

ORMONDE HOMES
(GLENLINE)
LIMITED
Residential Development,
"Glendine Way",
Bonnettsrath,
Kilkenny
Engineering Services
Design Report
(ESDR01)

July 2025



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1.0 INTRODUCTION

1.1 General

- 1.1.1 This Engineering Services Design Report (ESDR) which has been prepared by MPA Consulting Engineers at the request of our client Ormonde Homes (Glendine) Ltd. and relates to a proposed residential development of 50No. units at "Glendine Way", Bonnettsrath, Kilkenny, Co. Kilkenny.
- 1.1.2 This report contains information on a preliminary flood assessment as well as the design of roads & transport infrastructure, wastewater drainage, storm water management systems and watermain to be constructed for the proposed residential development.
- 1.1.3 The engineering designs have been carried out to take account of all the development proposed on site, which will consist of the construction of No. 50 residential units which comprise of semidetached, and Duplex Units.
- 1.1.4 The design of the site entrance and internal road network has been carried out to take account of the requirements of the Design Manual for Urban Roads and Streets (DMURS), the requirements of Kilkenny County Council in terms of sightlines and internal road design.
- 1.1.5 The design of the wastewater drainage system has been carried out empirically in accordance with Irish Water Code of Practice for Wastewater Infrastructure Connections and Developer Services Design and Construction Requirements for Self-Lay Developments July 2020 (Revision 2) Document IW-CDS-5030-03 and to take account of the Building Regulations, BS EN 752:2008 – Drain & Sewer Systems Outside Buildings (the Discharge Units Method of design in accordance with BS EN 12056-2:2000 – Gravity Drainage System) and the requirements of Kilkenny County Council.
- 1.1.6 The storm water management system proposed for the residential development is a Sustainable storm water management system which is in accordance with the Greater Dublin Strategic Drainage Strategy (GDSDS). It will involve direct infiltration to ground via swales & rain gardens, and large-scale infiltration device. Formal piped gravity systems will collect storm water from roads and hardstanding areas and discharge to infiltration devices located in open space areas of the site.
- 1.1.7 The water supply for the proposed development will be provided by connecting to an existing 200mm cast iron water main on Glendine Road. The watermain has been designed to comply with the Irish Water Document: Code of Practice for Water Infrastructure Standard Details (Document Number: IW-CDS-5020-01). The watermain is to be laid out to comply with Uisce Eireann Document: Code of Practice for Water Infrastructure (Document Number: IW-CDS-5020-03).

1.2 Site

- 1.2.1 The site is a greenfield site that is located south of the N77 along the Glendine Road, Kilkenny. The development site area (red line boundary) is approximately 1.43 hectares, with the site entrance on Glendine Road. This location can be seen on **Figure 1.1**
- 1.2.2 The site is relatively flat in an East – West direction, with levels varying from 61.70m AOD at the site entrance to 61.42m AOD the Eastern boundary over some 110m. Site levels vary in the North South direction, from 62.06m AOD at the Northern boundary to 64.38m AOD at the Northern boundary over some 120m.
- 1.2.3 Further to this, the adjoining Glendine Rd, falls in a North - South direction from 61.69m AOD at the proposed entrance to 59.19m AOD adjacent to the Southernmost boundary to the site.
- 1.2.4 The site is bound by the N77 (Kilkenny Ring Road) to the north with an intervening agricultural access immediately adjacent to the Northern boundary, the east by agricultural lands, the south by an existing residential property and the west, the existing Glendine Road. The boundaries are well established and are defined by a hedgerow to the north, east and south and, a wooden fence along the western boundary.
- 1.2.5 The Soil index of the site has been taken to be Soil Class 1 from the Flood Studies Report Maps. The value for SOIL for Class 1 is taken as 0.15 which indicates well-draining soils.



FIGURE 1.1 - SITE LOCATION

2.0 FLOODING

2.1 General

- 2.1.1 An initial flood assessment has been carried out to investigate if the site is at risk of flooding. The assessment has been carried out by referencing the mapped data available on the OPW and the Ordnance Survey maps.

2.2 Mapped Data

- 2.2.1 A review has been carried out of the mapped data for the area including the Ordnance Survey historical maps, the OPW Flood Hazard Mapping and the Catchment Flood Risk Assessment and Management (CFRAM) studies maps.

Historical Mapped Data

- 2.2.2 The historic OS maps contain details of lands marked as being "*Liable to Floods*". It is noted that the OS maps simply show the text "*Liable to Floods*" without delineating the extent of these areas, the frequency of flooding or the type of flooding.
- 2.2.3 Following a review of the historic maps for the area including the OS 6-inch map and 25-inch map, it can be seen on these maps that there is no record of areas "*Liable to Floods*". See extracts in **Figure 2.1** and **Figure 2.2** below.

