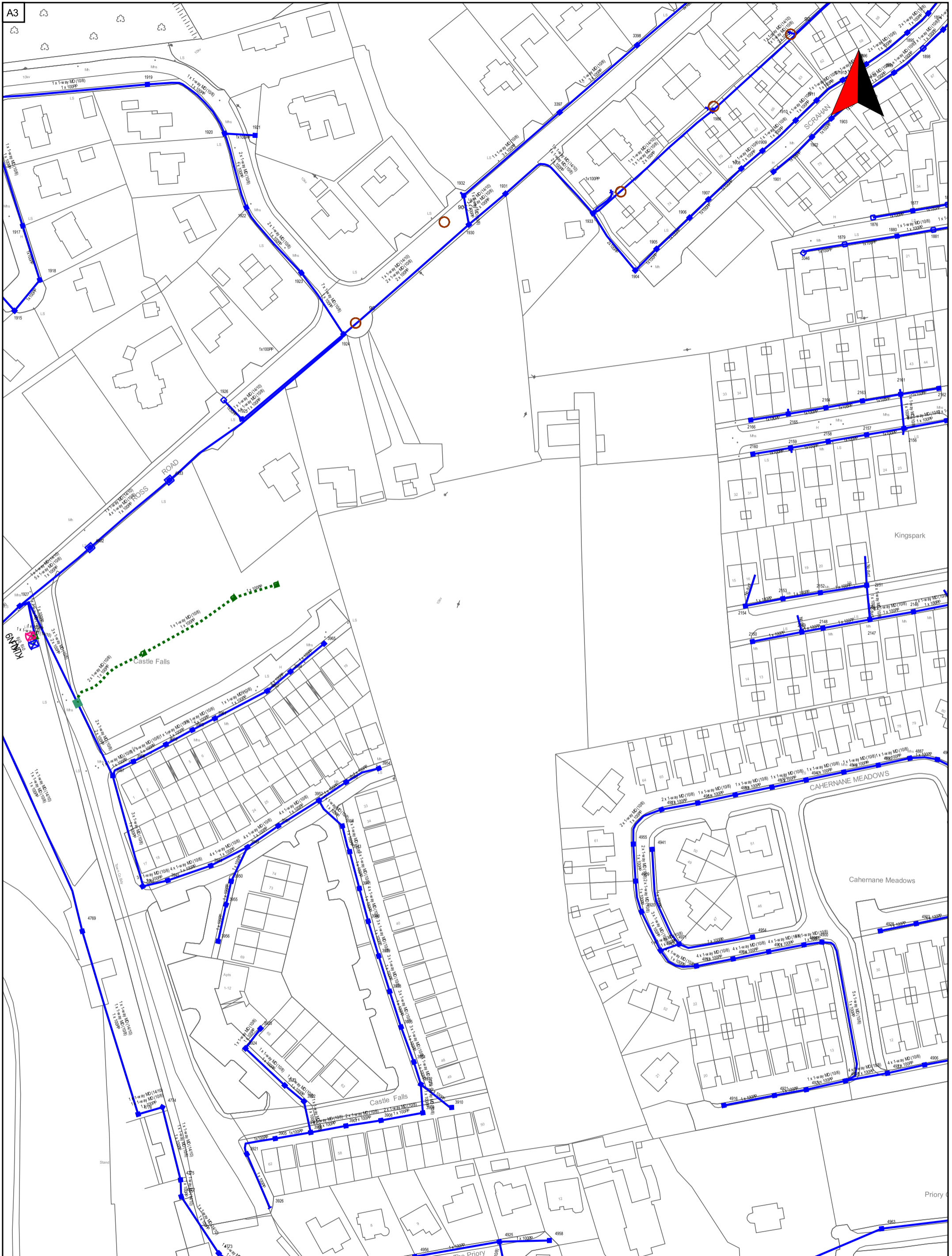
Water Distribution Network



Water Distribution Network



Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri



eMaps open air Civil Engineering Infrastructure Service

Scale: 1:1500

Irish National Grid Co-Ordinates
Centre XY: 96265 m, 89848 m

Date
14/06/2024

Smallworld
Powered by GE



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TITLE: 20240620-002_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: 20-Jun-2024

** SCALE: 1:2500

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

WARNING

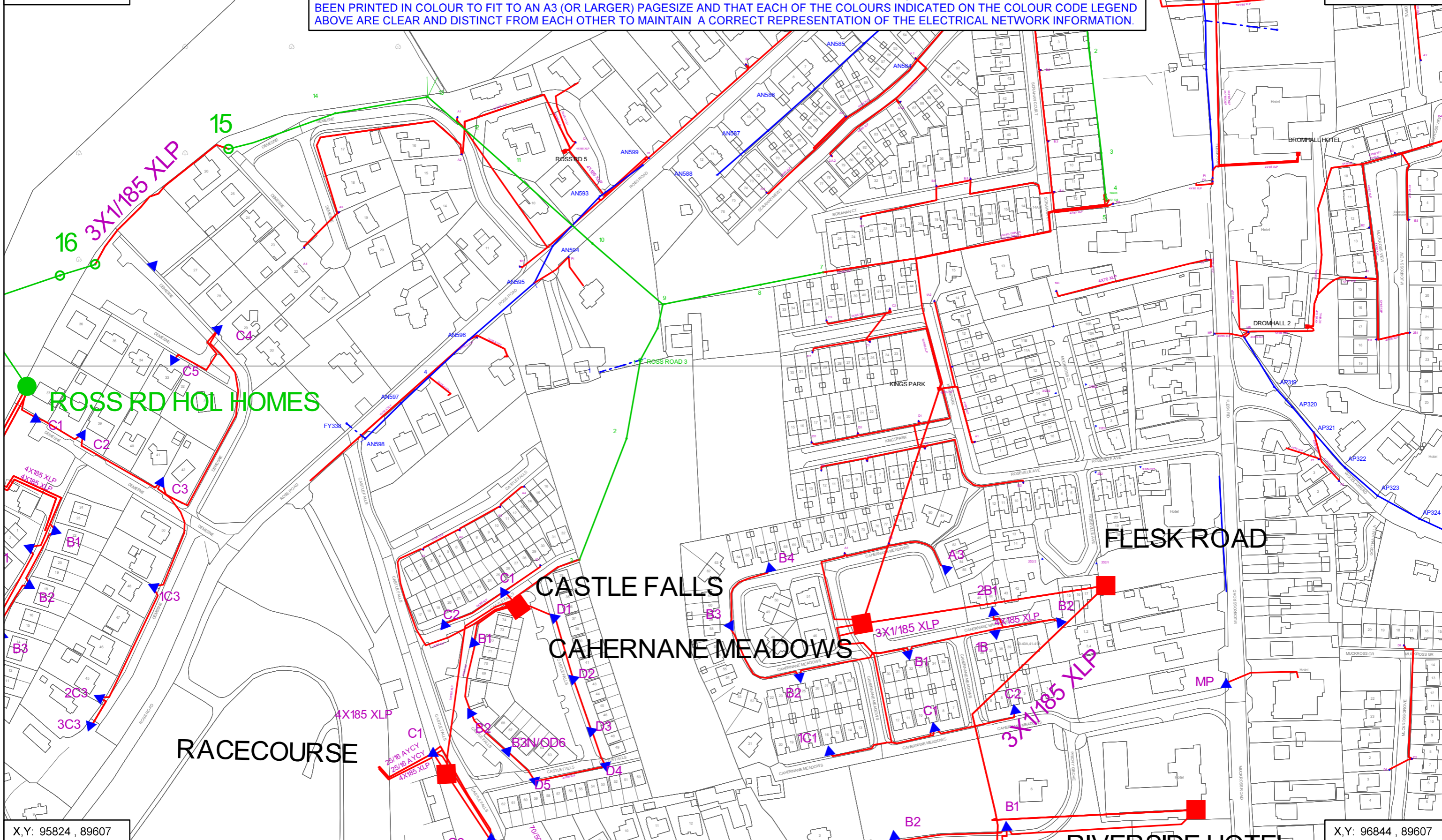
THIS MAP INDICATES THE APPROXIMATE LOCATION OF ESB TRANSMISSION (400KV, 220KV, 110KV, 38KV) AND DISTRIBUTION (20KV, 10KV, 230V/400V) UNDERGROUND CABLES AND OVERHEAD LINES IN THE GENERAL AREA OF THE PROPOSED WORKS. ESB NETWORKS TAKES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE MAP. IT IS 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.

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X,Y: 95824 , 90211

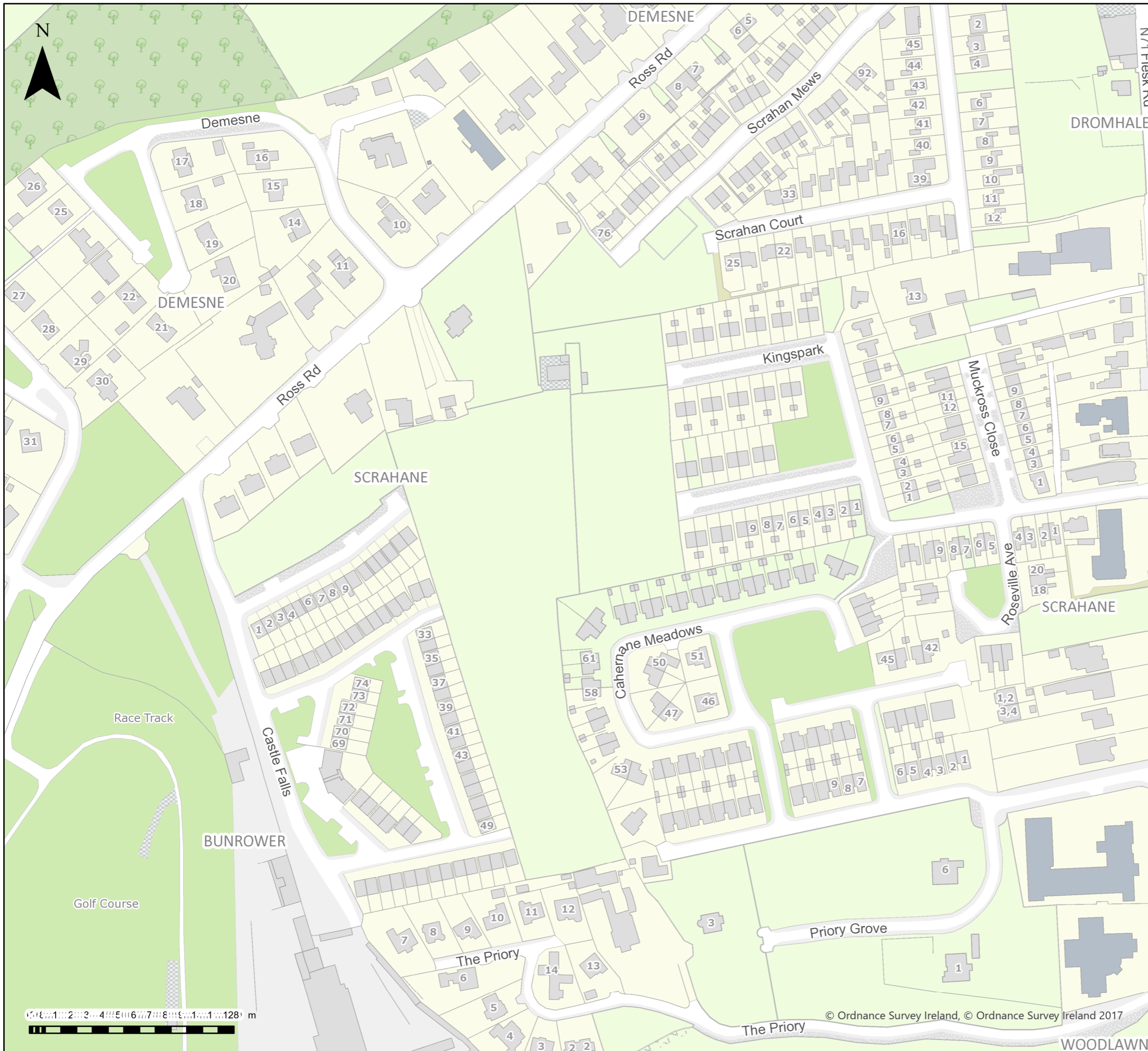
ESB NETWORKS HAS ISSUED THIS MAP AS A PDF DOCUMENT. IF VIEWING A PAPER VERSION OF THIS MAP, THE VIEWER MUST ENSURE THAT IT HAS BEEN PRINTED IN COLOUR TO FIT TO AN A3 (OR LARGER) PAGESIZE AND THAT EACH OF THE COLOURS INDICATED ON THE COLOUR CODE LEGEND ABOVE ARE CLEAR AND DISTINCT FROM EACH OTHER TO MAINTAIN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

X,Y: 96844 , 90211



X,Y: 95824 , 89607

X,Y: 96844 , 89607



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.

Legal Notice: Gas Networks Ireland (GNI) and its affiliates, accept no responsibility for the accuracy of any information contained in this document including data concerning location and technical designation of the gas distribution and transmission network (the 'Information'). The Information should not be relied on for accurate distance or depth of cover measurements.











Any representations and warranties, express or implied, are excluded to the fullest extent permitted by law. No liability shall be accepted for any loss or damage including, without limitation, direct, indirect or consequential loss, arising out of or in connection with the use or re-use of the Information.






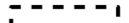








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 Aurora Telecom Duct
 Aurora Telecom Sub Duct
 Aurora Telecom Inserted Gas Pipe



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

	Cover (depth in metres)		Pressure Monitor
	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



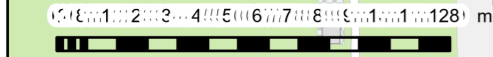
DIAL BEFORE YOU DIG
1800 427747

In Emergency call
1800 20 50 50



GAS NETWORK INFORMATION

Description: test	
Location: 496289,589919	
Plot Date: 14/06/2024 13:08	Scale: 2500 @ A3
Plotted By: 7842	Ref ID: 7842_14062024130823



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Appendix B – UÉ Correspondence

CONFIRMATION OF FEASIBILITY

David Butler
38 Eastgate Drive
Little Island
Cork
T45 Y049

28 January 2025

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

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

**Our Ref: CDS24008215 Pre-Connection Enquiry
Ross Road, Killarney, Co., Kerry**

Dear Applicant/Agent,

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

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 185 unit(s) at Ross Road, Killarney, Co., Kerry, (the **Development**).

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

- **Water Connection**
 - Feasible Subject to upgrades
 - Upsizing of approx. 280m of existing watermain from 100mm to 150mm.
- **Wastewater Connection**
 - Feasible Subject to upgrades
 - Upsizing of approx. 450m of existing sewer from 525mm to 750mm

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann 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 Uisce Éireann.

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/

Stiúirthóirí / Directors: Niall Gleeson (POF / CEO), Jerry Grant (Cathaoirleach / Chairperson), Gerard Britchfield, Liz Joyce, Michael Nolan, Patricia King, Eileen Maher, Cathy Mannion, Paul Reid, Michael Walsh.

Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin, Ireland D01NP86

Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Uisce Éireann is a designated activity company, limited by shares.

Cláraithe in Éirinn Uimh.: 530363 / Registered in Ireland No.: 530363.

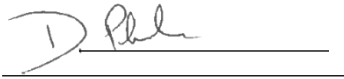
Where can you find more information?

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

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

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

Yours sincerely,

A handwritten signature in black ink, appearing to read 'D. Phelan', is written over a horizontal line.

Dermot Phelan
Connections Delivery Manager

Section A - What is important to know?