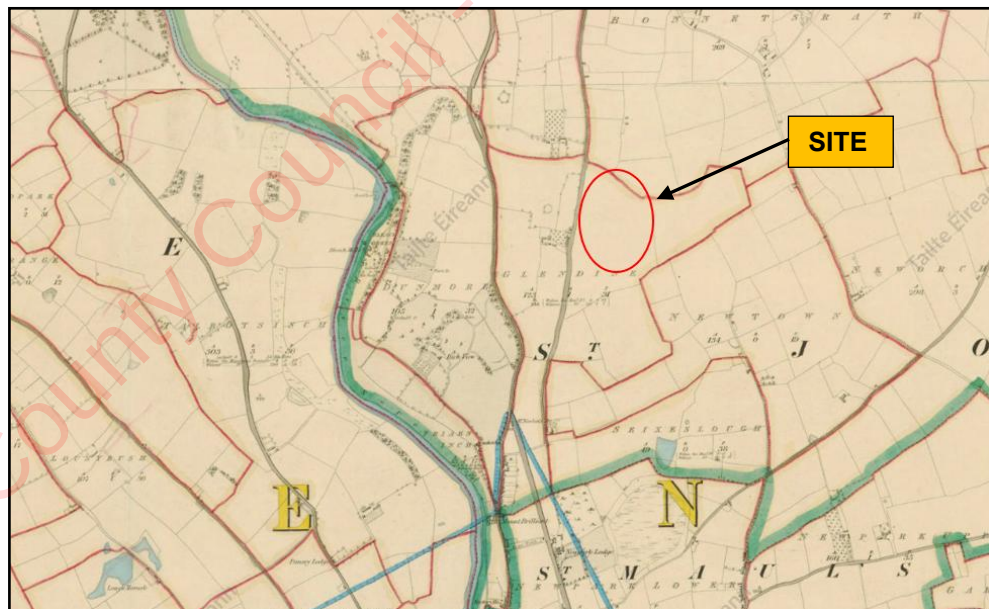


FIGURE 2.1– HISTORIC 6 INCH MAP

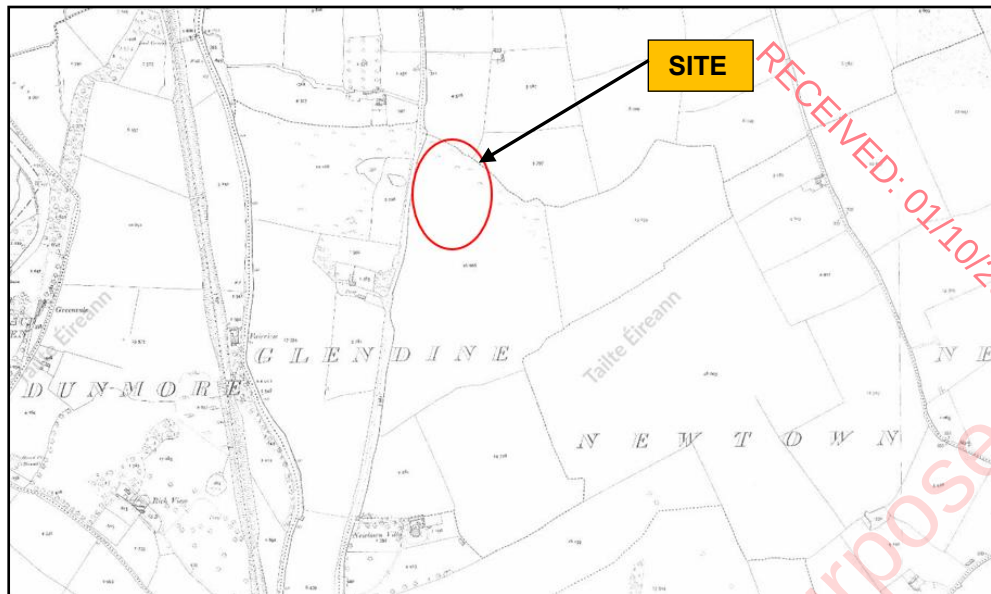


Figure 2.2 – HISTORIC 25 INCH MAP

OPW Drainage District & Benefiting Lands Mapping

- 2.2.4 The OPW drainage district maps represent a dataset prepared on behalf of the Drainage Districts (under the Arterial Drainage Act, 1925). These maps identify land that might benefit from the implementation of Arterial (Major) Drainage Schemes and may indicate areas of land subject to flooding or poor drainage. The maps for the area are reproduced below.
- 2.2.5 A review of the map shown in **Figure 2.3** below, indicates that the site does not form part of an area designated as a Drainage District which may be subject to flooding or an area of poor drainage.
- 2.2.6 The OPW benefiting lands map represents a dataset identifying land that might benefit from the implementation of Arterial Drainage Schemes (under the Arterial Drainage Act 1945) and again indicating areas of land that may be subject to flooding or poor drainage.
- 2.2.7 A review of the map shown in **Figure 2.3** below indicates that the site does not form part of an area designated as benefiting lands and which may be subject to flooding or an area of poor drainage.

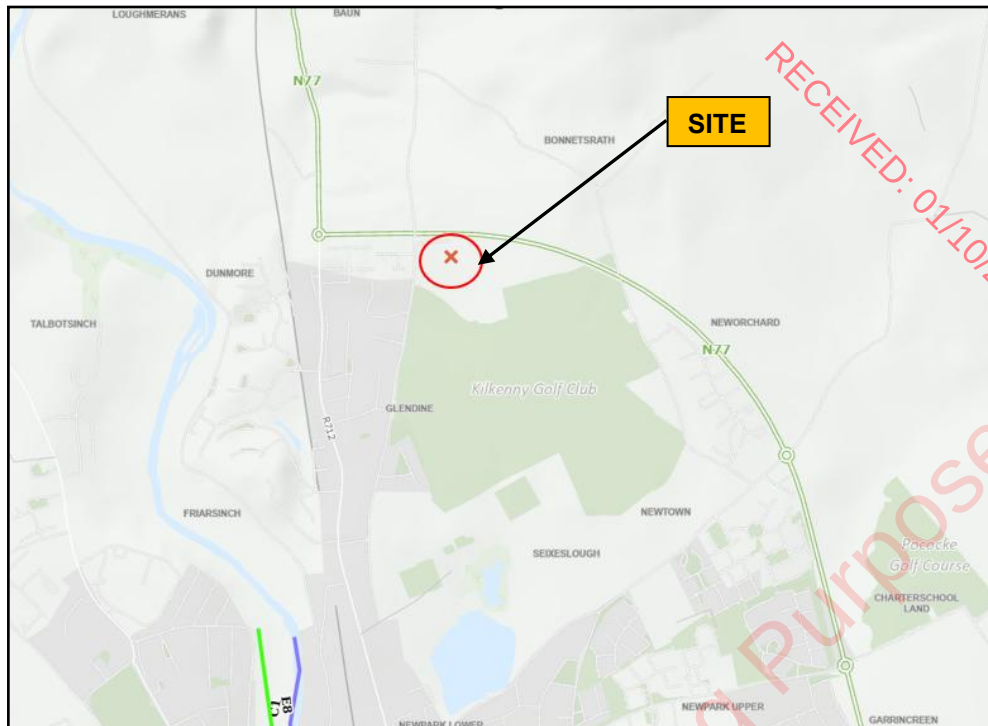


Figure 2.3 – OPW DRAINAGE DISTRICT & BENEFITTING LANDS

OPW Flooding Hazard Mapping

- 2.2.8 As part of the National Flood Risk Management Policy, the OPW developed a web-based data set, which contains information concerning historical flood data and display related mapped information.
- 2.2.9 After reviewing OPW Flood Hazard Maps, it is apparent that there is no history of flooding around the development site, with flood events recorded some 1.56km from the subject site as illustrated within **Figure 2.4** below.

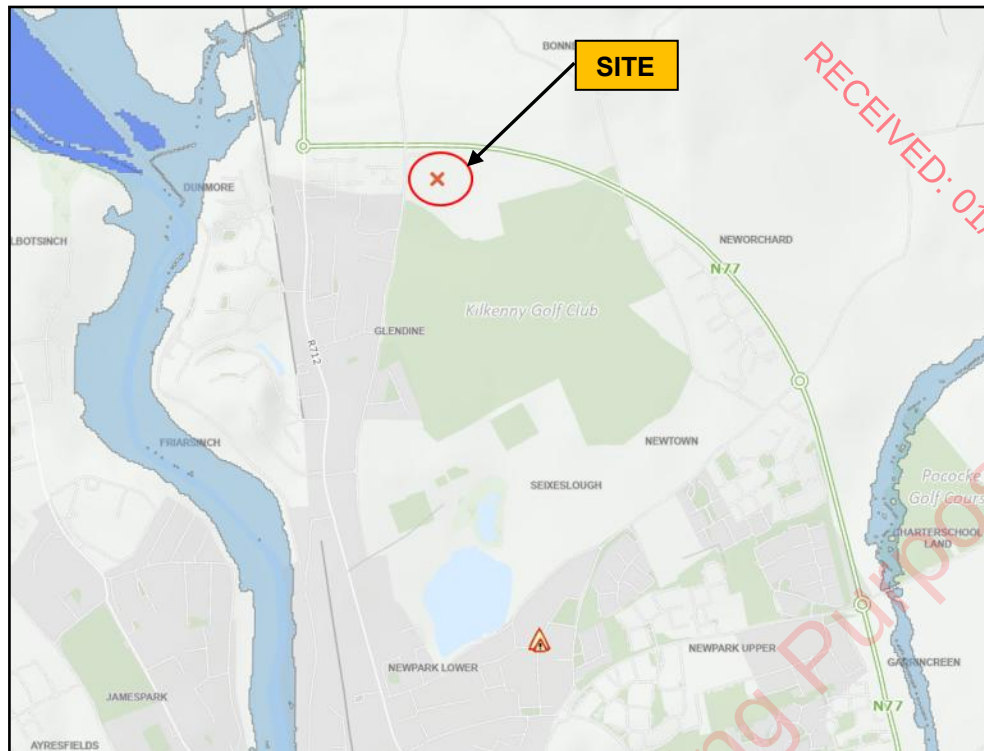


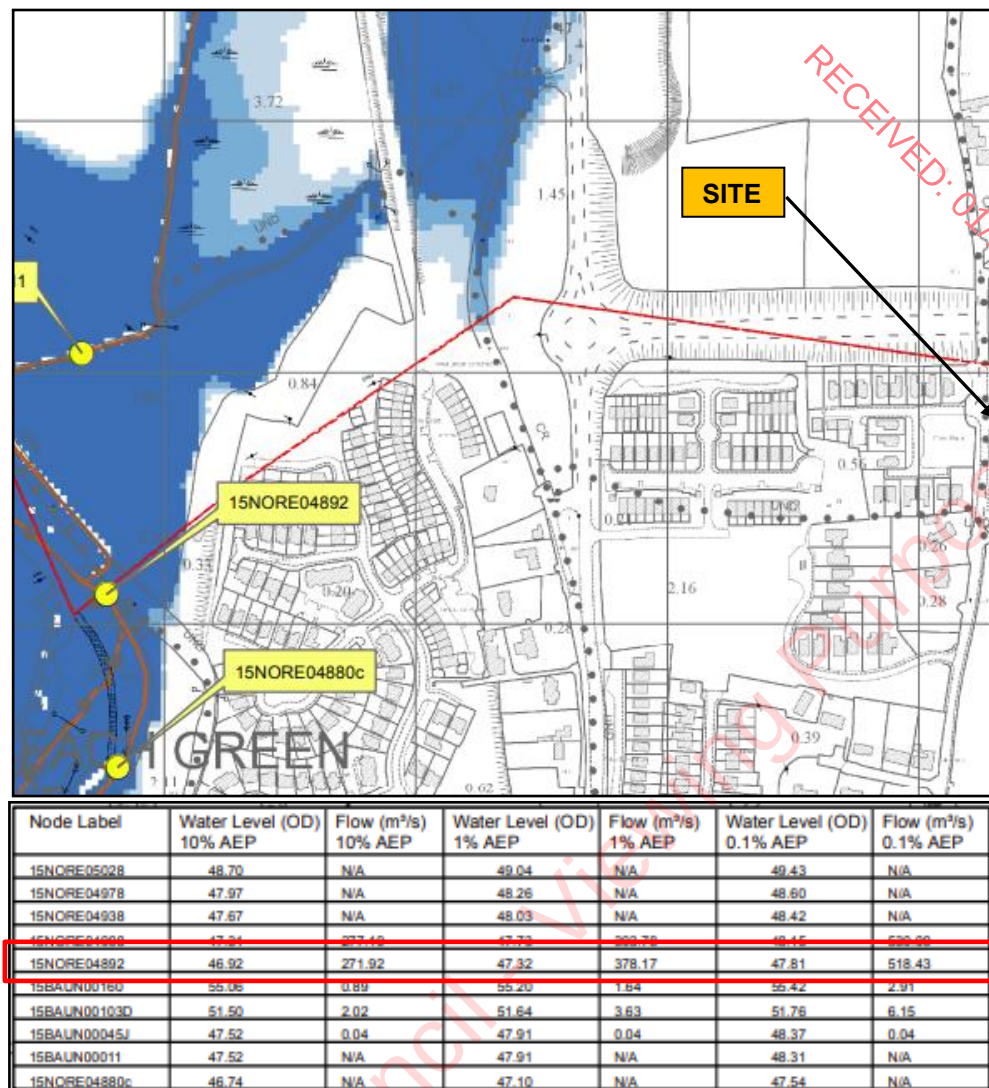
Figure 2.4 - OPW FLOOD HAZARD MAP

CFRAM Mapping

2.2.10 Catchment Flood Risk Assessment and Management (CFRAM) Studies carried out by the OPW are at the core of the national policy for flood risk management and the strategy for its implementation. Part of the CFRAM Studies is to assess flood risk, through the identification of flood hazard areas and the associated impacts of flooding.

2.2.11 The proposed site is located in Glendine Road, Co Kilkenny, and the CFRAM map did not identify any risk due to fluvial flooding for the site. **Figure 2.5** confirms that the site is located outside the flood extents of the 0.1%AEP flood event.

2.2.12 The estimated flood level at Node 15NORE04892 as indicated within **Figure 2.5** for the 0.1%AEP is 47.81m, some 14m below the lowest finished floor level on site and is located some 730m from the western boundary to the site.

**FIGURE 2.5 – OPW CFRAM EXTRACT****Outcome**

- 2.2.13 It is concluded, following a review of the historical mapping, flood extent and levels mapping for the extreme flood events, levels data for the site and local knowledge, that fluvial flooding will not be an issue and the site is defined as Zone C site suitable for vulnerable development, in accordance with the DoEHLG / OPW Guidelines for Planning Authorities - "The Planning Process and Flood Risk Management" (November 2009).