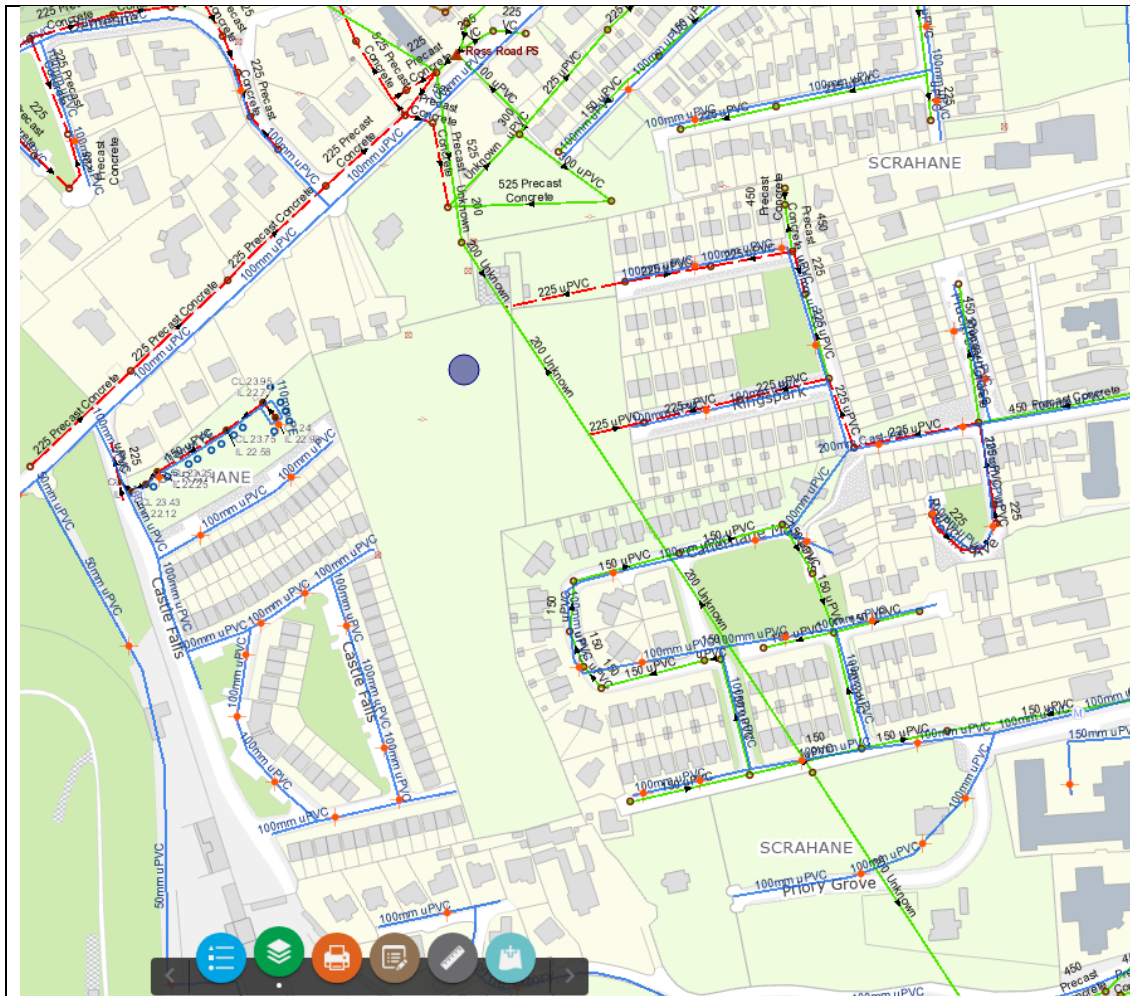
Do you need a contract to connect?	<ul style="list-style-type: none"> • Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Uisce Éireann's network(s). • Before the Development can connect to Uisce Éireann's network(s), you must submit a connection application <u>and be granted and sign</u> a connection agreement with Uisce Éireann.
When should I submit a Connection Application?	<ul style="list-style-type: none"> • A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	<ul style="list-style-type: none"> • Uisce Éireann connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	<ul style="list-style-type: none"> • All works to Uisce Éireann's network(s), including works in the public space, must be carried out by Uisce Éireann*. <p>*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</p>
Fire flow Requirements	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 Uisce Éireann's network(s)?	<ul style="list-style-type: none"> • Requests for maps showing Uisce Éireann's network(s) can be submitted to: datarequests@water.ie

<p>What are the design requirements for the connection(s)?</p>	<ul style="list-style-type: none"> The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with <i>the Uisce Éireann Connections and Developer Services Standard Details and Codes of Practice</i>, available at www.water.ie/connections
<p>Trade Effluent Licensing</p>	<ul style="list-style-type: none"> 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/ <p>**trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)</p>

Section B – Details of Uisce Éireann’s Network(s)

The map included below outlines the current Uisce Éireann infrastructure adjacent the Development: To access Uisce Éireann Maps email

datarequests@water.ie



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

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

onus is on the parties carrying out excavations or any other works to ensure the exact location of Uisce Éireann's underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

Appendix C – Foul Sewer Calculations

TITLE
Proposed Development at Ross Road, Killarney

Job Reference
24041



SUBJECT
Wastewater Discharge Calculations - Post Development

Calc. Sheet No.
1

DRAWING NUMBER
24041-OSL-XX-11-XX-DR-C-1130

Calculations by
BJM

Checked by
DB

Date
21.03.25

Foul Drainage

Housing Units	134	no.
Dry Weather Flow (DWF) ¹	150	litres/person/day
Average Occupancy Ratio ²	2.7	person/unit
Total Site Occupancy (i.e. population)	362	person
Total Daily Wastewater Discharge + 10% Unit Consumption Allowance ³	59,697	l/day
Peak Flow Factor ⁴	6.0	

Post Development Average Discharge **0.69** l/s

Post Development Peak Discharge⁵ **4.15** l/s

Foul Sewer Organic Loading

	Average Concentration ⁶	Maximum Concentration ⁷
BOD (mg/l)	168	422
SS (mg/l)	163	435
N (mg/l)	40.6	78.6
P (mg/l)	7.1	15.5
COD (mg/l)	389	1000

Notes:

1. Dry Weather Flow (DWF) is 150 litres/person/day from the Irish Water Code of Practice for Wastewater Infrastructure.
2. Occupancy ratio of 2.7 persons per dwelling from Irish Water Code of Practice for Wastewater Infrastructure.
3. The unit consumption allowance is 10% in accordance with the Irish Water Code of Practice for Wastewater Infrastructure.
4. The Peak Flow factor is taken as 6 times Dry Weather Flow (0 to 750 population), 4.5 DWF for 751 to 1000 and 3.0 DWF for 1001 to 5000
5. The peak discharge is equal to the Total Wastewater Discharge multiplied by the peak flow factor, expressed in litres/second.
6. The average concentrations of wastewater parameters taken from EPA "Wastewater Treatment Manuals, Treatment Systems for Small Communities, Business, Leisure Centres and Hotels".
7. Assumed Maximum concentration is equal to the average concentration plus 2 times the standard deviation (for the 95%ile) taken from EPA "Wastewater Treatment Manuals, Treatment Systems for Small Communities, Business, Leisure Centres and Hotels".

TITLE

Proposed Development at Ross Road, Killarney

Job Reference

24041

**SUBJECT**

Wastewater Discharge Calculations - Post Development

Calc. Sheet No.

2

DRAWING NUMBER

24041-OSL-XX-11-XX-DR-C-1130

Calculations by

BJM

Checked by

DB

Date

21.03.25

Foul Drainage

Day Staff ⁷	<input type="text" value="20"/>	no.
Dry Weather Flow (DWF) ¹	<input type="text" value="50"/>	litres/person/day
Children	<input type="text" value="102"/>	no.
Dry Weather Flow (DWF) ¹	<input type="text" value="50"/>	litres/person/day
Total Daily Wastewater Discharge + 10% Unit Consumption Allowance ²	<input type="text" value="6,732"/>	l/day
Peak Flow Factor ³	<input type="text" value="6.0"/>	

Post Development Average Discharge l/s

Post Development Peak Discharge⁴ l/s

Foul Sewer Organic Loading

	Average Concentration ⁵	Maximum Concentration ⁶
BOD (mg/l)	168	422
SS (mg/l)	163	435
N (mg/l)	40.6	78.6
P (mg/l)	7.1	15.5
COD (mg/l)	389	1000

Notes:

1. Dry Weather Flow (DWF) is 50 litres/person/day for Staff and Patrons taken from Irish Water "Code of Practice for Wastewater Infrastructure".
2. The unit consumption allowance is 10% in accordance with the Irish Water "Code of Practice for Wastewater Infrastructure".
3. The Peak Flow factor is taken from Irish Water "Code of Practice for Wastewater Infrastructure" Appendix C Section 1.2.7
4. The peak discharge is equal to the Total Wastewater Discharge multiplied by the peak flow factor, expressed in litres/second.
5. The average concentrations of wastewater parameters taken from EPA "Wastewater Treatment Manuals, Treatment Systems for Small Communities, Business, Leisure Centres and Hotels".
6. Assumed Maximum concentration is equal to the average concentration plus 2 times the standard deviation (for the 95%ile) taken from EPA "Wastewater Treatment Manuals, Treatment Systems for Small Communities, Business, Leisure Centres and Hotels".
7. Ratio of Adults to Children 1:5, Schedule 6 of the Child Care Act 1991 (Early Years Service) Regulations 2016.

Appendix D – SuDS Calculations and Summary

TITLE
Proposed Development at Ross Road, Killarney

Job Reference
24041



SUBJECT
Interception/Treatment Volume Summary

Calc. Sheet No.
1

DRAWING NUMBER
24041-OSL-11-DR-G-1120 to 1123

Calculations by
DV

Checked by
DB

Date
04/04/2025

INPUT DATA

Interception Volume Required 85.48 m³

Treatment Volume Required 256.45 m³

Catchment

Interception Volumes

Treatment Volumes

Swales	76.1	m ³	62.2	m ³
Bio-Retention / Tree Pits	1.5	m ³	8.1	m ³
Permeable Paving	21.9	m ³	228.3	m ³
Detention Ponds	3.7	m ³	80.3	m ³
Green Roofs Extensive	0.0	m ³	0.0	m ³
Green Roofs Intensive (Podium)	0.0	m ³	0.0	m ³
Stormtech Isolator Row	6.3	m ³	6.3	m ³

Total Volumes Provided 109.5 m³ 385.2 m³

Check Provided Volumes are greater than Required Volumes PASS PASS

TITLE
Proposed Development at Ross Road, Killarney

Job Reference
24041



SUBJECT
Detention Ponds - Bioretention Design

Detention Pond No.
1

Calc. Sheet No.
1

DRAWING NUMBER
24041-OSL-11-DR-C-1120 to 1123

Calculations by
BJM

Checked by
DB

Date
03/04/2025

BIORETENTION AREA

Surface Area of Bioretention Area (A_T) 150.1 m²

TREATMENT VOLUME

¹Treatment Volume (V_T) 57.1 m³

CATCHMENT AREA

Effective Impermeable Area Covered for Treatment (A) 4755.5 m²

INPUT DATA

²Filter Bed Depth (L) 0.500 m
 Coefficient of Permeability of Filter Medium (k) 0.000002 m/s
³Average Height of Water above Filter Bed (h) 0.050 m
⁴Time Required for Percolation (t) 48.0 hr

INFILTRATION VOLUME

Subgrade Infiltration Rate per hour 1.00 mm/hr
 Subgrade Infiltration Rate (f) 0.000 mm/s
⁵Subgrade Infiltration Volume 2.4 m³

Notes:

- 1 Treatment Volume V_t (m³) = Impermeable Area (ha) x 15mm x 10 x 80% (GDSDS Section 6.3.1.2.1).
- 2 Filter Bed depth typically between 0.9 and 1.5m
- 3 h = Half maximum height, where $h_{max} \leq 2m$
- 4 Typically between 24 and 48 hours
- 5 Volume calculated using 6 hour storm event.

Area of Bioretention Filter Bed =	$V_T \cdot L$
	$k(h+L)t$

Table: 1 Coefficient of Permeability of Filter Medium

Soil Type/Texture	Infiltration Rate (m/s)
Source: SUDS Manual Table 25-1	
Gravel	0.0003 - 0.03
Sand	0.00001 - 0.00005
Loamy Sand	0.0001 - 0.00003
Sandy Loam	0.0000001 - 0.00001
Loam	0.0000001 - 0.00005
Silt Loam	0.0000001 - 0.00001
Chalk	0.00000003 - 0.000003
Sandy Clay Loam	0.000000003 - 0.0000003
Silty Clay Loam	0.0000001 - 0.000001
Clay	< 0.00000003
Till	0.00000003 - 0.000003

TITLE
Proposed Development at Ross Road, Killarney

Job Reference
24041



SUBJECT
Detention Ponds - Bioretention Design

Detention Pond No.
2

Calc. Sheet No.
2

DRAWING NUMBER
24041-OSL-11-DR-C-1120 to 1123

Calculations by
BJM

Checked by
DB

Date
03/04/2025

BIORETENTION AREA

Surface Area of Bioretention Area (A_T) 61.1 m²

TREATMENT VOLUME

¹Treatment Volume (V_T) 23.2 m³

CATCHMENT AREA

Effective Impermeable Area Covered for Treatment (A) 1936.3 m²

INPUT DATA

²Filter Bed Depth (L) 0.500 m
 Coefficient of Permeability of Filter Medium (k) 0.000002 m/s
³Average Height of Water above Filter Bed (h) 0.050 m
⁴Time Required for Percolation (t) 48.0 hr

INFILTRATION VOLUME

Subgrade Infiltration Rate per hour 1.00 mm/hr
 Subgrade Infiltration Rate (f) 0.000 mm/s
⁵Subgrade Infiltration Volume 1.3 m³

Notes:

- 1 Treatment Volume V_t (m³) = Impermeable Area (ha) x 15mm x 10 x 80% (GDSDS Section 6.3.1.2.1).
- 2 Filter Bed depth typically between 0.9 and 1.5m
- 3 h = Half maximum height, where $h_{max} \leq 2m$
- 4 Typically between 24 and 48 hours
- 5 Volume calculated using 6 hour storm event.

Area of Bioretention Filter Bed =	$V_T \cdot L$
	$k(h+L)t$

Table: 1 Coefficient of Permeability of Filter Medium

Soil Type/Texture	Infiltration Rate (m/s)
Source: SUDS Manual Table 25-1	
Gravel	0.0003 - 0.03
Sand	0.00001 - 0.00005
Loamy Sand	0.0001 - 0.00003
Sandy Loam	0.0000001 - 0.00001
Loam	0.0000001 - 0.00005
Silt Loam	0.0000001 - 0.00001
Chalk	0.00000003 - 0.000003
Sandy Clay Loam	0.000000003 - 0.0000003
Silty Clay Loam	0.0000001 - 0.000001
Clay	< 0.00000003
Till	0.00000003 - 0.000003

TITLE Proposed Development at Killarney	Job Reference 24041		
SUBJECT Permeable Paving Design	Calc. Sheet No. 1		
DRAWING NUMBER 24041-OSL-11-DR-C-1120 to 1123	Calculations by DV	Checked by DB	Date 20/03/2025
<u>FLAT SITES</u>			
<u>INPUT DATA</u>			
Pavement Area (A)	3,044.57	m ²	
Pavement Perimeter (P)	2,449.10	m	
Sub-base Depth (d)	0.250	m	
¹ Sub-base Voids Ratio (η)	0.30		
Sub-base Infiltration Rate per hour	3600	mm/hr	
Sub-base Infiltration Rate (k)	1.000	mm/s	
Subgrade Infiltration Rate per hour	1.00	mm/hr	
Subgrade Infiltration Rate (f)	0.000	mm/s	
<u>VOLUME (STORAGE AND TREATMENT)</u>			
Permeable Paving Storage Volume per m ²	0.075	m ³ /m ²	
Total Permeable Paving Storage Volume	228.3	m³	
<u>INFILTRATION</u>			
Approx. Permeable Paving Infiltration per m ²	0.000	l/s/m ²	
² Total Permeable Paving Infiltration Rate	1.016	l/s	
³ Total Permeable Paving Infiltration Volume	21.9	m³	
<u>FLOW</u>			
Average Distance between Outlet Drains	6.0	m	
Flow Velocity through Permeable Paving	0.000086	m/s	
Trench Retention Time	19.4	hr	

TITLE
Proposed Development at Killarney

Job Reference
24041

SUBJECT
Permeable Paving Design

Calc. Sheet No.
1

DRAWING NUMBER
24041-OSL-11-DR-C-1120 to 1123

Calculations by
DV

Checked by
DB

Date
20/03/2025

Notes:

- 1 Sub-base material has a void ratio of approximately 30%, source 'BRE Digest 365'.
- 2 Wetted perimeter assuming 50% of trench depth, source 'BRE Digest 365'.
- 3 Volume calculated using 6 hour storm event.
- 4 For Paving on slopes includes infiltration, provide 500mmx500mm trenches at 10m centres along slope with 1000mmx500mm at base of slope. source 'Formpave - AquafLOW Permeable Paving System'.

Table: 1

Material	void Ratio, η
Clean stone	0.40 - 0.50
Uniform gravel	0.30 - 0.40
Graded sand or gravel	0.20 - 0.30

Source: The SUDS manual, Published by CIRIA.

Table: 2

Pavement Type	Effective Depth (m)
Car-Parking	0.40
Footpath	0.20

Effective Depths are provided from source 'Formpave - AquafLOW Permeable Paving System' and may subject to change as per site requirement.

Total Permeable Paving Outflow:

$$= A \cdot k \cdot i$$

where:

- A = Cross Sectional Area of Subbase
- k = Subbase Infiltration Rate
- i = Hydraulic Gradient

Hydraulic gradient has been assumed as the pavement gradient with an additional 250mm fall per 100m length.