3.0 TRANSPORT & ACCESS

3.1 Existing Infrastructure

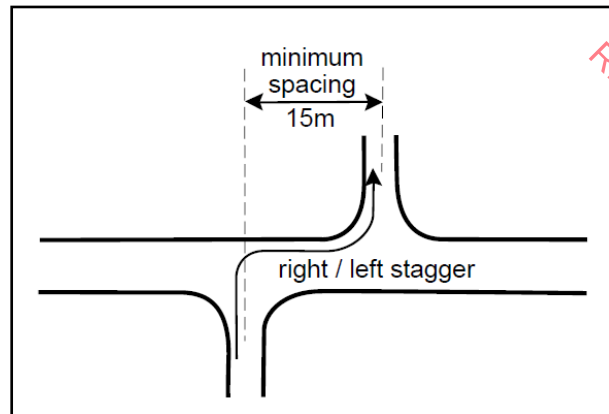
- 3.1.1 The proposed site is bounded to the West by Glendine Road, with an existing access formed with the Glendine Rd upgrade works.
- 3.1.2 Glendine Road is found to be Two-Way with a posted speed limit of 50kph approx. 10m to the North of the site on the inbound lane, Southbound. A 60kph sign posted limit is also provided on the outbound lane, Northbound.
- 3.1.3 The existing carriageway width is typically found to vary from 6.12m to 6.45m wide, with footpaths provided on both sides of the road for the extent of Cnoc Baun residential development. The footpath infrastructure continues in a Southbound direction extending to adjoining residential development, discharging to the Castlecomer Road.

3.2 Design Objectives

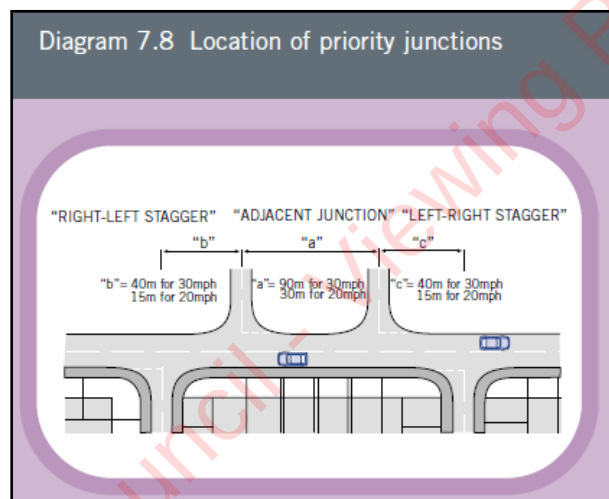
- 3.2.1 Provision for the safety of existing and future road users is an important consideration in the design of any proposed development, and this has been considered in detail during the development of the proposed scheme layout. This section outlines key road safety design issues and how these have been addressed.

3.3 Proposed Access

- 3.3.1 Following discussions with Owen Shine, Kilkenny County Council Roads, the existing access point was found to be inappropriate due to the proximity of the existing residential access to Cnoc Baun.
- 3.3.2 The existing entries are found to be staggered by circa 6.0m which is unacceptable to Kilkenny County Council. Due to this and to maximise safety at both the existing and proposed junctions, it is proposed to provide a new access point to the proposed residential development.
- 3.3.3 Due to existing site constraints, Uisce Eireann infrastructure, and the varying levels on site and on the Glendine Road, the potential access points cannot be achieved to the South of the existing entrance.
- 3.3.4 As set out within Development Control Advice Note 15, Section 7.3, "the spacing should be sufficient to separate conflicting turning movements and avoid 'straight across' vehicle movements. The spacing should normally be at least **15m** and a right-left stagger is preferred." *Emphasis added.*

**FIGURE 3.1 – ADVICE NOTE 15 EXTRACT**

- 3.3.5 Similarly, as set out within the Traffic Management Guidelines, a 15m Left-Right stagger is required for 20mph roads (30kph).

**FIGURE 3.2 – TRAFFIC MANAGEMENT GUIDELINES EXTRACT**

- 3.3.6 Therefore, due to the proceeding, the proposed development will be accessed from a new entrance from the Glendine Road which is to be staggered to the North of Cnoc Baun by 15m as set out within the enclosed drawing package in accordance with Kilkenny County Council requirements, Development Control Advice Note 15, and Traffic Management Guidelines.
- 3.3.7 This access will will serve as the main access for vehicles, pedestrians and cyclists to the site. The entrance will connect to the internal road network through the site as shown on the proposed site layout, Drawing No. 251034-MPA-X-X-X-XXX-DR-CE-1001 – Proposed Site Layout.

Entrance Geometry

- 3.3.8 It is proposed that a 6.3m wide entrance will serve as the primary entrance and exit from the site. The entrance radii are 4.5m which is adequate to accommodate large service vehicles as set out on Drawing 251034-MPA-X-X-X-XXX-DR-CE-1002-Proposed Entrance Layout.

- 3.3.9 Due to existing site constraints, Uisce Eireann Infrastructure and to facilitate the removal of the existing access and provision of a footpath, the existing road edge on Glendine Road is to be adjusted as set out within 251034-MPA-X-X-X-XXX-DR-CE-1002-Proposed Entrance Layout.
- 3.3.10 The entrance to the site will have the relevant stop sign (RUS 027), stop line (RRM 017) and STOP road marking (M 114) as per the Traffic Signs Manual. The entrance to the site will also be fitted with a SLOW ZONE SIGN (30km/h) (Sign F 403) on both sides of the access road.
- 3.3.11 In accordance with DMURS Advice Note 6 Priority Junction Tightening Measures, Section 3.3 – Options Available, it is proposed to provide a Continuous Footpath crossover at the entrance to the site. It is proposed that the existing tarmac surface to the footpath is replaced with concrete surfacing to allow for definition of the footpath crossover from the adjoining tarmac surfacing.

Glendine Road Stopping Sight Distances / Sightlines

- 3.3.12 A copy of the proposed sightlines drawing at the site egress onto the Glendine Road is included on Drawing No. 251034-MPA-X-X-X-XXX-DR-CE-1002 – Junction Details and Sightlines, submitted with this application.
- 3.3.13 The sign posted speed limit on Glendine Road is 50kph. As per Table 4.2 of DMURS, the Stopping Sight Distance (SSD) for a road with design speed of 50kph with a 2.4m set back is 45m. As included on Drawing No. 251034-MPA-X-X-X-XXX-DR-CE-1002 – Junction Details and Sightlines, sightlines are achieved to the nearside road edge in both north and south directions.