Table: 3

Material	Infiltration Rate (mm/hr)
Gravel	10 - 1000
Sand	0.1 - 100
Loamy sand	0.01 - 1
Sandy loam	0.05 - 0.5
Loam	0.001 - 0.1
Silt loam	0.0005 - 0.005
Chalk	0.001 - 100
Sandy clay loam	0.001 - 0.01
Silty clay loam	0.00005 - 0.005
Clay	< 0.0001
Till	0.00001 - 0.01
Rock	0.00001 - 1

Cutoff point for most infiltration drainage systems = 0.001 mm/hr
Source: Microdrainage

Total Trench Infiltration:

$$= \frac{1}{2} \cdot D \cdot L \cdot f$$

where:

- L = Length
- D = Depth to Invert
- f = Subgrade infiltration rate

TITLE
Proposed Development at Killarney

Job Reference
24041



SUBJECT
Surface Water Calculations - Swale 1 Channel Design

Calc. Sheet No.
1

DRAWING NUMBER
24041-OSL-11-DR-C-1120 to 1123

Calculations by
DV

Checked by
DB

Date
20/03/2025

INPUT DATA

Side Slopes	3.0	1 in ...
Bottom width (W)	1.00	m
Depth to Invert (D)	0.50	m
Length (L)	18.7	m
Slope (S)	177.0	1 in ...
Manning's Coefficient (n)	0.030	
Subgrade Infiltration Rate per hour	0.0	mm/hr
Subgrade Infiltration Rate (f)	0.000	mm/s

TREATMENT VOLUME

Total Plan Area of Swale	77.7	m ²
¹ Depth of Subgrade Treatment	0.20	m
Total Swale Treatment Volume (V_T)	15.54	m³

STORAGE VOLUME

Max. Length of Storage within Swale	18.7	m	Checkdams/Storage Areas	1.00	no
Swale Storage Volume per 19m Length	19.03	m³			
Swale Storage Volume (V)	19.03	m³	Total Storage Volume (Vt)	19.03	m³

INFILTRATION

Total Swale Infiltration Rate	0.00	l/s
³Total Swale Infiltration Volume	0.00	m³

FLOW

Maximum Swale Flow at Outlet	1404.5	l/s
Maximum Swale Velocity at Outlet	1.12	m/s
³Typical Swale Retention Time	0.005	hr

Notes:

- 1 Assume 200mm of topsoil.
- 2 Volume calculated using 6 hour storm event.
- 3 Swale retention time depends on outlet control, refer to WINDES Model.

$$\text{Total Swale Infiltration} = P \cdot L \cdot f$$

where:

P = Wetted Perimeter
L = Length
 f = Subgrade infiltration rate

$$\text{Total Swale Flow} = 1/n \cdot AR^{2/3} S^{1/2}$$

where:

A = Area of flow
P = Wetted perimeter
R = A/P
n = Manning's Coefficient
s = Slope

Table: 1

Material	Infiltration Rate (mm/hr)
Gravel	10 - 1000
Sand	0.1 - 100
Loamy sand	0.01 - 1
Sandy loam	0.05 - 0.5
Loam	0.001 - 0.1
Silt loam	0.0005 - 0.005
Chalk	0.001 - 100
Sandy clay loam	0.001 - 0.01
Silty clay loam	0.00005 - 0.005
Clay	< 0.0001
Till	0.00001 - 0.01
Rock	0.00001 - 1
Cutoff point for most infiltration drainage systems = 0.001 mm/hr	
Source: Microdrainage	

TITLE
Proposed Development at Killarney

Job Reference
24041



SUBJECT
Surface Water Calculations - Swale 2 Channel Design

Calc. Sheet No.
2

DRAWING NUMBER
24041-OSL-11-DR-C-1120 to 1123

Calculations by
DV

Checked by
DB

Date
20/03/2025

INPUT DATA

Side Slopes	3.0	1 in ...
Bottom width (W)	1.00	m
Depth to Invert (D)	0.50	m
Length (L)	10.0	m
Slope (S)	130.0	1 in ...
Manning's Coefficient (n)	0.030	
Subgrade Infiltration Rate per hour	0.0	mm/hr
Subgrade Infiltration Rate (f)	0.000	mm/s

TREATMENT VOLUME

Total Plan Area of Swale	41.6	m ²
¹ Depth of Subgrade Treatment	0.20	m
Total Swale Treatment Volume (V_T)	8.32	m³

STORAGE VOLUME

Max. Length of Storage within Swale	10.0	m	Checkdams/Storage Areas	1.00	no
Swale Storage Volume per 10m Length	19.03	m³			
Swale Storage Volume (V)	19.03	m³	Total Storage Volume (V_t)	19.03	m³

INFILTRATION

Total Swale Infiltration Rate	0.00	l/s
³Total Swale Infiltration Volume	0.00	m³

FLOW

Maximum Swale Flow at Outlet	1638.8	l/s
Maximum Swale Velocity at Outlet	1.31	m/s
³Typical Swale Retention Time	0.002	hr

Notes:

- 1 Assume 200mm of topsoil.
- 2 Volume calculated using 6 hour storm event.
- 3 Swale retention time depends on outlet control, refer to WINDES Model.

$$\text{Total Swale Infiltration} = P \cdot L \cdot f$$

where:

P = Wetted Perimeter
L = Length
f = Subgrade infiltration rate

$$\text{Total Swale Flow} = 1/n \cdot AR^{2/3} S^{1/2}$$

where:

A = Area of flow
P = Wetted perimeter
R = A/P
n = Manning's Coefficient
s = Slope

Table: 1

Material	Infiltration Rate (mm/hr)
Gravel	10 - 1000
Sand	0.1 - 100
Loamy sand	0.01 - 1
Sandy loam	0.05 - 0.5
Loam	0.001 - 0.1
Silt loam	0.0005 - 0.005
Chalk	0.001 - 100
Sandy clay loam	0.001 - 0.01
Silty clay loam	0.00005 - 0.005
Clay	< 0.0001
Till	0.00001 - 0.01
Rock	0.00001 - 1
Cutoff point for most infiltration drainage systems = 0.001 mm/hr	
Source: Microdrainage	

TITLE
Proposed Development at Killarney

Job Reference
24041



SUBJECT
Surface Water Calculations - Swale 3 Channel Design

Calc. Sheet No.
3

DRAWING NUMBER
='Swale 1'IC9:F9

Calculations by
DV

Checked by
DB

Date
20/03/2025

INPUT DATA

Side Slopes	3.0	1 in ...
Bottom width (W)	1.00	m
Depth to Invert (D)	0.50	m
Length (L)	10.0	m
Slope (S)	40.9	1 in ...
Manning's Coefficient (n)	0.030	
Subgrade Infiltration Rate per hour	0.0	mm/hr
Subgrade Infiltration Rate (<i>f</i>)	0.000	mm/s

TREATMENT VOLUME

Total Plan Area of Swale	41.6	m ²
¹ Depth of Subgrade Treatment	0.20	m
Total Swale Treatment Volume (V_T)	8.32	m³

STORAGE VOLUME

Max. Length of Storage within Swale	10.0	m	Checkdams/Storage Areas	1.00	no
Swale Storage Volume per 10m Length	19.03	m³			
Swale Storage Volume (V)	19.03	m³	Total Storage Volume (V_t)	19.03	m³

INFILTRATION

Total Swale Infiltration Rate	0.00	l/s
³Total Swale Infiltration Volume	0.00	m³

FLOW

Maximum Swale Flow at Outlet	2921.8	l/s
Maximum Swale Velocity at Outlet	2.34	m/s
³Typical Swale Retention Time	0.001	hr

Notes:

- 1 Assume 200mm of topsoil.
- 2 Volume calculated using 6 hour storm event.
- 3 Swale retention time depends on outlet control, refer to WINDES Model.

$$\text{Total Swale Infiltration} = P \cdot L \cdot f$$

where:

- P = Wetted Perimeter
- L = Length
- f* = Subgrade infiltration rate

$$\text{Total Swale Flow} = 1/n \cdot AR^{2/3} S^{1/2}$$

where:

- A = Area of flow
- P = Wetted perimeter
- R = A/P
- n = Manning's Coefficient
- s = Slope

Table: 1

Material	Infiltration Rate (mm/hr)
Gravel	10 - 1000
Sand	0.1 - 100
Loamy sand	0.01 - 1
Sandy loam	0.05 - 0.5
Loam	0.001 - 0.1
Silt loam	0.0005 - 0.005
Chalk	0.001 - 100
Sandy clay loam	0.001 - 0.01
Silty clay loam	0.00005 - 0.005
Clay	< 0.0001
Till	0.00001 - 0.01
Rock	0.00001 - 1
Cutoff point for most infiltration drainage systems = 0.001 mm/hr	
Source: Microdrainage	

TITLE
Proposed Development at Killarney

Job Reference
24041



SUBJECT
Surface Water Calculations - Swale 3 Channel Design

Calc. Sheet No.
3

DRAWING NUMBER
='Swale 1'IC9:F9

Calculations by
DV

Checked by
DB

Date
20/03/2025

INPUT DATA

Side Slopes	3.0	1 in ...
Bottom width (W)	1.00	m
Depth to Invert (D)	0.50	m
Length (L)	34.1	m
Slope (S)	179.0	1 in ...
Manning's Coefficient (n)	0.030	
Subgrade Infiltration Rate per hour	0.0	mm/hr
Subgrade Infiltration Rate (<i>f</i>)	0.000	mm/s

TREATMENT VOLUME

Total Plan Area of Swale	141.9	m ²
¹ Depth of Subgrade Treatment	0.20	m
Total Swale Treatment Volume (V_T)	28.39	m³

STORAGE VOLUME

Max. Length of Storage within Swale	34.1	m	Checkdams/Storage Areas	1.00	no
Swale Storage Volume per 34m Length	19.03	m³			
Swale Storage Volume (V)	19.03	m³	Total Storage Volume (V_T)	19.03	m³

INFILTRATION

Total Swale Infiltration Rate	0.00	l/s
³Total Swale Infiltration Volume	0.00	m³

FLOW

Maximum Swale Flow at Outlet	1396.6	l/s
Maximum Swale Velocity at Outlet	1.12	m/s
³Typical Swale Retention Time	0.008	hr

Notes:

- 1 Assume 200mm of topsoil.
- 2 Volume calculated using 6 hour storm event.
- 3 Swale retention time depends on outlet control, refer to WINDES Model.

$$\text{Total Swale Infiltration} = P \cdot L \cdot f$$

where:

- P = Wetted Perimeter
- L = Length
- f* = Subgrade infiltration rate

$$\text{Total Swale Flow} = 1/n \cdot AR^{2/3} S^{1/2}$$

where:

- A = Area of flow
- P = Wetted perimeter
- R = A/P
- n = Manning's Coefficient
- s = Slope

Table: 1

Material	Infiltration Rate (mm/hr)
Gravel	10 - 1000
Sand	0.1 - 100
Loamy sand	0.01 - 1
Sandy loam	0.05 - 0.5
Loam	0.001 - 0.1
Silt loam	0.0005 - 0.005
Chalk	0.001 - 100
Sandy clay loam	0.001 - 0.01
Silty clay loam	0.00005 - 0.005
Clay	< 0.0001
Till	0.00001 - 0.01
Rock	0.00001 - 1
Cutoff point for most infiltration drainage systems = 0.001 mm/hr	
Source: Microdrainage	

TITLE
Proposed Development at Ross Road, Killarney

Job Reference
24041



SUBJECT
Bioretention / Tree Pit Design

Calc. Sheet No.
1

DRAWING NUMBER
24041-OSL-11-DR-C-1120 to 1123

Calculations by
DV

Checked by
BJM

Date
03/04/2025

BIORETENTION / TREE PIT AREA

Number of Tree Pits 10.0 No.
 Area of Tree Pit 2.3 m²
Total Surface Area of Bioretention / Tree Pit Area (A_T) **22.5 m²**

TREATMENT VOLUME

¹Treatment Volume (V_T) 8.1 m³

CATCHMENT AREA

Effective Impermeable Area Covered for Treatment (A) 675.0 m²

INPUT DATA

²Filter Bed Depth (L) 1.200 m
 Coefficient of Permeability of Filter Medium (k) 0.000002 m/s
³Average Height of Water above Filter Bed (h) 0.050 m
⁴Time Required for Percolation (t) 48.0 hr

INFILTRATION VOLUME

Subgrade Infiltration Rate per hour 1.0 mm/hr
 Subgrade Infiltration Rate (f) 0.000 mm/s
⁵Subgrade Infiltration Volume 1.5 m³

Notes:

- 1 Treatment Volume V_T (m³) = Impermeable Area (ha) x 15mm x 10 x 80% (GSDSDS Section 6.3.1.2.1).
- 2 Filter Bed depth typically between 0.9 and 1.5m
- 3 h = Half maximum height, where h_{max} <=2m
- 4 Typically between 24 and 48 hours
- 5 Volume calculated using 6 hour storm event.

Area of Bioretention Filter Bed = $\frac{V_T \cdot L}{k(h+L)t}$

Table: 1 Coefficient of Permeability of Filter Medium

Soil Type/Texture	Infiltration Rate (m/s)
Source: SUDS Manual Table 25-1	
Gravel	0.0003 - 0.03
Sand	0.00001 - 0.00005
Loamy Sand	0.0001 - 0.00003
Sandy Loam	0.0000001 - 0.00001
Loam	0.0000001 - 0.00005
Silt Loam	0.0000001 - 0.00001
Chalk	0.00000003 - 0.000003
Sandy Clay Loam	0.0000000003 - 0.0000003
Silty Clay Loam	0.0000001 - 0.000001
Clay	< 0.00000003
Till	0.000000003 - 0.000003

Appendix E – Permissible Site Discharge Calculations

PROJECT
Proposed Development at Ross Road, Killarney

SUBJECT
Surface Water Calculations - Permissible Site Discharge

JOB REF.
24041

Calc. Sheet No.
1



Drawing ref.

Calculations by

Checked by

Date

24041-OSL-11-DR-C-1120

DV

DB

20/03/2025

PERMISSIBLE SURFACE WATER DISCHARGE CALCULATIONS

Site Area

What is the overall catchment area?

3.861

Hectares (ha)

Site is Less than 50 Hectares

Pre-Development Catchment Soil Characteristics

Are there different soil types present on the pre-developed site?

No

Catchment	This refers to the entire site area	
Area	3.86	Hectares (ha)
Drainage Group	1	Class
Depth to Impermeable Layers	2	Class
Permeability Group above Impermeable Layers	3	Class
Slope ⁽⁶⁾	1	Class
SOIL Type	2	From FSR Table
SOIL Index	0.30	

SOIL	SOIL Value	SPR
1	0.15	0.10
2	0.30	0.30
3	0.40	0.37
4	0.45	0.47
5	0.50	0.53

Site SOIL Index Value

0.30

Site SPR Value

0.30

Post-Development Catchment Characteristics

Is the development divided into sub-catchments?

No

What is the actual drainage area for catchment?

3.861

Hectares (ha)

Overall Catchment	Area (m ²)	Runoff Coeff.	Effective Area (m ²)
Roofs - Type 1 (Traditional)	8952.145	1.00	8952.1
Roofs - Type 2 (Extensive Green Roofs, 2-4cm depth)	0.000	0.70	0.0
Podium (Intensive Green Roofs, 6-10cm depth)	0.000	0.50	0.0
Roads and Footpaths - Type 1 (Traditional)	12419.071	0.80	9935.3
Roads and Footpaths - Type 2 (Draining to Suds features)	391.217	0.70	273.9
Landscaped Areas	10859.269	0.10	1085.9
*** Confines of building footprint used, non contributory areas such as the open space surrounding the building footprint not considered			
Grassed Areas - Open Space, not contributory	5986.395	0.00	0.0

Include Public Open Space in Effective Catchment Area?

No

Assumed open space area does not drain to surface water network

Effective Catchment Area

20247.2

m²

Effective Catchment Runoff Coefficient

0.52

Long-Term Storage

Is long-term Storage provided?

No

Permissible Site Discharge

Refer to UkSuds Calc

What is the Standard Average Annual Rainfall (SAAR)?

1537.1

mm

Met Éireann Extreme Rainfall SAAR 1991 – 2020

Co-ordinates (Irish Grid) Easting: 96284, Northing: 89903

Is the overall site area less than 50 hectares?

Yes

⁵QBAR_{Rural} calculated for 50 ha and linearly interpolated for area of site

17.7

Litres/sec

⁷Site Discharge =

17.7

Litres/sec

Notes and Formulae

1. SOIL index value calculated from Flood Studies Report - The Classification of Soils from Winter Rainfall Acceptance Rate (Table 4.5).

2. SPR value calculated from GSDSDS - Table 6.7.

3. Rainfall depth for 100 year return period, 6 hour duration with additional 10% for climate change.

4. Long-term storage Vol_{so} (m³) = Rainfall.Area.10.[(PIMP/100)(0.8.α)+(1-PIMP/100)(β.SPR)-SPR]. (GSDSDS Section 6.7.3).

Where long-term storage cannot be provided on-site due to ground conditions, Total Permissible Outflow is to be kept to QBAR_(Rural).

5. Total Permissible Outflow - QBAR_(Rural) calculated in accordance with GSDSDS - Regional Drainage Policies

(Volume 2 - Chapter 6), i.e. QBAR(m³/s)=0.00108x(Area)^{0.89}(SAAR)^{1.17}(SOIL)^{2.17} - For catchments greater than 50 hectares in area. Flow rates are linearly interpolated for areas smaller than 50hectares.

6. Where Total Permissible Outflow is less than 2.0l/s and not achievable, use 2.0 l/s or closest value possible.

7. QBAR multiplied by growth factors of 0.85 for 1 year, 2.1 for 30 year and 2.6 for 100 year return period events, from GSDSDS Figure C2.

PROJECT
Proposed Development at Ross Road, Killarney

JOB REF.
24041

SUBJECT
Surface Water Calculations - Soil Characteristics from FSR

Calc. Sheet No.
2

Drawing ref. Calculations by
24041-OSL-11-DR-C-
1120 to 1123 DV

Checked by
DB

Date
20/03/2025



Estimation of flood peaks from catchment characteristics

Property	Classes
A Drainage group	1 Rarely waterlogged within 60 cm at any time (well and moderately well drained) 2 Commonly waterlogged within 60 cm during winter (imperfect and poor) 3 Commonly waterlogged within 60 cm during winter and summer (very poorly drained)
B Depth to 'impermeable' layers	1 >80 cm 2 80-40 cm 3 <40 cm
C Permeability group (above 'impermeable' layers or to 80 cm)	1 Rapid 2 Medium 3 Slow
D Slope	1 0-2° 2 2-8° 3 >8°

Table 4.4 Classification of soil factors.

Having decided all four parameters, Table 4.5 was used to reach the index of 'winter rain acceptance'.

Table 4.5 The classification of soils by winter rain acceptance rate from soil survey data.

Drainage class Group	Depth to impermeable layer (cm)	Slope classes											
		0 - 2°			2 - 8°			>8°					
		Permeability rates above impermeable layers											
		Rapid (1)	Medium (2)	Slow (3)	Rapid (1)	Medium (2)	Slow (3)	Rapid (1)	Medium (2)	Slow (3)			
1	>80	1			1			1			3		
	40 - 80	1			2			3			4		
	<40	—			—			—			—		
2	>80	2			3			4			—		
	40 - 80	2			4			—			—		
	<40	3			—			—			—		
3	>80	—			5			—			—		
	40 - 80	—			5			—			—		
	<40	—			—			—			—		

Winter rain acceptance indices: 1, very high; 2, high; 3, moderate; 4, low; 5, very low. Upland peat and peaty soils are in Class 5. Urban areas are unclassified.

1. Soil index (SPR) value calculated from Flood Studies Report - The Classification of Soils from Winter Rainfall Acceptance Rate (Table 4.5).

Appendix F – Interception and Treatment Volumes Calculations

PROJECT
Proposed Development at Ross Road, Killarney

SUBJECT
Surface Water Calculations - Treatment Volume

Drawing ref.
24041-OSL-11-DR-C-1120 to 1123

Calculations by **Checked by**
DV DB

JOB REF.
24041

Calc. Sheet No.
1

Date
20/03/2025



SURFACE WATER CALCULATIONS

Site Area

Total Site Area =	3.86	Hectares (ha)
--------------------------	------	---------------

Treatment Volume (Post-Development)

Impermeable Area =	2.137	Hectares (ha)
Rainfall Depth =	15	mm
Treatment Volume (Vt) =	256.4546	m ³

Notes

1. Treatment Volume Vt (m³) = Impermeable Area (ha) x 15mm x 10 (GSDS Section 6.3.1.2.1). For sites where a pond is applicable.

80% runoff from impermeable areas assumed.

PROJECT
Proposed Development at Ross Road, Killarney

SUBJECT
Surface Water Calculations - Interception Volume

JOB REF.
24041

Calc. Sheet No.
2



Drawing ref.
24041-OSL-11-DR-C-1120 to 1123

Calculations by DV
Checked by DB

Date
20/03/2025

SURFACE WATER CALCULATIONS

Site Area

Total Site Area =	3.86	Hectares (ha)
--------------------------	------	---------------

Interception Volume (Post-Development)

Impermeable Area =	2.137	Hectares (ha)
Rainfall Depth =	5	mm
¹Interception Volume =	85.48486	m ³

Notes

1. Interception Volume (m³) = Impermeable Area (ha) x 5mm x 10 (GSDS Section 6.3.1.2.1). For sites where a pond is applicable.

80% runoff from impermeable areas assumed.

Appendix G – Water Demand Calculations

TITLE
Proposed Development at Ross Road, Killarney

Job Reference
24041



SUBJECT
Water Demand Calculations - Post Development

Calc. Sheet No.
1

DRAWING NUMBER
24041-OSL-XX-11-XX-DR-C-1140

Calculations by
BJM

Checked by **Date**
DB 21.03.25

DEMAND

Housing Units	134	no.
Daily Demand per person	150	litres/person/day
Average Occupancy Ratio ¹	2.7	person/unit
Total Site Occupancy	362	people
Average Daily Demand	54,270	l/day
Average Day in Peak Week ²	67,838	l/day
Normal Length of Day ³	12	hours
Peak Factor ⁴	5.0	

Post Development Peak Water Demand⁵	3.93	l/s
Post Development Average Water Demand	0.63	l/s
Normal Demand⁶	1.26	l/s

Notes:

1. Occupancy ratio of 2.7 persons per dwelling from Irish Water Code of Practice for Water Infrastructure.
2. Average Day in Peak Week is 1.25 times the average daily demand.
3. Assumed normal demand is the total daily demand during the normal length of day.
4. Peak Factor for pipe sizing from Irish Water Code of Practice for Water Infrastructure
5. Peak Factor multiplied by Average Day in Peak Week flow
6. Normal demand is the total daily demand during the normal length of day.
7. Fire flow is required at 25l/s as per B.S. 5306-1:1976.

TITLE

Proposed Development at Ross Road, Killarney

Job Reference

24041

**SUBJECT**

Water Demand Calculations - Post Development

Calc. Sheet No.

2

DRAWING NUMBER

24041-OSL-XX-11-XX-DR-C-1140

Calculations by

BJM

Checked by

DB

Date

21.03.25

DEMANDDaily Demand per person¹Day Staff⁷ people litres/person/dayChildren people litres/person/dayAverage Daily Demand l/dayAverage Day in Peak Week² l/dayNormal Length of Day³ hoursPeak Factor⁴ **Post Development Peak Water Demand⁵** l/s**Post Development Average Water Demand** l/s**Normal Demand⁶** l/s**Notes:**

1. Daily Demand per person is 50 litres/person/day for Staff taken from Irish Water "Code of Practice for Wastewater Infrastructure".
2. Average Day in Peak Week is 1.25 times the average daily demand.
3. Assumed normal demand is the total daily demand during the normal length of day.
4. Peak Factor of 2.1 assumed due to size of development.
5. Peak Factor multiplied by Average Day in Peak Week flow
6. Normal demand is the total daily demand during the normal length of day.
7. Ratio of Adults to Children 1:5, Schedule 6 of the Child Care Act 1991 (Early Years Service) Regulations 2016.

Appendix H – Surface Water Network Calculations

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type	
SW2.1	Outlet	2.000	Free Discharge	
SW2	Outlet	1.001	Free Discharge	
SW3	Outlet	1.002	Free Discharge	
SW4	Outlet	1.003	Free Discharge	
SW5	Outlet	1.004	Free Discharge	
SW6	Outlet	1.005	Free Discharge	
SW7	Outlet	1.006	Free Discharge	
SW8	Outlet	1.007	Free Discharge	
SW9	Outlet	1.009	Hydro-Brake®	
	Invert Elevation (m)	22.429		
	Design Depth (m)	0.800		
	Design Flow (L/s)	7.5		
	Objective	Minimize Upstream Storage Requirements		
	Application	Surface Water Only		
	Sump Available	<input type="checkbox"/>		
	Unit Reference	CHE-0125-7500-0800-7500		
	SW10	Outlet	1.010	Free Discharge
SW11	Outlet	1.011	Free Discharge	
SW12	Outlet	1.012	Free Discharge	
SW13	Outlet	1.013	Free Discharge	
SW14	Outlet	1.014	Free Discharge	
SW15	Outlet	1.015	Free Discharge	
SW16	Outlet	1.016	Free Discharge	
	Outlet	1.018	Hydro-Brake®	

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Junction	Outlet Name	Outgoing Connection	Outlet Type		
SW17	Invert Elevation (m)	21.810			
	Design Depth (m)	0.750			
	Design Flow (L/s)	17.7			
	Objective	Minimize Upstream Storage Requirements			
	Application	Surface Water Only			
	Sump Available	<input type="checkbox"/>			
	Unit Reference	CHE-0184-1770-0750-1770			
	SW10.3.1	Outlet		6.000	Free Discharge
	SW10.3	Outlet		5.003	Free Discharge
SW10.1	Outlet	5.000	Free Discharge		
SW10.2	Outlet	5.001	Free Discharge		
SW1	Outlet	1.000	Free Discharge		
SW18	Outlet	3.000	Free Discharge		
SW19	Outlet	3.001	Free Discharge		
SW20	Outlet	3.002	Free Discharge		
SW20.1	Outlet	4.000	Free Discharge		
SW14.1	Outlet	7.000	Free Discharge		
SW14.2	Outlet	7.001	Free Discharge		
SW14.3	Outlet	7.002	Free Discharge		
SW14.4	Outlet	7.003	Free Discharge		
SW14.5	Outlet	7.005	Hydro-Brake®		
	Invert Elevation (m)	22.200			
	Design Depth (m)	0.750			
	Design Flow (L/s)	7.5			
	Objective	Minimize Upstream Storage Requirements			
	Application	Surface Water Only			
	Sump Available	<input type="checkbox"/>			
	Unit Reference	CHE-0126-7500-0750-7500			

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Detention Pond 1

Type : Pond

Dimensions

Exceedance Elevation (m)	26.500
Depth (m)	0.500
Base Elevation (m)	26.000
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	3.00
Total Volume (m³)	92.519

Depth (m)	Area (m²)	Volume (m³)
0.000	150.11	0.000
0.500	222.32	92.519

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C2.2
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (3)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	21.951
Friction Scheme	Manning's n
n	0.35

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Detention Pond 2

Type : Pond

Dimensions

Exceedance Elevation (m)	24.350
Depth (m)	0.500
Base Elevation (m)	23.850
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	3.00
Total Volume (m³)	42.131

Depth (m)	Area (m²)	Volume (m³)
0.000	61.120	0.000
0.500	109.759	42.131

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C3.5
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	18.496
Friction Scheme	Manning's n
n	0.35

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Swale 1

Type : Swale

Swale

Exceedance Elevation (m)	26.600
Depth (m)	0.300
Base Elevation (m)	26.300
Top Width (m)	2.991
Side Slope (1:x)	3.00
Base Width (m)	1.191
Freeboard (mm)	0
Length (m)	18.671
Long. Slope (1:x)	177.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.35
Total Volume (m³)	11.715

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C2.1
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe
Outlet Type	Free Discharge

Advanced

Swale

Porosity (%)	100
--------------	-----

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Swale 2

Type : Swale

Swale

Exceedance Elevation (m)	24.300
Depth (m)	0.300
Base Elevation (m)	24.000
Top Width (m)	3.001
Side Slope (1:x)	3.00
Base Width (m)	1.201
Freeboard (mm)	0
Length (m)	18.100
Long. Slope (1:x)	40.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.35
Total Volume (m³)	11.407

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C3.4
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (1)
Outlet Type	Free Discharge

Advanced

Swale

Porosity (%)	100
--------------	-----

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Swale 3

Type : Swale

Swale

Exceedance Elevation (m)	24.350
Depth (m)	0.300
Base Elevation (m)	24.050
Top Width (m)	3.000
Side Slope (1:x)	3.00
Base Width (m)	1.200
Freeboard (mm)	0
Length (m)	36.624
Long. Slope (1:x)	170.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.35
Total Volume (m³)	23.073

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C5.1
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (2)
Outlet Type	Free Discharge

Advanced

Swale

Porosity (%)	100
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Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Attenuation Tank 1 - MC3500

Type : Chamber

Dimensions

Exceedance Elevation (m)	24.250
Depth (m)	1.641
Base Elevation (m)	22.450
Number of Chambers	120
Number of Rows	10
Distance Between Rows (mm)	150
Total Volume (m³)	634.708

Chamber Shape

Type	Parabolic Arch Chamber
Chamber Length (m)	2.286
Wall Thickness (mm)	45
Diameter / Base Width (mm)	1956
Height (mm)	1146

Embedded Parameters

Porosity (%)	30
Height Above (m)	0.300
Height Below (m)	0.150
Sides (m)	0.300
Ends (m)	0.300

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.007
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	3.002
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.008
Outlet Type	Free Discharge

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Attenuation Tank 2 - SC800

Type : Chamber

Dimensions

Exceedance Elevation (m)	24.100
Depth (m)	1.183
Base Elevation (m)	22.250
Number of Chambers	115
Number of Rows	5
Distance Between Rows (mm)	150
Total Volume (m³)	286.306

Chamber Shape

Type	Parabolic Arch Chamber
Chamber Length (m)	2.169
Wall Thickness (mm)	45
Diameter / Base Width (mm)	1295
Height (mm)	838

Embedded Parameters

Porosity (%)	30
Height Above (m)	0.150
Height Below (m)	0.150
Sides (m)	0.300
Ends (m)	0.300

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	7.003
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	7.004
Outlet Type	Free Discharge

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Attenuation Tank 3 - SC800

Type : Chamber

Dimensions

Exceedance Elevation (m)	24.000
Depth (m)	1.183
Base Elevation (m)	21.825
Number of Chambers	105
Number of Rows	15
Distance Between Rows (mm)	0
Total Volume (m³)	248.217

Chamber Shape

Type	Parabolic Arch Chamber
Chamber Length (m)	2.169
Wall Thickness (mm)	45
Diameter / Base Width (mm)	1295
Height (mm)	838

Embedded Parameters

Porosity (%)	30
Height Above (m)	0.150
Height Below (m)	0.150
Sides (m)	0.300
Ends (m)	0.300

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.016
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.017
Outlet Type	Free Discharge

Project: Large-scale Residential Development at Ross Killarney County Kerry		Date: 17/03/2025		
Report Details: Type: Connections Storm Phase: Masterplan		Designed by: BJM	Checked by:	Approved By:
		Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Name	Length (m)	Connection Type	Slope (1:x)	Manning's n	Diameter / Base Width (mm)	Upstream Cover Elevation (m)	Upstream Invert Elevation (m)	Downstream Cover Elevation (m)
1.000	18.633	Pipe	200.352	0.013	225	26.667	25.267	26.600
2.000	18.382	Pipe	197.651	0.013	225	26.660	25.267	26.600
1.001	29.483	Pipe	200.000	0.013	225	26.600	25.174	26.348
1.002	41.598	Pipe	200.000	0.013	300	26.348	25.027	26.186
1.003	11.281	Pipe	200.000	0.013	300	26.186	24.819	26.170
1.004	60.592	Pipe	60.000	0.013	375	26.170	24.762	25.421
1.005	11.096	Pipe	60.000	0.013	375	25.421	23.752	24.904
1.006	19.256	Pipe	30.000	0.013	375	24.904	23.567	24.408
3.000	22.160	Pipe	199.636	0.013	225	24.150	22.950	24.282
3.001	64.820	Pipe	200.000	0.013	300	24.282	22.839	24.450
4.000	23.577	Pipe	95.028	0.013	225	24.163	22.763	24.450
1.018	11.955	Pipe	298.878	0.013	300	24.002	21.810	24.318
1.009	30.164	Pipe	298.651	0.013	225	24.394	22.429	24.216
1.010	17.084	Pipe	305.066	0.013	375	24.216	22.328	24.401
1.011	11.859	Pipe	296.485	0.013	375	24.401	22.272	24.576
1.012	44.158	Pipe	300.397	0.013	375	24.576	22.232	24.080
1.013	16.101	Pipe	298.171	0.013	375	24.080	22.085	23.900
1.014	14.813	Pipe	302.301	0.013	375	23.900	22.031	23.681
1.015	29.256	Pipe	298.526	0.013	375	23.681	21.982	23.661
1.007	23.562	Pipe	49.550	0.013	375	24.408	22.926	24.250
1.008	9.772	Pipe	465.347	0.013	375	24.250	22.450	24.394
3.002	8.028	Pipe	123.707	0.013	375	24.450	22.515	24.250
5.000	30.225	Pipe	100.084	0.013	225	24.463	23.063	24.154
5.001	9.036	Pipe	150.607	0.013	225	24.154	22.761	24.097
5.003	49.194	Pipe	131.888	0.013	300	24.097	22.701	24.216
6.000	27.412	Pipe	190.360	0.013	225	24.245	22.845	24.097
7.000	75.521	Pipe	300.000	0.013	375	24.328	22.828	24.668
7.001	24.568	Pipe	300.000	0.013	375	24.668	22.576	24.570
7.002	37.624	Pipe	300.000	0.013	375	24.570	22.494	24.200
7.003	5.922	Pipe	49.785	0.013	375	24.200	22.369	24.100
7.004	4.344	Pipe	86.888	0.013	375	24.100	22.250	24.100
7.005	8.077	Pipe	47.791	0.013	225	24.100	22.200	23.900
1.016	6.787	Pipe	115.040	0.013	450	23.661	21.884	24.002
1.017	5.787	Pipe	385.792	0.013	450	24.000	21.825	24.002
Pipe	6.406	Pipe	5.030	0.013	225	26.705	26.300	26.348
Pipe (1)	3.069	Pipe	2.477	0.013	225	24.752	24.000	24.154
Pipe (2)	6.843	Pipe	3.974	0.013	225	24.565	24.050	24.216
Pipe (3)	11.493	Pipe	11.806	0.013	225	26.500	26.000	26.348
Pipe (4)	11.968	Pipe	7.864	0.013	225	24.350	23.850	24.216

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Name	Downstream Invert Elevation (m)	Part Family	Lock	Flow Restriction (L/s)	Culvert Type	Culvert Entrance
1.000	25.174		None		(None)	(None)
2.000	25.174		None		(None)	(None)
1.001	25.027		None		(None)	(None)
1.002	24.819		None		(None)	(None)
1.003	24.762		None		(None)	(None)
1.004	23.752		None		(None)	(None)
1.005	23.567		None		(None)	(None)
1.006	22.926		None		(None)	(None)
3.000	22.839		None		(None)	(None)
3.001	22.515		None		(None)	(None)
4.000	22.515		None		(None)	(None)
1.018	21.770		None	19.4	(None)	(None)
1.009	22.328		None	8.2	(None)	(None)
1.010	22.272		None		(None)	(None)
1.011	22.232		None		(None)	(None)
1.012	22.085		None		(None)	(None)
1.013	22.031		None		(None)	(None)
1.014	21.982		None		(None)	(None)
1.015	21.884		None		(None)	(None)
1.007	22.450		None		(None)	(None)
1.008	22.429		None		(None)	(None)
3.002	22.450		None		(None)	(None)
5.000	22.761		None		(None)	(None)
5.001	22.701		None		(None)	(None)
5.003	22.328		None		(None)	(None)
6.000	22.701		None		(None)	(None)
7.000	22.576		None		(None)	(None)
7.001	22.494		None		(None)	(None)
7.002	22.369		None		(None)	(None)
7.003	22.250		None		(None)	(None)
7.004	22.200		None		(None)	(None)
7.005	22.031		None	8.2	(None)	(None)
1.016	21.825		None		(None)	(None)
1.017	21.810		None		(None)	(None)
Pipe	25.027		None		(None)	(None)
Pipe (1)	22.761		None		(None)	(None)
Pipe (2)	22.328		None		(None)	(None)
Pipe (3)	25.027		None		(None)	(None)
Pipe (4)	22.328		None		(None)	(None)