3.4 Onsite Infrastructure

Internal Road Network

- 3.4.1 The layout of the proposed internal road network will allow vehicles to circulate the site and is designed in accordance with DMURS. The internal access road will typically have a carriageway width of 5.5m, with associated footpaths of minimum width 1.8m. Shared surface and homezones are also to be provided to the South of the site, which will consist of a 4.8m carriageway and 1.2m pedestrian buffer.
- 3.4.2 A vehicle swept path assessment has been carried out in order to ensure refuse vehicles have adequate space to circulate the site taking account of the proposed Traffic Calming measures. The auto track assessments can be seen on Drawing No. 251034-MPA-X-X-X-XXX-DR-CE-1005, & 251034-MPA-X-X-X-XXX-DR-CE-1006 – Proposed Vehicle Tracking.
- 3.4.3 Due to the nature of the site, and to minimise excessive reversing manoeuvres, refuse collection points have been provided in 3No. convenient locations throughout the site. With the inclusion of these collection points, refuse collection vehicles will limit reversing to circa 20m.

Forward Visibility of Internal Road Network.

- 3.4.4 To ensure the new road network for the site has adequate forward visibility, a forward visibility assessment was carried out of the internal junctions.
- 3.4.5 The proposed internal road network will have a proposed speed limit of 30km/h. As per table 4.2 of DMURS, the required SSD for a 30kph zone is 23m. The visibility splays were taken at junctions from the center of the nearside left-hand driving lane to the nearside road edge of approaching traffic.
- 3.4.6 As demonstrated on Drawing No. 251034-MPA-X-X-X-XXX-DR-CE – 1002, Proposed Sightlines, there is adequate forward visibility throughout the site.

Parking

- 3.4.7 Car parking spaces are to be 5.0m x 2.5m in accordance with Kilkenny County Development Plan 2021 – 2027. 2No. of car parking spaces per unit have been provided as per Table 12.3: Car Parking Standards.
- 3.4.8 Visitor Spaces are provided at a rate of 0.25 spaces per unit, i.e. 13No. spaces as set out within the proposed site layout, 251034-MPA-X-X-X-XXX-DR-CE-1001-Proposed Site Layout.
- 3.4.9 In accordance with Kilkenny County Development Plan 2021 – 2027, Section 12.14 Electric vehicles, all in curtilage parking spaces are to be equipped with a fully functional EV charging point.

Shared Surfaces

- 3.4.10 There are Shared Surfaces / Home zones proposed within the development, these are typically cul-de-sac roads serving a small number of units.
- 3.4.11 At these locations, a minimum width of 6.0m (4.8m carriageway & 1.2m pedestrian buffer) has been provided. The proposed shared surfaces will be constructed as raised tables and will be finished in accordance with the landscape architects' details.
- 3.4.12 The relevant traffic calming triangles (M 112) will be placed on the ramped surface which will mark the entrance to all the shared surfaces on site. The relevant stop signs (RUS 027), stop lines (RRM 017) and STOP road marking (M 114) will be provided as per the Traffic Signs Manual at all junctions between the 5.5m wide arterial road and lesser priority roads including the shared surfaces.

3.5 Proposed Active Travel & Traffic Calming***Pedestrian Facilities***

- 3.5.1 A pedestrian footpath with a width of 2.0m will be provided for the entire development adjacent to the main access road. The footpath shall also be adequately paved with dished kerbs provided at junction entrances.

Cycle Facilities

- 3.5.2 In accordance with Table 12.2: Bicycle parking requirements, of Kilkenny County Development Plan 2021 – 2027, 1No. bicycle parking space will be provided per bedroom for the Duplex/ Apartment units. Cycle parking is to be provided within the curtilage of the units which is secured and convenient as set out within the architect's unit layouts.

Traffic Calming

- 3.5.3 The development layout has been designed so that the horizontal alignment, street enclosure, parked cars and pedestrian activity will naturally slow traffic to the required speed of 30kph or less on the local streets.
- 3.5.4 The development has also been designed as a slow zone with adequate signage showing children at play and the posted speed limit at the site entrance.
- 3.5.5 Additional to this, other traffic calming measures include vertical deflection measures in the form of raised tables with contrasting surfacing at entrance to the Shared surface. Speed reducing bends have also been provided at a number of locations within the site to further slow traffic to the required speed.
- 3.5.6 The traffic calming features are typically provided at 70m or less spacing to ensure a maximum speed of <30kph as per Table 7.1 of the Traffic Management Guidelines.

4.0 WASTEWATER DRAINAGE SYSTEM

4.1 Existing Infrastructure

4.1.1 There is currently no public wastewater drainage infrastructure on site. There is an existing 225mm uPVC pipe to the south-west of the site located at the entrance junction of the Glendine Woods Estate as shown in **Figure 4.1** below.

4.1.2 A pre-Connection Enquiry has been issued to Uisce Éireann with reference number **CDS25004365**. At the time of writing, a return on the submitted PCE and associated confirmation of feasibility is awaited. A copy of the latest correspondence from Uisce Éireann can be seen on **Appendix A**.

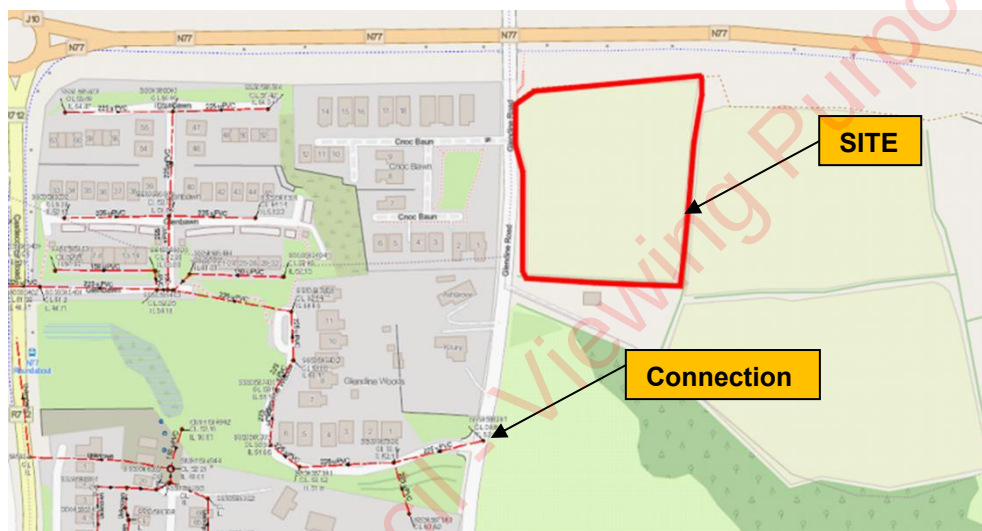


FIGURE 4.1 – EXISTING WASTEWATER INFRASTRUCTURE

4.2 Proposed Infrastructure

General

4.2.1 The wastewater sewer within the site has been designed in accordance with Irish Water Code of Practice for Wastewater Infrastructure Connections and Developer Services Design and Construction Requirements for Self-Lay Developments July 2020 (Revision 2) Document IW-CDS-5030-03 and with the Colebrook-White formulas, B.S. 752: 2008, Drain & Sewer Systems and the current Building Regulations.