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (km ²)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analyzed (km ²)
C1.1	SW2.1		Time of Concentration	0.00102	59	0	59	0.00060
C1.2	SW1		Time of Concentration	0.00109	59	0	59	0.00064
C2.1	Swale 1		Time of Concentration	0.00060	50	0	50	0.00030
C2.2	Detention Pond 1		Time of Concentration	0.00082	50	0	50	0.00041
C2.3	SW3		Time of Concentration	0.00247	50	0	50	0.00124
C2.4	SW4		Time of Concentration	0.00067	50	0	50	0.00034
C2.5	SW5		Time of Concentration	0.00393	50	0	50	0.00196
C2.6	SW6		Time of Concentration	0.00116	50	0	50	0.00058
C2.7	SW20.1		Time of Concentration	0.00123	50	0	50	0.00061
C3.1	SW10.1		Time of Concentration	0.00145	62	0	62	0.00090
C3.2	SW10.3.1		Time of Concentration	0.00114	62	0	62	0.00071
C3.3	SW10.3		Time of Concentration	0.00126	62	0	62	0.00078
C3.4	Swale 2		Time of Concentration	0.00065	62	0	62	0.00040
C3.5	Detention Pond 2		Time of Concentration	0.00071	62	0	62	0.00044
C4.1	SW18		Time of Concentration	0.00088	60	0	60	0.00053
C4.2	SW19		Time of Concentration	0.00220	60	0	60	0.00132
C4.3	SW14.1		Time of Concentration	0.00484	60	0	60	0.00290
C4.4	SW14.2		Time of Concentration	0.00167	60	0	60	0.00100
C4.5	SW14.3		Time of Concentration	0.00202	60	0	60	0.00121
C5.1	Swale 3		Time of Concentration	0.00081	46	0	46	0.00037
C5.2	SW9		Time of Concentration	0.00119	46	0	46	0.00055
C5.3	SW10		Time of Concentration	0.00121	46	0	46	0.00056
C5.4	SW12		Time of Concentration	0.00195	46	0	46	0.00089
C6.1	SW14		Time of Concentration	0.00168	36	0	36	0.00061
C6.2	SW16		Time of Concentration	0.00171	36	0	36	0.00062
TOTAL		0.0		0.03838				0.02049

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Flow Options

Peak Flow Calculation	Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimize Excavation
Design Level	Level Crowns
Min. Cover Depth (m)	1.200
Min. Slope (1:x)	1000.00
Max. Slope (1:x)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	<input checked="" type="checkbox"/>
Reduce Channel Depths	<input checked="" type="checkbox"/>

Manhole Options

Apply Offset	<input type="checkbox"/>
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Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Reduced
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform First Flush Analysis	<input type="checkbox"/>

Rainfall

FSR 5YR

Type: FSR

Region	Scotland and Ireland
M5-60 (mm)	21.4
Ratio R	0.242
Summer	<input checked="" type="checkbox"/>
Winter	<input checked="" type="checkbox"/>

Return Period

Return Period (years)	Increase Rainfall (%)
5.0	20.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 5YR: 5 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (km ²)	Max. Inflow (L/s)	Total Inflow Volume (m ³)
C1.1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	14.6	6.357
C1.2	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	15.6	6.795
C2.1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	7.3	3.193
C2.2	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	10.0	4.327
C2.3	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	30.1	13.085
C2.4	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	8.2	3.568
C2.5	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	47.8	20.776
C2.6	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	14.2	6.159
C2.7	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	14.9	6.480
C4.1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	12.9	5.604
C4.2	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	32.2	13.973
C3.1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	22.0	9.541
C3.2	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	17.3	7.505
C3.3	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	19.1	8.288

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		




C3.4	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	9.8	4.258
C3.5	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	10.7	4.666
C5.1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	9.1	3.940
C4.3	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	70.7	30.707
C4.4	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	24.4	10.588
C4.5	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	29.5	12.833
C5.2	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	13.4	5.811
C5.3	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	13.6	5.898
C5.4	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	21.8	9.463
C6.1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	14.8	6.417
C6.2	FSR 5YR: 5 years: +20 %: 15 mins: Summer	0.00	15.0	6.513

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 5YR: 5 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Elevation (m)	Invert Elevation (m)	Max. Elevation (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW2.1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	26.660	25.267	25.372	0.105	14.6	0.119	0.000	14.0	6.362	OK
SW2	FSR 5YR: 5 years: +20 %: 15 mins: Summer	26.600	25.174	25.334	0.160	28.9	0.181	0.000	25.6	13.120	OK
SW3	FSR 5YR: 5 years: +20 %: 15 mins: Summer	26.348	25.027	25.231	0.204	56.5	0.231	0.000	51.4	29.317	OK
SW4	FSR 5YR: 5 years: +20 %: 15 mins: Summer	26.186	24.819	25.033	0.215	59.6	0.243	0.000	55.5	32.703	OK
SW5	FSR 5YR: 5 years: +20 %: 15 mins: Summer	26.170	24.762	24.939	0.177	103.3	0.200	0.000	98.7	53.336	OK
SW6	FSR 5YR: 5 years: +20 %: 15 mins: Summer	25.421	23.752	23.956	0.203	112.9	0.230	0.000	106.9	59.338	OK
SW7	FSR 5YR: 5 years: +20 %: 15 mins: Summer	24.904	23.567	23.725	0.158	106.9	0.178	0.000	104.7	59.269	OK
SW8	FSR 5YR: 5 years: +20 %: 15 mins: Summer	24.408	22.926	23.108	0.182	104.7	0.206	0.000	101.7	59.252	OK
SW9	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.394	22.429	23.054	0.625	7.6	0.707	0.000	7.5	512.571	Surcharged
SW10	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.216	22.328	22.582	0.254	21.3	0.288	0.000	21.2	750.068	OK
SW11	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.401	22.272	22.581	0.309	21.2	0.350	0.000	21.1	750.016	OK
SW12	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.576	22.232	22.581	0.349	24.3	0.394	0.000	24.1	801.001	OK
SW13	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.080	22.085	22.579	0.494	24.1	0.558	0.000	23.5	800.899	Surcharged
SW14	FSR 5YR: 5 years: +20 %: 960 mins: Summer	23.900	22.031	22.578	0.547	32.0	0.618	0.000	31.7	1127.109	Surcharged
SW15	FSR 5YR: 5 years: +20 %: 960 mins: Summer	23.681	21.982	22.576	0.594	31.7	0.672	0.000	31.2	1127.026	Surcharged
SW16	FSR 5YR: 5 years: +20 %: 960 mins: Summer	23.661	21.884	22.573	0.689	33.4	0.780	0.000	33.1	1162.106	Surcharged
SW17	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.002	21.810	22.572	0.762	17.8	0.862	0.000	17.7	1157.788	Surcharged
EX SW1	FSR 5YR: 5 years: +20 %: 2160 mins: Summer	24.318	21.770	21.886	0.116	17.7	0.000	0.000	17.7	1577.476	OK
SW10.3.1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	24.245	22.845	22.959	0.114	17.3	0.128	0.000	16.5	7.512	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry		Date: 17/03/2025					
Report Details: Type: Junctions Summary Storm Phase: Masterplan		Designed by: BJM	Checked by:	Approved By:			
		Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49					

SW10.3	FSR 5YR: 5 years: +20 %: 15 mins: Summer	24.09 7	22.70 1	22.878	0.177	59.3	0.200	0.000	54.9	29.330	OK
SW10.1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	24.46 3	23.06 3	23.172	0.109	22.0	0.123	0.000	21.2	9.556	OK
SW10.2	FSR 5YR: 5 years: +20 %: 15 mins: Summer	24.15 4	22.76 1	22.920	0.159	26.4	0.179	0.000	23.7	13.591	OK
SW1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	26.66 7	25.26 7	25.378	0.111	15.6	0.126	0.000	14.9	6.800	OK
SW18	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.15 0	22.95 0	23.054	0.104	2.1	0.118	0.000	2.1	30.250	OK
SW19	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.28 2	22.83 9	23.054	0.215	7.2	0.243	0.000	7.2	105.645	OK
SW20	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.45 0	22.51 5	23.054	0.539	9.4	0.609	0.000	8.9	140.500	Surcharged
SW20.1	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.16 3	22.76 3	23.054	0.291	2.4	0.329	0.000	2.3	34.944	Surcharged
SW14.1	FSR 5YR: 5 years: +20 %: 15 mins: Summer	24.32 8	22.82 8	23.046	0.218	70.7	0.247	0.000	64.8	30.749	OK
SW14.2	FSR 5YR: 5 years: +20 %: 15 mins: Summer	24.66 8	22.57 6	22.850	0.274	89.1	0.310	0.000	76.3	41.163	OK
SW14.3	FSR 5YR: 5 years: +20 %: 15 mins: Summer	24.57 0	22.49 4	22.775	0.281	105.8	0.317	0.000	98.3	53.976	OK
SW14.4	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.20 0	22.36 9	22.686	0.317	19.8	0.359	0.000	19.5	291.832	OK
SW14.5	FSR 5YR: 5 years: +20 %: 960 mins: Summer	24.10 0	22.20 0	22.686	0.486	6.9	0.550	0.000	6.9	291.704	Surcharged

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 5YR: 5 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Avg. Depth


Stormwater Control	Storm Event	Max. US Elevation (m)	Max. DS Elevation (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 1 - MC3500	FSR 5YR: 5 years: +20 %: 960 mins: Summer	23.054	23.054	0.604	0.604	32.2	276.042	0.000	0.000	7.5	481.340	56.509	OK
Attenuation Tank 2 - SC800	FSR 5YR: 5 years: +20 %: 960 mins: Summer	22.686	22.686	0.436	0.436	19.5	115.048	0.000	0.000	6.9	291.706	59.817	OK
Attenuation Tank 3 - SC800	FSR 5YR: 5 years: +20 %: 960 mins: Summer	22.573	22.573	0.748	0.748	33.1	183.617	0.000	0.000	17.8	1157.884	26.025	OK
Swale 1	FSR 5YR: 5 years: +20 %: 30 mins: Summer	26.497	26.323	0.091	0.023	5.1	1.991	0.000	0.000	4.3	4.280	83.002	OK
Swale 2	FSR 5YR: 5 years: +20 %: 30 mins: Summer	24.522	24.023	0.070	0.023	6.8	1.709	0.000	0.000	6.6	5.852	85.019	OK
Swale 3	FSR 5YR: 5 years: +20 %: 60 mins: Summer	24.362	24.072	0.097	0.022	5.9	4.137	0.000	0.000	4.7	7.147	82.070	OK
Detention Pond 1	FSR 5YR: 5 years: +20 %: 120 mins: Summer	26.055	26.025	0.055	0.025	5.0	6.475	0.000	0.000	3.4	9.520	93.001	OK
Detention Pond 2	FSR 5YR: 5 years: +20 %: 60 mins: Summer	23.942	23.878	0.092	0.028	7.0	4.229	0.000	0.000	5.4	8.060	89.963	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 5YR: 5 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Elevation (m)	Max. US Water Elevation (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW1	SW2	26.667	25.378	0.135	6.800	0.6	0.47	14.9	OK
2.000	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW2.1	SW2	26.660	25.372	0.132	6.362	0.6	0.44	14.0	OK
1.001	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW2	SW3	26.600	25.334	0.182	13.120	0.7	0.81	25.6	OK
1.002	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW3	SW4	26.348	25.231	0.209	29.317	1.0	0.75	51.4	OK
1.003	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW4	SW5	26.186	25.033	0.196	32.703	1.1	0.81	55.5	OK
1.004	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW5	SW6	26.170	24.939	0.190	53.336	1.8	0.44	98.7	OK
1.005	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW6	SW7	25.421	23.956	0.181	59.338	2.0	0.47	106.9	OK
1.006	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW7	SW8	24.904	23.725	0.170	59.269	2.2	0.33	104.7	OK
3.000	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW18	SW19	24.150	23.048	0.136	5.604	0.5	0.39	12.4	OK
3.001	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW19	SW20	24.282	23.013	0.166	19.665	1.0	0.59	40.4	OK
4.000	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW20.1	SW20	24.163	22.850	0.122	6.503	0.7	0.31	14.4	OK
1.018	FSR 5YR: 5 years: +20 %: 2160 mins: Summer	Pipe	SW17	EX SW1	24.002	22.528	0.120	1577.476	0.7	0.32	17.7	Surcharged
1.009	FSR 5YR: 5 years: +20 %: 120 mins: Summer	Pipe	SW9	SW10	24.394	22.902	0.175	65.317	0.5	0.3	7.7	Surcharged
1.010	FSR 5YR: 5 years: +20 %: 60 mins: Summer	Pipe	SW10	SW11	24.216	22.578	0.253	110.670	0.8	0.63	63.2	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry				Date: 17/03/2025													
Report Details: Type: Connections Summary Storm Phase: Masterplan				Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49									Designed by: BJM		Checked by:		Approved By:

1.011	FSR 5YR: 5 years: +20 %: 60 mins: Summer	Pipe	SW11	SW12	24.401	22.529	0.258	110.429	0.8	0.61	62.5	OK
1.012	FSR 5YR: 5 years: +20 %: 60 mins: Summer	Pipe	SW12	SW13	24.576	22.492	0.276	127.736	0.9	0.75	75.5	OK
1.013	FSR 5YR: 5 years: +20 %: 60 mins: Summer	Pipe	SW13	SW14	24.080	22.378	0.297	126.565	0.8	0.73	74.0	OK
1.014	FSR 5YR: 5 years: +20 %: 60 mins: Summer	Pipe	SW14	SW15	23.900	22.333	0.292	169.222	1.0	0.87	88.2	OK
1.015	FSR 5YR: 5 years: +20 %: 60 mins: Summer	Pipe	SW15	SW16	23.681	22.269	0.335	167.410	1.0	0.86	87.1	OK
1.007	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW8	Attenuation Tank 1 - MC3500	24.408	23.108	0.178	59.252	2.2	0.41	101.7	OK
1.008	FSR 5YR: 5 years: +20 %: 30 mins: Winter	Pipe	Attenuation Tank 1 - MC3500	SW9	24.250	22.754	0.314	11.648	0.1	0.09	7.5	OK
3.002	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW20	Attenuation Tank 1 - MC3500	24.450	22.698	0.215	23.891	1.5	0.31	48.4	OK
5.000	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW10.1	SW10.2	24.463	23.172	0.134	9.556	0.9	0.47	21.2	OK
5.001	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW10.2	SW10.3	24.154	22.920	0.168	13.591	0.7	0.65	23.7	OK
5.003	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW10.3	SW10	24.097	22.878	0.203	29.330	1.1	0.65	54.9	OK
6.000	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW10.3.1	SW10.3	24.245	22.959	0.145	7.512	0.6	0.51	16.5	OK
7.000	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW14.1	SW14.2	24.328	23.046	0.246	30.749	0.8	0.64	64.8	OK
7.001	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW14.2	SW14.3	24.668	22.850	0.277	41.163	0.9	0.75	76.3	OK
7.002	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW14.3	SW14.4	24.570	22.775	0.231	53.976	1.4	0.97	98.3	OK
7.003	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	SW14.4	Attenuation Tank 2 - SC800	24.200	22.550	0.188	53.262	2.3	0.38	94.5	OK
7.004	FSR 5YR: 5 years: +20 %: 120 mins: Summer	Pipe	Attenuation Tank 2 - SC800	SW14.5	24.100	22.613	0.375	80.212	0.3	0.04	7.6	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry		Date: 17/03/2025		
Report Details: Type: Connections Summary Storm Phase: Masterplan		Designed by: BJM	Checked by:	Approved By:
		Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



7.005	FSR 5YR: 5 years: +20 %: 60 mins: Summer	Pipe	SW14.5	SW14	24.100	22.586	0.219	31.851	0.3	0.12	7.6	Surcharged
1.016	FSR 5YR: 5 years: +20 %: 60 mins: Summer	Pipe	SW16	Attenuation Tank 3 - SC800	23.661	22.266	0.412	177.296	1.3	0.36	95.5	OK
1.017	FSR 5YR: 5 years: +20 %: 240 mins: Summer	Pipe	Attenuation Tank 3 - SC800	SW17	24.000	22.505	0.450	358.961	0.1	0.12	18.0	Surcharged
Pipe	FSR 5YR: 5 years: +20 %: 15 mins: Summer	Pipe	Swale 1	SW3	26.705	26.368	0.107	2.812	0.5	0.02	4.5	OK
Pipe (1)	FSR 5YR: 5 years: +20 %: 30 mins: Summer	Pipe	Swale 2	SW10.2	24.752	24.065	0.084	5.852	0.6	0.02	6.6	OK
Pipe (2)	FSR 5YR: 5 years: +20 %: 60 mins: Summer	Pipe	Swale 3	SW10	24.565	24.127	0.134	7.147	0.3	0.02	4.7	OK
Pipe (3)	FSR 5YR: 5 years: +20 %: 120 mins: Summer	Pipe	Detention Pond 1	SW3	26.500	26.042	0.086	9.520	0.4	0.03	3.4	OK
Pipe (4)	FSR 5YR: 5 years: +20 %: 60 mins: Summer	Pipe	Detention Pond 2	SW10	24.350	23.916	0.138	8.060	0.3	0.03	5.4	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Phase Management Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



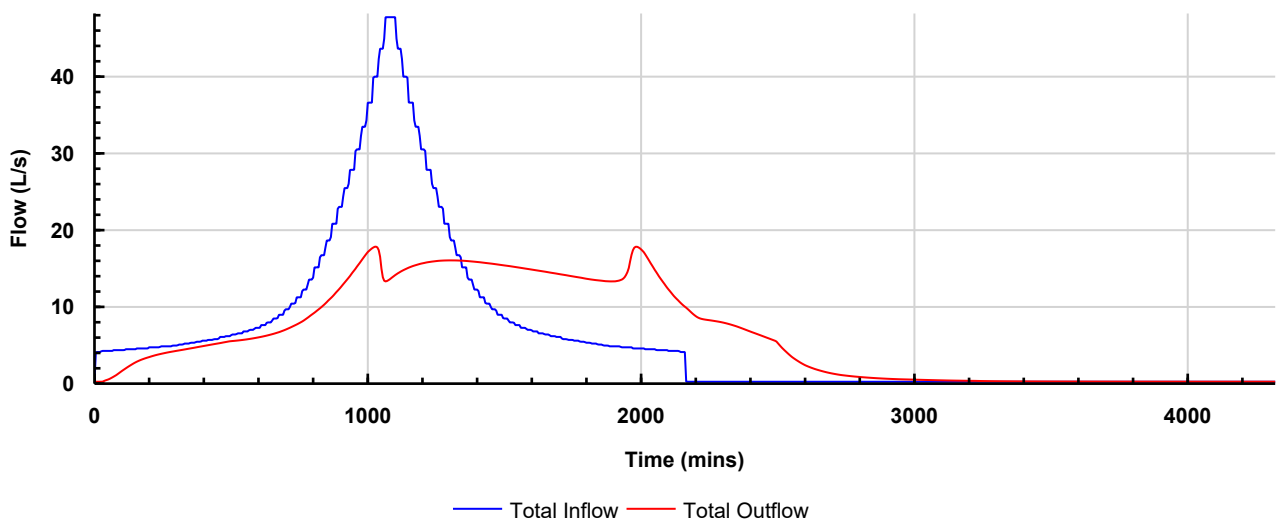
Masterplan
FSR 5YR: 5 years: Increase Rainfall (%): +20: 2160 mins: Summer

Tables

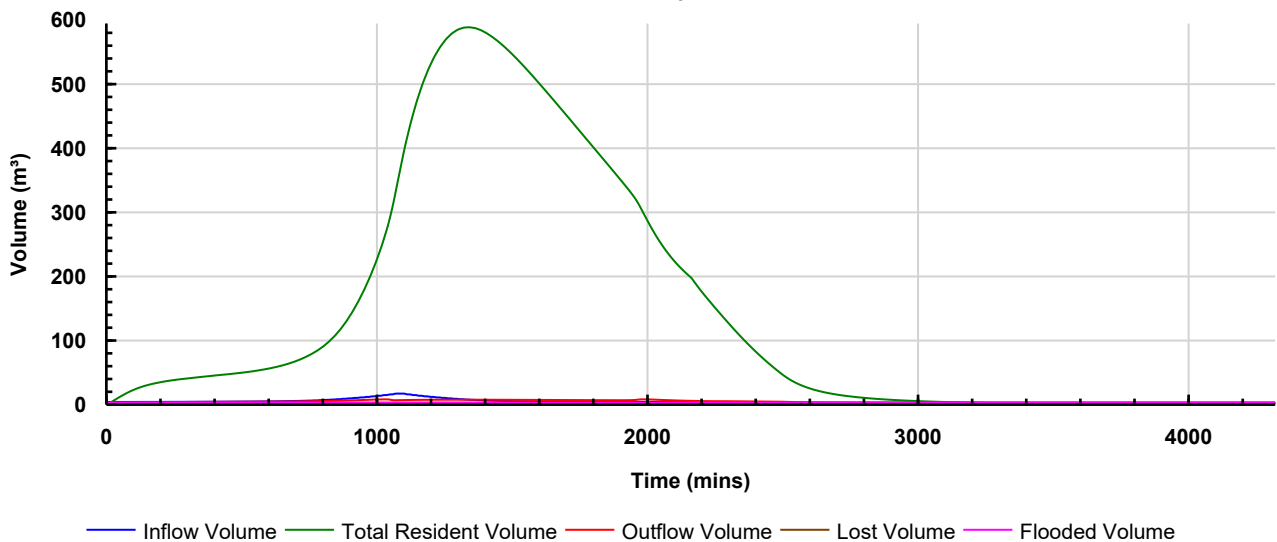
Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
EX SW1			17.7	1577.476
TOTAL	47.7	1578.235	17.7	1577.476

Graphs

Flow Graph



Volume Graph



Appendix I – Surface Water Critical Storm Calculations

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type	
SW2.1	Outlet	2.000	Free Discharge	
SW2	Outlet	1.001	Free Discharge	
SW3	Outlet	1.002	Free Discharge	
SW4	Outlet	1.003	Free Discharge	
SW5	Outlet	1.004	Free Discharge	
SW6	Outlet	1.005	Free Discharge	
SW7	Outlet	1.006	Free Discharge	
SW8	Outlet	1.007	Free Discharge	
SW9	Outlet	1.009	Hydro-Brake®	
	Invert Elevation (m)	22.429		
	Design Depth (m)	0.800		
	Design Flow (L/s)	7.5		
	Objective	Minimize Upstream Storage Requirements		
	Application	Surface Water Only		
	Sump Available	<input type="checkbox"/>		
	Unit Reference	CHE-0125-7500-0800-7500		
	SW10	Outlet	1.010	Free Discharge
SW11	Outlet	1.011	Free Discharge	
SW12	Outlet	1.012	Free Discharge	
SW13	Outlet	1.013	Free Discharge	
SW14	Outlet	1.014	Free Discharge	
SW15	Outlet	1.015	Free Discharge	
SW16	Outlet	1.016	Free Discharge	
	Outlet	1.018	Hydro-Brake®	

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
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Report Details: Type: Junctions Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Junction	Outlet Name	Outgoing Connection	Outlet Type		
SW17	Invert Elevation (m)	21.810			
	Design Depth (m)	0.750			
	Design Flow (L/s)	17.7			
	Objective	Minimize Upstream Storage Requirements			
	Application	Surface Water Only			
	Sump Available	<input type="checkbox"/>			
	Unit Reference	CHE-0184-1770-0750-1770			
	SW10.3.1	Outlet		6.000	Free Discharge
	SW10.3	Outlet		5.003	Free Discharge
SW10.1	Outlet	5.000	Free Discharge		
SW10.2	Outlet	5.001	Free Discharge		
SW1	Outlet	1.000	Free Discharge		
SW18	Outlet	3.000	Free Discharge		
SW19	Outlet	3.001	Free Discharge		
SW20	Outlet	3.002	Free Discharge		
SW20.1	Outlet	4.000	Free Discharge		
SW14.1	Outlet	7.000	Free Discharge		
SW14.2	Outlet	7.001	Free Discharge		
SW14.3	Outlet	7.002	Free Discharge		
SW14.4	Outlet	7.003	Free Discharge		
SW14.5	Outlet	7.005	Hydro-Brake®		
	Invert Elevation (m)	22.200			
	Design Depth (m)	0.750			
	Design Flow (L/s)	7.5			
	Objective	Minimize Upstream Storage Requirements			
	Application	Surface Water Only			
	Sump Available	<input type="checkbox"/>			
	Unit Reference	CHE-0126-7500-0750-7500			

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Detention Pond 1

Type : Pond

Dimensions

Exceedance Elevation (m)	26.500
Depth (m)	0.500
Base Elevation (m)	26.000
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	3.00
Total Volume (m³)	92.519

Depth (m)	Area (m²)	Volume (m³)
0.000	150.11	0.000
0.500	222.32	92.519

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C2.2
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (3)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	21.951
Friction Scheme	Manning's n
n	0.35

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Detention Pond 2

Type : Pond

Dimensions

Exceedance Elevation (m)	24.350
Depth (m)	0.500
Base Elevation (m)	23.850
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	3.00
Total Volume (m³)	42.131

Depth (m)	Area (m²)	Volume (m³)
0.000	61.120	0.000
0.500	109.759	42.131

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C3.5
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	18.496
Friction Scheme	Manning's n
n	0.35

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Swale 1

Type : Swale

Swale

Exceedance Elevation (m)	26.600
Depth (m)	0.300
Base Elevation (m)	26.300
Top Width (m)	2.991
Side Slope (1:x)	3.00
Base Width (m)	1.191
Freeboard (mm)	0
Length (m)	18.671
Long. Slope (1:x)	177.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.35
Total Volume (m³)	11.715

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C2.1
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe
Outlet Type	Free Discharge

Advanced

Swale

Porosity (%)	100
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Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Swale 2

Type : Swale

Swale

Exceedance Elevation (m)	24.300
Depth (m)	0.300
Base Elevation (m)	24.000
Top Width (m)	3.001
Side Slope (1:x)	3.00
Base Width (m)	1.201
Freeboard (mm)	0
Length (m)	18.100
Long. Slope (1:x)	40.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.35
Total Volume (m³)	11.407

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C3.4
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (1)
Outlet Type	Free Discharge

Advanced

Swale

Porosity (%)	100
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Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Swale 3

Type : Swale

Swale

Exceedance Elevation (m)	24.350
Depth (m)	0.300
Base Elevation (m)	24.050
Top Width (m)	3.000
Side Slope (1:x)	3.00
Base Width (m)	1.200
Freeboard (mm)	0
Length (m)	36.624
Long. Slope (1:x)	170.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.35
Total Volume (m³)	23.073

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	C5.1
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (2)
Outlet Type	Free Discharge

Advanced

Swale

Porosity (%)	100
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Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Attenuation Tank 1 - MC3500

Type : Chamber

Dimensions

Exceedance Elevation (m)	24.250
Depth (m)	1.641
Base Elevation (m)	22.450
Number of Chambers	120
Number of Rows	10
Distance Between Rows (mm)	150
Total Volume (m³)	634.708

Chamber Shape

Type	Parabolic Arch Chamber
Chamber Length (m)	2.286
Wall Thickness (mm)	45
Diameter / Base Width (mm)	1956
Height (mm)	1146

Embedded Parameters

Porosity (%)	30
Height Above (m)	0.300
Height Below (m)	0.150
Sides (m)	0.300
Ends (m)	0.300

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.007
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	3.002
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.008
Outlet Type	Free Discharge

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Attenuation Tank 2 - SC800

Type : Chamber

Dimensions

Exceedance Elevation (m)	24.100
Depth (m)	1.183
Base Elevation (m)	22.250
Number of Chambers	115
Number of Rows	5
Distance Between Rows (mm)	150
Total Volume (m³)	286.306

Chamber Shape

Type	Parabolic Arch Chamber
Chamber Length (m)	2.169
Wall Thickness (mm)	45
Diameter / Base Width (mm)	1295
Height (mm)	838

Embedded Parameters

Porosity (%)	30
Height Above (m)	0.150
Height Below (m)	0.150
Sides (m)	0.300
Ends (m)	0.300

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	7.003
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	7.004
Outlet Type	Free Discharge

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Attenuation Tank 3 - SC800

Type : Chamber

Dimensions

Exceedance Elevation (m)	24.000
Depth (m)	1.183
Base Elevation (m)	21.825
Number of Chambers	105
Number of Rows	15
Distance Between Rows (mm)	0
Total Volume (m³)	248.217

Chamber Shape

Type	Parabolic Arch Chamber
Chamber Length (m)	2.169
Wall Thickness (mm)	45
Diameter / Base Width (mm)	1295
Height (mm)	838

Embedded Parameters

Porosity (%)	30
Height Above (m)	0.150
Height Below (m)	0.150
Sides (m)	0.300
Ends (m)	0.300

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.016
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.017
Outlet Type	Free Discharge

Project: Large-scale Residential Development at Ross Killarney County Kerry		Date: 17/03/2025		
Report Details: Type: Connections Storm Phase: Masterplan		Designed by: BJM	Checked by:	Approved By:
		Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Name	Length (m)	Connection Type	Slope (1:x)	Manning's n	Diameter / Base Width (mm)	Upstream Cover Elevation (m)	Upstream Invert Elevation (m)	Downstream Cover Elevation (m)
1.000	18.633	Pipe	200.352	0.013	225	26.667	25.267	26.600
2.000	18.382	Pipe	197.651	0.013	225	26.660	25.267	26.600
1.001	29.483	Pipe	200.000	0.013	225	26.600	25.174	26.348
1.002	41.598	Pipe	200.000	0.013	300	26.348	25.027	26.186
1.003	11.281	Pipe	200.000	0.013	300	26.186	24.819	26.170
1.004	60.592	Pipe	60.000	0.013	375	26.170	24.762	25.421
1.005	11.096	Pipe	60.000	0.013	375	25.421	23.752	24.904
1.006	19.256	Pipe	30.000	0.013	375	24.904	23.567	24.408
3.000	22.160	Pipe	199.636	0.013	225	24.150	22.950	24.282
3.001	64.820	Pipe	200.000	0.013	300	24.282	22.839	24.450
4.000	23.577	Pipe	95.028	0.013	225	24.163	22.763	24.450
1.018	11.955	Pipe	298.878	0.013	300	24.002	21.810	24.318
1.009	30.164	Pipe	298.651	0.013	225	24.394	22.429	24.216
1.010	17.084	Pipe	305.066	0.013	375	24.216	22.328	24.401
1.011	11.859	Pipe	296.485	0.013	375	24.401	22.272	24.576
1.012	44.158	Pipe	300.397	0.013	375	24.576	22.232	24.080
1.013	16.101	Pipe	298.171	0.013	375	24.080	22.085	23.900
1.014	14.813	Pipe	302.301	0.013	375	23.900	22.031	23.681
1.015	29.256	Pipe	298.526	0.013	375	23.681	21.982	23.661
1.007	23.562	Pipe	49.550	0.013	375	24.408	22.926	24.250
1.008	9.772	Pipe	465.347	0.013	375	24.250	22.450	24.394
3.002	8.028	Pipe	123.707	0.013	375	24.450	22.515	24.250
5.000	30.225	Pipe	100.084	0.013	225	24.463	23.063	24.154
5.001	9.036	Pipe	150.607	0.013	225	24.154	22.761	24.097
5.003	49.194	Pipe	131.888	0.013	300	24.097	22.701	24.216
6.000	27.412	Pipe	190.360	0.013	225	24.245	22.845	24.097
7.000	75.521	Pipe	300.000	0.013	375	24.328	22.828	24.668
7.001	24.568	Pipe	300.000	0.013	375	24.668	22.576	24.570
7.002	37.624	Pipe	300.000	0.013	375	24.570	22.494	24.200
7.003	5.922	Pipe	49.785	0.013	375	24.200	22.369	24.100
7.004	4.344	Pipe	86.888	0.013	375	24.100	22.250	24.100
7.005	8.077	Pipe	47.791	0.013	225	24.100	22.200	23.900
1.016	6.787	Pipe	115.040	0.013	450	23.661	21.884	24.002
1.017	5.787	Pipe	385.792	0.013	450	24.000	21.825	24.002
Pipe	6.406	Pipe	5.030	0.013	225	26.705	26.300	26.348
Pipe (1)	3.069	Pipe	2.477	0.013	225	24.752	24.000	24.154
Pipe (2)	6.843	Pipe	3.974	0.013	225	24.565	24.050	24.216
Pipe (3)	11.493	Pipe	11.806	0.013	225	26.500	26.000	26.348
Pipe (4)	11.968	Pipe	7.864	0.013	225	24.350	23.850	24.216

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Name	Downstream Invert Elevation (m)	Part Family	Lock	Flow Restriction (L/s)	Culvert Type	Culvert Entrance
1.000	25.174		None		(None)	(None)
2.000	25.174		None		(None)	(None)
1.001	25.027		None		(None)	(None)
1.002	24.819		None		(None)	(None)
1.003	24.762		None		(None)	(None)
1.004	23.752		None		(None)	(None)
1.005	23.567		None		(None)	(None)
1.006	22.926		None		(None)	(None)
3.000	22.839		None		(None)	(None)
3.001	22.515		None		(None)	(None)
4.000	22.515		None		(None)	(None)
1.018	21.770		None	19.4	(None)	(None)
1.009	22.328		None	8.2	(None)	(None)
1.010	22.272		None		(None)	(None)
1.011	22.232		None		(None)	(None)
1.012	22.085		None		(None)	(None)
1.013	22.031		None		(None)	(None)
1.014	21.982		None		(None)	(None)
1.015	21.884		None		(None)	(None)
1.007	22.450		None		(None)	(None)
1.008	22.429		None		(None)	(None)
3.002	22.450		None		(None)	(None)
5.000	22.761		None		(None)	(None)
5.001	22.701		None		(None)	(None)
5.003	22.328		None		(None)	(None)
6.000	22.701		None		(None)	(None)
7.000	22.576		None		(None)	(None)
7.001	22.494		None		(None)	(None)
7.002	22.369		None		(None)	(None)
7.003	22.250		None		(None)	(None)
7.004	22.200		None		(None)	(None)
7.005	22.031		None	8.2	(None)	(None)
1.016	21.825		None		(None)	(None)
1.017	21.810		None		(None)	(None)
Pipe	25.027		None		(None)	(None)
Pipe (1)	22.761		None		(None)	(None)
Pipe (2)	22.328		None		(None)	(None)
Pipe (3)	25.027		None		(None)	(None)
Pipe (4)	22.328		None		(None)	(None)

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (km ²)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analyzed (km ²)
C1.1	SW2.1		Time of Concentration	0.00102	59	0	59	0.00060
C1.2	SW1		Time of Concentration	0.00109	59	0	59	0.00064
C2.1	Swale 1		Time of Concentration	0.00060	50	0	50	0.00030
C2.2	Detention Pond 1		Time of Concentration	0.00082	50	0	50	0.00041
C2.3	SW3		Time of Concentration	0.00247	50	0	50	0.00124
C2.4	SW4		Time of Concentration	0.00067	50	0	50	0.00034
C2.5	SW5		Time of Concentration	0.00393	50	0	50	0.00196
C2.6	SW6		Time of Concentration	0.00116	50	0	50	0.00058
C2.7	SW20.1		Time of Concentration	0.00123	50	0	50	0.00061
C3.1	SW10.1		Time of Concentration	0.00145	62	0	62	0.00090
C3.2	SW10.3.1		Time of Concentration	0.00114	62	0	62	0.00071
C3.3	SW10.3		Time of Concentration	0.00126	62	0	62	0.00078
C3.4	Swale 2		Time of Concentration	0.00065	62	0	62	0.00040
C3.5	Detention Pond 2		Time of Concentration	0.00071	62	0	62	0.00044
C4.1	SW18		Time of Concentration	0.00088	60	0	60	0.00053
C4.2	SW19		Time of Concentration	0.00220	60	0	60	0.00132
C4.3	SW14.1		Time of Concentration	0.00484	60	0	60	0.00290
C4.4	SW14.2		Time of Concentration	0.00167	60	0	60	0.00100
C4.5	SW14.3		Time of Concentration	0.00202	60	0	60	0.00121
C5.1	Swale 3		Time of Concentration	0.00081	46	0	46	0.00037
C5.2	SW9		Time of Concentration	0.00119	46	0	46	0.00055
C5.3	SW10		Time of Concentration	0.00121	46	0	46	0.00056
C5.4	SW12		Time of Concentration	0.00195	46	0	46	0.00089
C6.1	SW14		Time of Concentration	0.00168	36	0	36	0.00061
C6.2	SW16		Time of Concentration	0.00171	36	0	36	0.00062
TOTAL		0.0		0.03838				0.02049