Gravity System

4.2.2 The private Wastewater sewers conveying the effluent from the dwellings to the main Wastewater drainage system will consist of 100mm pipes at min falls of 1:60.

4.2.3 The pipes for the proposed wastewater sewerage system have been laid out to comply with the requirements of Irish Water Code of Practice for Wastewater Infrastructure Connections and

Developer Services Design and Construction Requirements for Self-Lay Developments July 2020 (Revision 2) Document IW-CDS-5030-03.

- 4.2.4 The wastewater drainage system is to consist of 150mm, and 225mm diameter uPVC pipes at gradients varying from 1:60 to 1:200 as per Section 3.6 of Irish Water Code of Practice for Wastewater Infrastructure.
- 4.2.5 The proportional velocities have been extrapolated from the Wavin sewer Systems Design Manual for uPVC pipes based on the proportional capacity, and from this the partial velocity / design velocity has been calculated. In all cases the design velocity will be 0.70 m/s or greater as per BS EN 752:2008 – Drain & Sewer Systems Outside Buildings and IW requirements, thereby ensuring adequate self-cleansing velocities for the entire system.
- 4.2.6 The drawings included with this submission show the Proposed Wastewater Layout (Drawing No. 251034-MPA-X-X-X-XXX-DR-CE-1110 - Proposed Wastewater Layout) and Proposed Wastewater Drainage Long sections (Drawing No. 251034-MPA-X-X-X-XXX-DR-CE-2000 - Proposed Wastewater Drainage Longitudinal Sections).

5.0 STORM WATER MANAGEMENT SYSTEM

5.1 General

- 5.1.1 It is proposed to provide a storm water management system based on direct infiltration to ground via swales & rain gardens and large engineered infiltration devices for roads and paved areas. A formal piped gravity systems with collect storm water from roads and hardstanding and discharge to infiltration devices located in the open areas of the site.
- 5.1.2 Hardstand areas have been provided with a formal gully and pipe gravity sewer system to convey stormwater to an appropriately sized Petrol Interceptor prior to discharge to the Large Scale Infiltration System located within the green area in the centre of the site.
- 5.1.3 The gravity storm sewer system has been designed in accordance with the Colebrook-White formulas and the Modified Rational Method, where:

$$Q_p = CiA$$

and

$$Q_p = \text{Peak Flow (l/s)}$$

$$C = C_v \times C_r \text{ (} C_v = 0.75 \text{ \& } C_r = 1.3 \text{)}$$

$$i = \text{Rainfall intensity (mm/hr)}$$

- 5.1.4 The drawings included with this submission show the Proposed Storm Drainage Plan (drawing number 251034-MPA-X-X-X-XXX-DR-CE-1200 and Proposed Storm Sewer Longitudinal Sections (drawing number 251034-MPA-X-X-X-XXX-DR-CE-2100).

5.2 Gravity System

- 5.2.1 The pipe network has been designed in accordance with the Modified Rational Method, utilising rainfall data for the Kilkenny area from Met Eireann. The rainfall data has been entered into the Site 3D modelling software. Simulations for different storm events plus climate change according to the requirements of Kilkenny County Council which are in accordance with the Greater Dublin Strategic Drainage Study (GSDSDS) and performs the analysis to size the drainage systems including pipes diameters and attenuation volume requirements.
- 5.2.2 Stormwater simulations were carried out for the 1 in 5, 30 and 100 years plus 20% climate change, thereby ensuring an appropriate level of service for the storm drainage system. The time of entry has been taken to be 5 minutes in accordance with Recommendations for Site Development. Appropriate pipe roughness coefficients have been taken from the pipe literature.

5.2.3 The pipes required to drain the proposed development vary between 225mm and 300mm in diameter.

5.2.4 It can be seen in **Appendix B** that all pipes have been designed with adequate capacity and the partial velocities for all pipes are above 0.70 m/s, in accordance with BS EN 752: 2008, thereby ensuring adequate self-cleansing velocities for the entire system.

5.3 Petrol Interceptor

5.3.1 A Kingspan Klargest Petrol Interceptors (NSBP010) have been provided to filter hydrocarbons from the runoff water from the roads and parking spaces as shown on the Proposed Storm Drainage Plan, 251034-MPA-X-X-X-XXX-DR-CE-1200.

5.3.2 The bypass separators have been sized based on the corresponding drainage area from the hardstanding areas on site. The NSBP010 model is sized to serve a maximum drained area of 5560 m² with capacity for 1000l of silt and 150l of oil.

5.4 Infiltration System Design

General

5.4.1 It is proposed that the storm water from roofs, roads, footpaths and paved areas are to be discharged to an engineered infiltration system to serve the development as outlined within the enclosed drawing Proposed Storm Drainage Plan, 251034-MPA-X-X-X-XXX-DR-CE-1200.

Infiltration Testing

5.4.2 Site infiltration testing was carried out by Declan Kearns & Associates, and it found suitable infiltration on site. Infiltration rates of 1.845E-05 m/sec, or 0.001107 m/min was established as indicated within **Appendix C**.

5.5 SuDS Measures

Engineered Soakaway

5.5.1 It is proposed that the storm pipework will convey all storm water from the hard standing areas and contributing surrounding area to an engineered soakaway. The engineered soakaways will consist of modular geocellular units with depths of 1.35m with a voids ratio of 95% and will allow for storm water to infiltrate to ground.

5.5.2 The geocellular units and the perforated inlet/outlet pipe are wrapped in geotextile to protect them against construction damage and also to stop silt and clay from filling the voids of the modular unit.

5.5.3 The engineered soakaway incorporates inlet manholes with sumps and overflow weirs which direct the first flush into an isolator row. The isolator row and sump can be easily accessed, and the necessary maintenance can be undertaken.