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Flow Options

Peak Flow Calculation	Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimize Excavation
Design Level	Level Crowns
Min. Cover Depth (m)	1.200
Min. Slope (1:x)	1000.00
Max. Slope (1:x)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	<input checked="" type="checkbox"/>
Reduce Channel Depths	<input checked="" type="checkbox"/>

Manhole Options

Apply Offset	<input type="checkbox"/>
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Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Reduced
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform First Flush Analysis	<input type="checkbox"/>

Rainfall

FSR 30YR

Type: FSR

Region	Scotland and Ireland
M5-60 (mm)	21.4
Ratio R	0.242
Summer	<input checked="" type="checkbox"/>
Winter	<input checked="" type="checkbox"/>

Return Period

Return Period (years)	Increase Rainfall (%)
30.0	20.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 100YR

Type: FSR

Region	Scotland and Ireland	
M5-60 (mm)		21.4
Ratio R		0.242
Summer	<input checked="" type="checkbox"/>	
Winter	<input checked="" type="checkbox"/>	

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	20.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 30YR: 30 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (km ²)	Max. Inflow (L/s)	Total Inflow Volume (m ³)
C1.1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	21.7	9.423
C1.2	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	23.2	10.082
C2.1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	10.9	4.732
C2.2	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	14.8	6.414
C2.3	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	44.7	19.403
C2.4	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	12.2	5.290
C2.5	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	71.0	30.814
C2.6	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	21.0	9.129
C2.7	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	22.1	9.615
C4.1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	19.2	8.314
C4.2	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	47.7	20.728
C3.1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	32.6	14.155
C3.2	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	25.6	11.128
C3.3	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	28.3	12.288

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



C3.4	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	14.6	6.318
C3.5	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	15.9	6.920
C5.1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	13.5	5.844
C4.3	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	104.9	45.547
C4.4	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	36.2	15.699
C4.5	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	43.8	19.035
C5.2	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	19.8	8.617
C5.3	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	20.2	8.752
C5.4	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	32.3	14.039
C6.1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	21.9	9.516
C6.2	FSR 30YR: 30 years: +20 %: 15 mins: Summer	0.00	22.2	9.657

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 100YR: 100 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (km ²)	Max. Inflow (L/s)	Total Inflow Volume (m ³)
C1.1	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	28.3	12.291
C1.2	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	30.3	13.152
C2.1	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	14.2	6.168
C2.2	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	19.3	8.366
C2.3	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	58.3	25.308
C2.4	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	15.9	6.906
C2.5	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	92.6	40.192
C2.6	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	27.4	11.907
C2.7	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	28.9	12.540
C4.1	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	25.0	10.846
C4.2	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	62.3	27.038
C3.1	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	42.5	18.459
C3.2	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	33.4	14.513
C3.3	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	36.9	16.033

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		




C3.4	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	19.0	8.240
C3.5	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	20.8	9.029
C5.1	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	17.6	7.622
C4.3	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	136.8	59.404
C4.4	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	47.2	20.477
C4.5	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	57.2	24.828
C5.2	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	25.9	11.239
C5.3	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	26.3	11.412
C5.4	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	42.2	18.315
C6.1	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	28.6	12.411
C6.2	FSR 100YR: 100 years: +20 %: 15 mins: Summer	0.00	29.0	12.597

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 30YR: 30 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Elevation (m)	Invert Elevation (m)	Max. Elevation (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW2.1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	26.660	25.267	25.494	0.227	21.7	0.256	0.000	16.6	9.429	Surcharged
SW2	FSR 30YR: 30 years: +20 %: 15 mins: Summer	26.600	25.174	25.460	0.286	35.0	0.324	0.000	30.4	19.489	Surcharged
SW3	FSR 30YR: 30 years: +20 %: 15 mins: Summer	26.348	25.027	25.314	0.287	77.8	0.325	0.000	69.7	44.680	OK
SW4	FSR 30YR: 30 years: +20 %: 15 mins: Summer	26.186	24.819	25.108	0.290	81.9	0.327	0.000	78.4	49.691	OK
SW5	FSR 30YR: 30 years: +20 %: 15 mins: Summer	26.170	24.762	24.987	0.225	149.4	0.254	0.000	144.3	80.296	OK
SW6	FSR 30YR: 30 years: +20 %: 15 mins: Summer	25.421	23.752	24.016	0.263	165.3	0.298	0.000	158.2	89.198	OK
SW7	FSR 30YR: 30 years: +20 %: 15 mins: Summer	24.904	23.567	23.770	0.203	158.2	0.229	0.000	155.7	89.102	OK
SW8	FSR 30YR: 30 years: +20 %: 960 mins: Summer	24.408	22.926	23.330	0.405	31.3	0.458	0.000	31.3	465.014	Surcharged
SW9	FSR 30YR: 30 years: +20 %: 960 mins: Summer	24.394	22.429	23.330	0.901	7.6	1.019	0.000	7.5	638.270	Surcharged
SW10	FSR 30YR: 30 years: +20 %: 720 mins: Summer	24.216	22.328	22.842	0.514	30.8	0.582	0.000	29.3	761.128	Surcharged
SW11	FSR 30YR: 30 years: +20 %: 720 mins: Summer	24.401	22.272	22.841	0.569	29.3	0.644	0.000	28.8	760.899	Surcharged
SW12	FSR 30YR: 30 years: +20 %: 720 mins: Summer	24.576	22.232	22.840	0.608	34.3	0.688	0.000	33.6	822.702	Surcharged
SW13	FSR 30YR: 30 years: +20 %: 720 mins: Summer	24.080	22.085	22.837	0.752	33.6	0.850	0.000	33.4	822.344	Surcharged
SW14	FSR 30YR: 30 years: +20 %: 720 mins: Summer	23.900	22.031	22.835	0.804	40.5	0.909	0.000	40.3	1218.524	Surcharged
SW15	FSR 30YR: 30 years: +20 %: 720 mins: Summer	23.681	21.982	22.833	0.851	40.3	0.962	0.000	40.2	1218.242	Surcharged
SW16	FSR 30YR: 30 years: +20 %: 720 mins: Summer	23.661	21.884	22.829	0.945	44.0	1.069	0.000	43.9	1259.907	Surcharged
SW17	FSR 30YR: 30 years: +20 %: 720 mins: Summer	24.002	21.810	22.828	1.018	19.6	1.151	0.000	19.2	1226.093	Surcharged
EX SW1	FSR 30YR: 30 years: +20 %: 720 mins: Summer	24.318	21.770	21.891	0.121	19.2	0.000	0.000	19.2	1225.979	OK
SW10.3.1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	24.245	22.845	23.002	0.157	25.6	0.177	0.000	22.8	11.125	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry		Date: 17/03/2025					
Report Details: Type: Junctions Summary Storm Phase: Masterplan		Designed by: BJM	Checked by:	Approved By:			
		Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49					


SW10.3	FSR 30YR: 30 years: +20 %: 30 mins: Summer	24.09 7	22.70 1	22.968	0.267	65.2	0.302	0.000	61.6	60.512	OK
SW10.1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	24.46 3	23.06 3	23.202	0.139	32.6	0.158	0.000	31.6	14.118	OK
SW10.2	FSR 30YR: 30 years: +20 %: 15 mins: Summer	24.15 4	22.76 1	23.027	0.266	40.3	0.301	0.000	36.4	20.247	Surcharged
SW1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	26.66 7	25.26 7	25.503	0.236	23.2	0.267	0.000	18.4	10.087	Surcharged
SW18	FSR 30YR: 30 years: +20 %: 960 mins: Summer	24.15 0	22.95 0	23.331	0.381	2.8	0.430	0.000	2.8	40.616	Surcharged
SW19	FSR 30YR: 30 years: +20 %: 960 mins: Summer	24.28 2	22.83 9	23.331	0.492	9.7	0.556	0.000	8.9	141.831	Surcharged
SW20	FSR 30YR: 30 years: +20 %: 960 mins: Summer	24.45 0	22.51 5	23.330	0.815	11.9	0.922	0.000	11.7	187.270	Surcharged
SW20.1	FSR 30YR: 30 years: +20 %: 960 mins: Summer	24.16 3	22.76 3	23.330	0.567	3.2	0.642	0.000	3.0	46.965	Surcharged
SW14.1	FSR 30YR: 30 years: +20 %: 15 mins: Summer	24.32 8	22.82 8	23.149	0.321	104.9	0.363	0.000	77.5	45.584	OK
SW14.2	FSR 30YR: 30 years: +20 %: 15 mins: Summer	24.66 8	22.57 6	23.050	0.474	113.7	0.536	0.000	109.2	61.118	Surcharged
SW14.3	FSR 30YR: 30 years: +20 %: 960 mins: Summer	24.57 0	22.49 4	22.939	0.444	26.7	0.503	0.000	26.1	392.026	Surcharged
SW14.4	FSR 30YR: 30 years: +20 %: 960 mins: Summer	24.20 0	22.36 9	22.938	0.569	26.1	0.644	0.000	25.6	391.939	Surcharged
SW14.5	FSR 30YR: 30 years: +20 %: 960 mins: Summer	24.10 0	22.20 0	22.938	0.738	7.6	0.834	0.000	6.8	391.648	Surcharged

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 100YR: 100 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Elevation (m)	Invert Elevation (m)	Max. Elevation (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW2.1	FSR 100YR: 100 years: +20 %: 15 mins: Summer	26.660	25.267	25.908	0.641	28.3	0.725	0.000	20.4	12.299	Surcharged
SW2	FSR 100YR: 100 years: +20 %: 15 mins: Summer	26.600	25.174	25.863	0.689	42.8	0.779	0.000	35.0	25.440	Surcharged
SW3	FSR 100YR: 100 years: +20 %: 15 mins: Summer	26.348	25.027	25.664	0.638	98.2	0.721	0.000	91.6	59.348	Surcharged
SW4	FSR 100YR: 100 years: +20 %: 15 mins: Summer	26.186	24.819	25.236	0.418	107.5	0.472	0.000	104.7	65.940	Surcharged
SW5	FSR 100YR: 100 years: +20 %: 15 mins: Summer	26.170	24.762	25.039	0.277	197.3	0.314	0.000	187.2	105.870	OK
SW6	FSR 100YR: 100 years: +20 %: 15 mins: Summer	25.421	23.752	24.074	0.322	214.7	0.364	0.000	202.0	117.529	OK
SW7	FSR 100YR: 100 years: +20 %: 15 mins: Summer	24.904	23.567	23.808	0.241	202.0	0.272	0.000	197.7	117.418	OK
SW8	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.408	22.926	23.653	0.728	38.3	0.823	0.000	37.6	567.006	Surcharged
SW9	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.394	22.429	23.654	1.225	7.6	1.385	0.000	7.5	672.034	Surcharged
SW10	FSR 100YR: 100 years: +20 %: 720 mins: Winter	24.216	22.328	23.499	1.171	25.8	1.325	0.000	25.2	873.136	Surcharged
SW11	FSR 100YR: 100 years: +20 %: 720 mins: Winter	24.401	22.272	23.499	1.227	25.2	1.387	0.000	25.0	872.145	Surcharged
SW12	FSR 100YR: 100 years: +20 %: 720 mins: Winter	24.576	22.232	23.498	1.266	29.5	1.432	0.000	29.3	947.426	Surcharged
SW13	FSR 100YR: 100 years: +20 %: 720 mins: Winter	24.080	22.085	23.497	1.412	29.3	1.597	0.000	29.2	944.577	Surcharged
SW14	FSR 100YR: 100 years: +20 %: 720 mins: Winter	23.900	22.031	23.496	1.465	33.9	1.657	0.000	33.8	1396.928	Surcharged
SW15	FSR 100YR: 100 years: +20 %: 720 mins: Winter	23.681	21.982	23.495	1.513	33.8	1.711	0.000	33.7	1378.075	Flood Risk
SW16	FSR 100YR: 100 years: +20 %: 960 mins: Summer	23.661	21.884	23.486	1.602	43.8	1.812	0.000	48.3	1726.954	Flood Risk
SW17	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.002	21.810	23.486	1.676	77.9	1.895	0.000	19.4	1725.852	Surcharged
EX SW1	FSR 100YR: 100 years: +20 %: 240 mins: Summer	24.318	21.770	21.892	0.122	19.4	0.000	0.000	19.4	457.561	OK
SW10.3.1	FSR 100YR: 100 years: +20 %: 30 mins: Summer	24.245	22.845	23.624	0.779	23.1	0.881	0.000	21.7	20.003	Surcharged

Project: Large-scale Residential Development at Ross Killarney County Kerry		Date: 17/03/2025					
Report Details: Type: Junctions Summary Storm Phase: Masterplan		Designed by: BJM	Checked by:	Approved By:			
		Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49					

SW10.3	FSR 100YR: 100 years: +20 %: 30 mins: Summer	24.09 7	22.70 1	23.561	0.860	84.1	0.973	0.000	81.8	78.622	Surcharged
SW10.1	FSR 100YR: 100 years: +20 %: 30 mins: Summer	24.46 3	23.06 3	23.757	0.694	29.4	0.785	0.000	28.4	25.406	Surcharged
SW10.2	FSR 100YR: 100 years: +20 %: 30 mins: Summer	24.15 4	22.76 1	23.642	0.881	40.0	0.997	0.000	37.8	36.741	Surcharged
SW1	FSR 100YR: 100 years: +20 %: 15 mins: Summer	26.66 7	25.26 7	25.917	0.650	30.3	0.736	0.000	22.4	13.160	Surcharged
SW18	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.15 0	22.95 0	23.654	0.704	3.4	0.796	0.000	3.1	49.541	Surcharged
SW19	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.28 2	22.83 9	23.654	0.815	11.5	0.922	0.000	11.0	172.831	Surcharged
SW20	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.45 0	22.51 5	23.654	1.139	14.7	1.288	0.000	14.6	225.783	Surcharged
SW20.1	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.16 3	22.76 3	23.654	0.891	3.9	1.007	0.000	3.8	56.986	Surcharged
SW14.1	FSR 100YR: 100 years: +20 %: 15 mins: Summer	24.32 8	22.82 8	24.069	1.241	136.8	1.404	0.000	124.1	59.422	Flood Risk
SW14.2	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.66 8	22.57 6	23.682	1.106	24.8	1.250	0.000	23.8	364.588	Surcharged
SW14.3	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.57 0	22.49 4	23.682	1.187	31.5	1.343	0.000	30.6	477.891	Surcharged
SW14.4	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.20 0	22.36 9	23.681	1.312	30.6	1.484	0.000	30.0	478.266	Surcharged
SW14.5	FSR 100YR: 100 years: +20 %: 960 mins: Summer	24.10 0	22.20 0	23.681	1.481	16.0	1.674	0.000	7.5	517.686	Surcharged

Project: Large-scale Residential Development at Ross Killarney County Kerry		Date: 17/03/2025		
Report Details: Type: Stormwater Controls Summary Storm Phase: Masterplan		Designed by: BJM	Checked by:	Approved By:
		Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 30YR: 30 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Elevation (m)	Max. DS Elevation (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 1 - MC3500	FSR 30YR: 30 years: +20 %: 960 mins: Summer	23.330	23.330	0.880	0.880	43.0	414.386	0.000	0.000	7.5	596.769	34.712	OK
Attenuation Tank 2 - SC800	FSR 30YR: 30 years: +20 %: 960 mins: Summer	22.938	22.938	0.688	0.688	25.6	193.387	0.000	0.000	7.6	391.721	32.454	OK
Attenuation Tank 3 - SC800	FSR 30YR: 30 years: +20 %: 720 mins: Summer	22.829	22.829	1.003	1.003	43.9	229.919	0.000	0.000	19.6	1226.447	7.372	OK
Swale 1	FSR 30YR: 30 years: +20 %: 30 mins: Summer	26.521	26.328	0.115	0.028	7.5	2.594	0.000	0.000	6.7	6.387	77.855	OK
Swale 2	FSR 30YR: 30 years: +20 %: 15 mins: Summer	24.552	24.026	0.100	0.026	14.6	2.272	0.000	0.000	8.7	6.144	80.083	OK
Swale 3	FSR 30YR: 30 years: +20 %: 60 mins: Summer	24.384	24.077	0.119	0.027	8.6	5.346	0.000	0.000	7.2	10.497	76.829	OK
Detention Pond 1	FSR 30YR: 30 years: +20 %: 60 mins: Summer	26.071	26.031	0.071	0.031	9.4	8.404	0.000	0.000	5.4	9.794	90.917	OK
Detention Pond 2	FSR 30YR: 30 years: +20 %: 30 mins: Summer	23.965	23.884	0.115	0.034	11.1	5.336	0.000	0.000	8.0	8.412	87.334	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry		Date: 17/03/2025		
Report Details: Type: Stormwater Controls Summary Storm Phase: Masterplan		Designed by: BJM	Checked by:	Approved By:
		Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