- 5.5.4 Infiltration system has been designed and sized for a 100 year plus 20% climate change as indicated within **Appendix B**. This also confirms the required infiltration tank volume to be 307m³ and the time to emptying to 50% to be less than 24 hours in accordance with CIRIA Guide 156 based on the equation for flow equilibrium.

Rain gardens, Bio-Retention Areas & Swales

- 5.5.5 It is proposed that the main carpark will be provided with a series of rain gardens and Swales through the site as indicated within the Proposed Storm Drainage Plan, 251034-MPA-X-X-X-XXX-DR-CE-1200.
- 5.5.6 The Bio-Retention areas and swales areas are planted depressions that allow rainwater and runoff from impervious areas to be filtered, stored and percolated through the natural ground.
- 5.5.7 Additionally there will be overflow pipes from each Bio-Retention area that will connect through a carrier drain into the proposed infiltration system.
- 5.5.8 Tree pits are also to be incorporated within the landscaping design to manage stormwater and in accordance with *Implementation of Urban Nature-based Solutions Guidance Document for Planners, Developers and Developer Agents*.

Rainwater Butts

- 5.5.9 Rainwater butts will be supplied at the rear of each dwelling house for rainwater harvesting. All rainwater butts will be fitted with an overflow facility to discharge into the development site main drainage.

6.0 WATERMAIN

6.1 Existing Infrastructure

- 6.1.1 There are 2 No. existing watermain located within the adjoining Glendine Road, a 200mm cast iron pipe to the West and a 375mm diameter asbestos truck main as set out within **Figure 7.1** below.
- 6.1.2 A spur connection has been provided to the site, however with the adjustment to the site entrance as noted previously, the existing spur connection is unsuitable therefore a new connection is proposed.
- 6.1.3 A pre-Connection Enquiry has been issued to Uisce Éireann with reference number CDS25004365. At the time of writing, a return on the submitted PCE and associated confirmation of feasibility is awaited. A copy of the latest correspondence from Uisce Éireann can be seen on Appendix A.

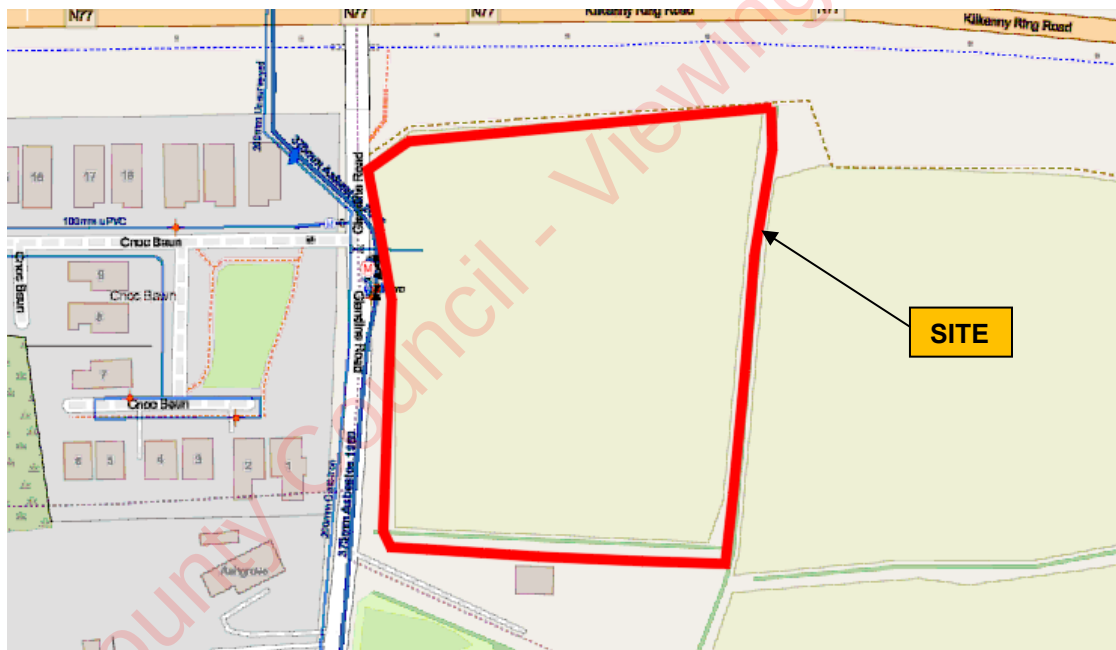


Figure 6.1– EXISTING WATERMAIN INFRASTRUCTURE

6.2 General

- 6.2.1 The watermain has been designed for the full development and will be laid out in accordance with Irish Water Code of Practice for Water Infrastructure Connections and Developer Services Design and Construction Requirements for Self-Lay Developments July 2020 (Revision 2) Document IW-CDS-5020-03 and as outlined within Drawing No. 251015-MPA-2-X-XXX-DR-CE-1300 - Proposed Watermain Layout.

- 6.2.2 In accordance with Irish Water Code of Practice a 100mm diameter MDPE (PE 80) to IS EN 12201: Part 1 and 2 and IS EN 12203-3 watermain will serve the proposed development. This will be served by connecting to the existing water supply network on Glendine Road.

6.3 Design Data

- 6.3.1 The supply shall be metered with the relevant bulk water meter which is located at the entrance to the site in accordance with the requirements of Irish Water. Each dwelling will be fitted with the relevant boundary box to Irish Water standards.
- 6.3.2 All boundary boxes, air valves, scour valves, sluice valves and water meters as required, will be provided around the site as shown on Drawing No. 251034-MPA-X-X-X-XX-DR-CE-1300 – Proposed Watermain Layout.
- 6.3.3 Screw down type fire hydrants complying with B.S. 750: 1984 will be provided as shown, as can be seen hydrants are not located in roadways or parking spaces, and no building is more than 46m from a hydrant.
- 6.3.4 A looped water main layout is to be adopted to ensure no significant dead ends and provide balanced pressure throughout, wash out hydrants will be provided at the end of short runs where looping is not feasible.
- 6.3.5 A summary of the expected average and daily demand for the development is shown in **Table 7.1** below. Daily demand has been calculated based on Irish Water Code of Practice, which outlines average daily domestic demand shall be based on a per-capita consumption of 150 l/person/day and an average occupancy ratio of 2.7 persons per dwelling, i.e. 405l/dwelling/day.
- 6.3.6 The average day/peak week demand should be taken as 1.25 times the average daily domestic demand. The peak demand for sizing of the pipe network will normally be 5.0 times the average day/ peak week demand as outlined within **Table 7.1** below.