**FSR 100YR: 100 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank
By: Max. Avg. Depth**


Stormwater Control	Storm Event	Max. US Elevation (m)	Max. DS Elevation (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation Tank 1 - MC3500	FSR 100YR: 100 years: +20 %: 960 mins: Summer	23.654	23.654	1.204	1.204	52.1	546.148	0.000	0.000	7.3	621.791	13.953	OK
Attenuation Tank 2 - SC800	FSR 100YR: 100 years: +20 %: 960 mins: Summer	23.680	23.680	1.430	1.430	30.0	286.065	0.000	0.000	16.0	497.306	0.084	OK
Attenuation Tank 3 - SC800	FSR 100YR: 100 years: +20 %: 720 mins: Winter	23.526	23.526	1.701	1.701	71.8	248.276	0.000	0.000	52.6	1299.744	-0.024	OK
Swale 1	FSR 100YR: 100 years: +20 %: 30 mins: Summer	26.540	26.332	0.134	0.032	9.8	3.099	0.000	0.000	8.9	8.348	73.550	OK
Swale 2	FSR 100YR: 100 years: +20 %: 15 mins: Summer	24.569	24.031	0.116	0.031	19.0	2.762	0.000	0.000	12.0	8.061	75.788	OK
Swale 3	FSR 100YR: 100 years: +20 %: 30 mins: Summer	24.409	24.082	0.144	0.032	12.1	6.583	0.000	0.000	9.9	9.943	71.468	OK
Detention Pond 1	FSR 100YR: 100 years: +20 %: 60 mins: Summer	26.083	26.038	0.083	0.038	12.1	9.873	0.000	0.000	8.1	13.131	89.328	OK
Detention Pond 2	FSR 100YR: 100 years: +20 %: 30 mins: Summer	23.983	23.891	0.133	0.041	14.4	6.304	0.000	0.000	11.4	11.250	85.038	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		




FSR 30YR: 30 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Elevation (m)	Max. US Water Elevation (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW1	SW2	26.667	25.503	0.225	10.087	0.5	0.58	18.4	Surcharged
2.000	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW2.1	SW2	26.660	25.494	0.225	9.429	0.5	0.52	16.6	Surcharged
1.001	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW2	SW3	26.600	25.460	0.225	19.489	0.8	0.96	30.4	Surcharged
1.002	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW3	SW4	26.348	25.314	0.288	44.680	1.0	1.02	69.7	OK
1.003	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW4	SW5	26.186	25.108	0.257	49.691	1.3	1.15	78.4	OK
1.004	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW5	SW6	26.170	24.987	0.244	80.296	1.9	0.64	144.3	OK
1.005	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW6	SW7	25.421	24.016	0.233	89.198	2.2	0.7	158.2	OK
1.006	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW7	SW8	24.904	23.770	0.218	89.102	2.3	0.49	155.7	OK
3.000	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW18	SW19	24.150	23.097	0.188	8.316	0.5	0.54	17.2	OK
3.001	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW19	SW20	24.282	23.068	0.216	29.121	1.1	0.86	59.1	OK
4.000	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW20.1	SW20	24.163	22.871	0.155	9.602	0.7	0.47	21.5	OK
1.018	FSR 30YR: 30 years: +20 %: 720 mins: Summer	Pipe	SW17	EX SW1	24.002	22.828	0.125	1225.979	0.7	0.34	19.2	Surcharged
1.009	FSR 30YR: 30 years: +20 %: 15 mins: Winter	Pipe	SW9	SW10	24.394	22.777	0.225	5.753	0.5	0.31	8.1	Surcharged
1.010	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW10	SW11	24.216	22.677	0.356	65.910	0.9	0.89	89.2	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry				Date: 17/03/2025													
Report Details: Type: Connections Summary Storm Phase: Masterplan				Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49									Designed by: BJM		Checked by:		Approved By:

1.011	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW11	SW12	24.401	22.635	0.364	65.506	0.8	0.82	83.3	OK
1.012	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW12	SW13	24.576	22.597	0.367	78.908	1.0	1.02	102.9	OK
1.013	FSR 30YR: 30 years: +20 %: 30 mins: Summer	Pipe	SW13	SW14	24.080	22.511	0.375	116.584	0.9	1	101.6	Surcharged
1.014	FSR 30YR: 30 years: +20 %: 30 mins: Summer	Pipe	SW14	SW15	23.900	22.438	0.375	142.157	1.1	1.17	118.2	Surcharged
1.015	FSR 30YR: 30 years: +20 %: 30 mins: Summer	Pipe	SW15	SW16	23.681	22.338	0.374	139.527	1.2	1.15	116.7	OK
1.007	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW8	Attenuation Tank 1 - MC3500	24.408	23.160	0.232	89.026	2.5	0.61	151.5	OK
1.008	FSR 30YR: 30 years: +20 %: 960 mins: Summer	Pipe	Attenuation Tank 1 - MC3500	SW9	24.250	23.330	0.375	596.723	0.1	0.09	7.5	Surcharged
3.002	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW20	Attenuation Tank 1 - MC3500	24.450	22.778	0.295	35.361	1.7	0.48	75.1	OK
5.000	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW10.1	SW10.2	24.463	23.202	0.203	14.118	0.8	0.7	31.6	OK
5.001	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW10.2	SW10.3	24.154	23.027	0.225	20.247	0.9	0.99	36.4	Surcharged
5.003	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW10.3	SW10	24.097	22.947	0.290	43.452	1.1	0.94	78.9	OK
6.000	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW10.3.1	SW10.3	24.245	23.002	0.202	11.125	0.6	0.7	22.8	OK
7.000	FSR 30YR: 30 years: +20 %: 15 mins: Winter	Pipe	SW14.1	SW14.2	24.328	23.111	0.357	45.613	0.8	0.85	85.6	OK
7.001	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW14.2	SW14.3	24.668	23.050	0.375	61.118	1.0	1.08	109.2	Surcharged
7.002	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW14.3	SW14.4	24.570	22.929	0.333	79.728	1.4	1.4	141.7	Surcharged
7.003	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	SW14.4	Attenuation Tank 2 - SC800	24.200	22.599	0.252	78.332	2.6	0.54	135.2	OK
7.004	FSR 30YR: 30 years: +20 %: 60 mins: Winter	Pipe	Attenuation Tank 2 - SC800	SW14.5	24.100	22.701	0.375	43.781	0.3	0.04	8.0	Surcharged

Project: Large-scale Residential Development at Ross Killarney County Kerry		Date: 17/03/2025					
Report Details: Type: Connections Summary Storm Phase: Masterplan		Designed by: BJM	Checked by:	Approved By:			
		Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49					


7.005	FSR 30YR: 30 years: +20 %: 60 mins: Summer	Pipe	SW14.5	SW14	24.100	22.705	0.225	41.890	0.3	0.12	7.5	Surcharged
1.016	FSR 30YR: 30 years: +20 %: 30 mins: Summer	Pipe	SW16	Attenuation Tank 3 - SC800	23.661	22.306	0.450	150.250	1.7	0.49	130.2	OK
1.017	FSR 30YR: 30 years: +20 %: 720 mins: Winter	Pipe	Attenuation Tank 3 - SC800	SW17	24.000	22.807	0.450	1226.992	0.1	0.14	19.8	Surcharged
Pipe	FSR 30YR: 30 years: +20 %: 30 mins: Summer	Pipe	Swale 1	SW3	26.705	26.391	0.145	6.387	0.4	0.03	6.7	OK
Pipe (1)	FSR 30YR: 30 years: +20 %: 30 mins: Summer	Pipe	Swale 2	SW10.2	24.752	24.081	0.144	8.684	0.6	0.03	9.9	OK
Pipe (2)	FSR 30YR: 30 years: +20 %: 30 mins: Summer	Pipe	Swale 3	SW10	24.565	24.145	0.225	7.542	0.4	0.03	7.5	OK
Pipe (3)	FSR 30YR: 30 years: +20 %: 60 mins: Summer	Pipe	Detention Pond 1	SW3	26.500	26.055	0.126	9.794	0.6	0.04	5.4	OK
Pipe (4)	FSR 30YR: 30 years: +20 %: 15 mins: Summer	Pipe	Detention Pond 2	SW10	24.350	23.928	0.192	4.900	0.3	0.05	8.2	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



FSR 100YR: 100 years: Increase Rainfall (%): +20: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Elevation (m)	Max. US Water Elevation (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW1	SW2	26.667	25.917	0.225	13.160	0.6	0.71	22.4	Surcharged
2.000	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW2.1	SW2	26.660	25.908	0.225	12.299	0.5	0.64	20.4	Surcharged
1.001	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	SW2	SW3	26.600	25.805	0.225	35.080	1.0	1.23	39.0	Surcharged
1.002	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW3	SW4	26.348	25.664	0.300	59.348	1.3	1.34	91.6	Surcharged
1.003	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW4	SW5	26.186	25.236	0.300	65.940	1.5	1.53	104.7	Surcharged
1.004	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW5	SW6	26.170	25.039	0.299	105.870	2.0	0.83	187.2	OK
1.005	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW6	SW7	25.421	24.074	0.281	117.529	2.3	0.89	202.0	OK
1.006	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW7	SW8	24.904	23.808	0.259	117.418	2.4	0.62	197.7	OK
3.000	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW18	SW19	24.150	23.212	0.225	10.850	0.6	0.71	22.6	Surcharged
3.001	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW19	SW20	24.282	23.149	0.273	37.747	1.1	1.11	75.7	Surcharged
4.000	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW20.1	SW20	24.163	22.890	0.219	12.275	0.8	0.61	28.1	OK
1.018	FSR 100YR: 100 years: +20 %: 240 mins: Summer	Pipe	SW17	EX SW1	24.002	23.148	0.126	457.561	0.7	0.35	19.4	Surcharged
1.009	FSR 100YR: 100 years: +20 %: 960 mins: Summer	Pipe	SW9	SW10	24.394	23.654	0.225	671.770	0.6	0.39	10.2	Surcharged
1.010	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	SW10	SW11	24.216	23.191	0.375	124.918	1.0	1.07	107.7	Surcharged

Project: Large-scale Residential Development at Ross Killarney County Kerry				Date: 17/03/2025													
Report Details: Type: Connections Summary Storm Phase: Masterplan				Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49								Designed by: BJM		Checked by:		Approved By:	

1.011	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	SW11	SW12	24.401	23.104	0.375	124.166	1.0	1.04	105.8	Surcharged
1.012	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	SW12	SW13	24.576	23.038	0.375	147.547	1.2	1.32	133.1	Surcharged
1.013	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	SW13	SW14	24.080	22.749	0.375	144.141	1.2	1.3	131.9	Surcharged
1.014	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	SW14	SW15	23.900	22.624	0.375	171.870	1.3	1.47	148.4	Surcharged
1.015	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	SW15	SW16	23.681	22.478	0.375	168.745	1.3	1.45	147.4	Surcharged
1.007	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW8	Attenuation Tank 1 - MC3500	24.408	23.203	0.277	117.274	2.6	0.77	191.6	OK
1.008	FSR 100YR: 100 years: +20 %: 960 mins: Winter	Pipe	Attenuation Tank 1 - MC3500	SW9	24.250	23.629	0.375	632.952	0.1	0.09	7.6	Surcharged
3.002	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW20	Attenuation Tank 1 - MC3500	24.450	22.858	0.375	46.044	1.8	0.62	97.8	OK
5.000	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW10.1	SW10.2	24.463	23.560	0.225	18.405	0.8	0.69	31.1	Surcharged
5.001	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	SW10.2	SW10.3	24.154	23.642	0.225	36.741	0.9	1.03	37.8	Surcharged
5.003	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW10.3	SW10	24.097	23.327	0.300	56.716	1.2	1	83.9	Surcharged
6.000	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW10.3.1	SW10.3	24.245	23.409	0.225	14.505	0.6	0.74	24.0	Surcharged
7.000	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW14.1	SW14.2	24.328	24.069	0.375	59.422	1.1	1.23	124.1	Flood Risk
7.001	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW14.2	SW14.3	24.668	23.645	0.375	79.356	1.5	1.6	161.9	Surcharged
7.002	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW14.3	SW14.4	24.570	23.378	0.375	102.829	1.9	2.1	212.1	Surcharged
7.003	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	SW14.4	Attenuation Tank 2 - SC800	24.200	22.670	0.324	100.893	2.8	0.84	207.5	OK
7.004	FSR 100YR: 100 years: +20 %: 960 mins: Summer	Pipe	Attenuation Tank 2 - SC800	SW14.5	24.100	23.680	0.375	477.067	0.2	0.09	16.0	Surcharged

Project: Large-scale Residential Development at Ross Killarney County Kerry		Date: 17/03/2025		
Report Details: Type: Connections Summary Storm Phase: Masterplan		Designed by: BJM	Checked by:	Approved By:
		Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



7.005	FSR 100YR: 100 years: +20 %: 600 mins: Summer	Pipe	SW14.5	SW14	24.100	23.579	0.225	307.424	0.4	0.16	10.7	Surcharged
1.016	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	SW16	Attenuation Tank 3 - SC800	23.661	22.418	0.450	183.383	1.7	0.62	165.7	Surcharged
1.017	FSR 100YR: 100 years: +20 %: 960 mins: Summer	Pipe	Attenuation Tank 3 - SC800	SW17	24.000	23.496	0.450	1684.447	0.5	0.54	77.9	Surcharged
Pipe	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	Swale 1	SW3	26.705	26.405	0.225	8.348	0.3	0.04	8.9	OK
Pipe (1)	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	Swale 2	SW10.2	24.752	24.094	0.225	11.310	0.6	0.05	13.0	OK
Pipe (2)	FSR 100YR: 100 years: +20 %: 30 mins: Summer	Pipe	Swale 3	SW10	24.565	24.163	0.225	9.943	0.3	0.04	9.9	OK
Pipe (3)	FSR 100YR: 100 years: +20 %: 60 mins: Summer	Pipe	Detention Pond 1	SW3	26.500	26.064	0.225	13.131	0.6	0.06	8.1	OK
Pipe (4)	FSR 100YR: 100 years: +20 %: 15 mins: Summer	Pipe	Detention Pond 2	SW10	24.350	23.940	0.225	6.908	0.3	0.07	11.6	OK

Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Phase Management Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



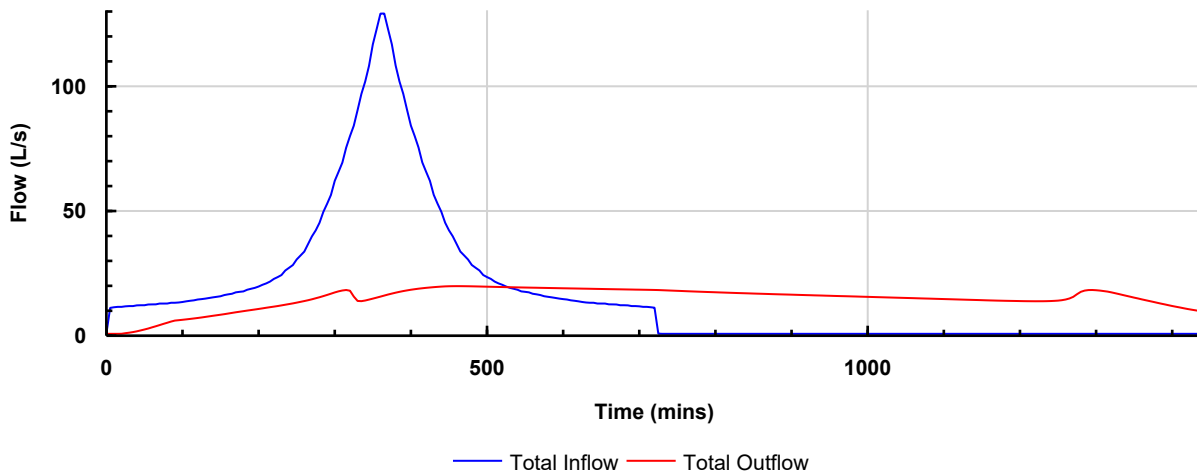
Masterplan
FSR 30YR: 30 years: Increase Rainfall (%): +20: 720 mins: Summer

Tables

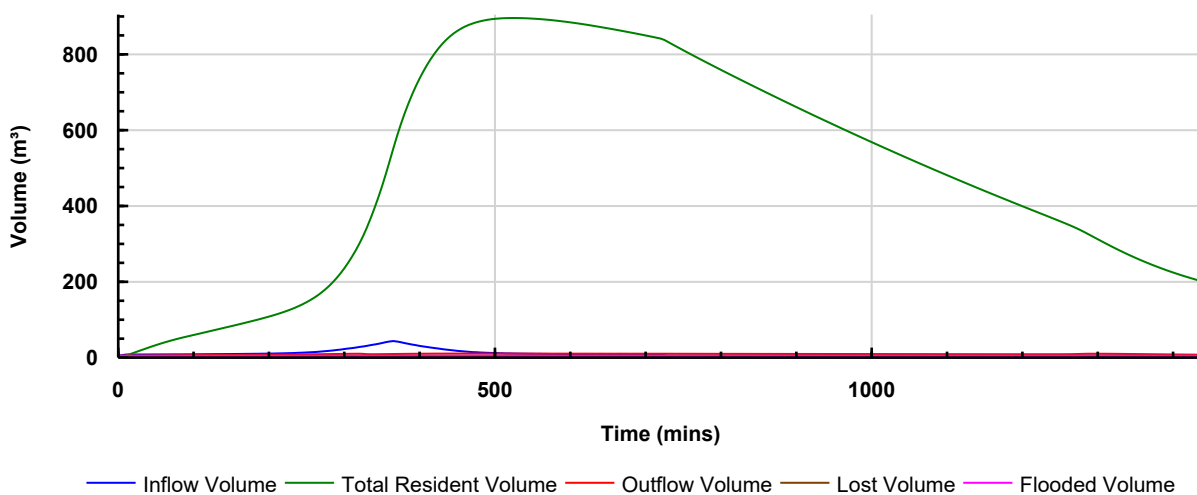
Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
EX SW1			19.2	1225.979
TOTAL	129.2	1423.340	19.2	1225.979

Graphs

Flow Graph



Volume Graph



Project: Large-scale Residential Development at Ross Killarney County Kerry	Date: 17/03/2025		
	Designed by: BJM	Checked by:	Approved By:
Report Details: Type: Phase Management Storm Phase: Masterplan	Company Address: Unit 38 Eastgate Drive Little Island, Cork T45 YO49		



Masterplan
FSR 100YR: 100 years: Increase Rainfall (%): +20: 240 mins: Summer

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
EX SW1			19.4	457.561
TOTAL	316.9	1223.275	19.4	457.561

Graphs