Table 7.1 Estimated Average Flows	
Building use Category	Residential
Number of Units	50
Daily Demand (litres/person/day)	405
Total Daily Demand (litres/day)	20,250
Average Demand (litres/second) *	0.35
Peak Flow (litres/second)	1.75
Total - Peak Flow (litres/second)	1.75/s

* The unit has been assumed to be used for 16 hours per day.

7.0 SUMMARY AND CONCLUSIONS

7.1 Summary

- 7.1.1 This Engineering Services Design Report (ESDR) which has been prepared by MPA Consulting Engineers at the request of our client Ormonde Homes (Glendine) Ltd. and relates to a proposed residential development of 50No. units at "Glendine Way", Bonnettsrath, Kilkenny, Co. Kilkenny.
- 7.1.2 A preliminary flood risk assessment was carried out in order to determine if the site was at risk of flooding. After studying historical maps, historic past flood events and CFRAM maps, the site is located in Flood Zone C and thus is suitable for development.
- 7.1.3 The design of the site entrance, internal road network and parking spaces been carried out to take account of the requirements of the Design Manual for Urban Roads and Streets (DMURS) and the requirements of Kilkenny County Council.
- 7.1.4 The proposed wastewater sewer will be a gravity fed system that will take all wastewater from the proposed development and connect to the existing sewer that exists at the entrance junction of the Glendine Woods Estate.
- 7.1.5 SuDS measures have effectively been incorporated into the design in the form of engineered soakaways, Swales, Rain Gardens, and Tree Pits which allow stormwater to infiltrate to ground.
- 7.1.6 Stormwater from the roofs, carriageways, shared surfaces and footpaths will be conveyed via a formal gully and pipe system which will convey stormwater to a soakaways located on site.
- 7.1.7 The water supply facility will be provided by a connection to the existing watermain on the adjoining Glendine Road.

7.2 Conclusions

- 7.2.1 In conclusion the proposed site is deemed suitable for development, as it is located in Flood Zone C.
- 7.2.2 The proposed entrance and internal road network have been designed in accordance with DMURS and Kilkenny County Council and will provide safe access, circulation and egress for the development.
- 7.2.3 This report has shown that the wastewater drainage proposed for the site has sufficient capacity and a connection to an appropriate public main can be established without difficulty, thus ensuring adequate wastewater drainage for the proposed development.
- 7.2.4 As can be seen from the preceding information, the storm management system on the site, with the incorporation of infiltration and storage devices has sufficient capacity, thus ensuring adequate drainage for the proposed development.

- 7.2.5 A suitable watermain connection can be provided in accordance with Uisce Eireann Code of Practice for Water Infrastructure ensuring adequate potable water supply for the development.

Appendix A

Uisce Eireann Correspondence

Eddie Quann :: MPA Consulting Engineers

From: newconnections <newconnections@water.ie>
Sent: Tuesday 17 June 2025 11:29
To: Eddie Quann :: MPA Consulting Engineers
Subject: CDS25004365 Uisce Éireann Pre-Connection Enquiry EMAIL:0624987



Uisce Éireann Pre Connection Enquiry Ref Number: CDS25004365

Dear Customer,

Thank you for submitting your Pre-connection Enquiry Form for 251034 - Site, Ballyfoyle Road, Radestown, Kilkenny . Your Uisce Éireann reference number for your application is CDS25004365, which you can keep for your records.

Next steps in your enquiry:

Assessment of Enquiry: Your enquiry is currently being assessed to confirm it is technically feasible; we will be in touch once this assessment has been completed. A significant level of analysis is required before we can provide a response. Two of a number of considerations are:

- A review of the available capacity in Uisce Éireann infrastructure versus your requirements.
- The location for connection versus the distance to/from our network.

Where your requirements are of a significant nature for example, multiple properties or commercial/industrial developments, this work may take a period of time to complete.

Getting a Confirmation of Feasibility: If your application is technically feasible, we will issue you with a letter of "Confirmation of Feasibility". This will outline what capital works if any, may be required to upgrade the public infrastructure to cater for your development.

From receipt of your Pre-connection Enquiry, it takes on average 16 weeks to issue a Confirmation of Feasibility.

Design Layout Approval: Where you are proposing to apply for a housing development (two or more properties), a **Statement of Design Acceptance** to your proposal will be required from Uisce Éireann before applying for Planning Permission. Please therefore submit your designs for assessment to Uisce Éireann to ensure they comply with our requirements, in advance of applying for Planning Permission.

Connection Application: Your Confirmation of Feasibility; which is a specific requirement to apply for Planning Permission through the Strategic Housing Development process, will assist you in obtaining your Planning Permission following which you may apply for your connection immediately.

If you have any further queries please contact us on **1800 278 278** or **+353 1 707 2828**; alternatively, you can visit www.water.ie/connections for more information.

Please note that the rates charged for 1850 numbers may vary across different service providers. Calls from mobiles may be more expensive.

Please do not amend this subject line as it will help us deal with your response.

Yours sincerely,

Customer Service Advisor



Callsave 1800 278 278 | +353 1 707 2828

www.water.ie/connections



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Colvill House, 24-26 Talbot Street, Dublin 1

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Thank you for your attention.

Appendix B

Storm Modelling Output

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S1.0	0.072	1.350	Type C	61.822	60.794	0.803	650909.855	658621.586
S1.1	0.128	1.350	Type C	61.668	60.343	1.025	650889.405	658622.981
S2.0	0.012	1.200	Unknown	61.836	60.886	0.725	650797.970	658629.060
S2.1	0.012	1.350	Type C	62.162	60.757	1.180	650808.795	658627.496
S2.2	0.126	1.350	Type C	61.940	60.681	1.034	650821.191	658618.683
S1.2	0.054	1.350	Type B	61.989	60.146	1.543	650850.222	658619.965
S3.0	0.112	1.200	Unknown	63.575	62.150	1.200	650896.446	658554.706
S3.1	0.018	1.350	Type C	63.639	61.938	1.475	650854.216	658556.781
S4.0	0.075	1.200	Unknown	63.525	62.175	1.125	650806.161	658561.602
S3.2	0.069	1.200	Type B	63.759	61.895	1.639	650845.845	658558.985
S1.3	0.000	1.200	Type B	62.763	60.038	2.425	650848.335	658593.079
S1.4	0.000	1.200	Type B	62.805	60.006	2.499	650840.236	658593.387
S6.0	0.040	1.200	Unknown	63.200	62.350	0.700	650797.881	658575.476
S6.1	0.000	1.350	Type C	62.500	61.675	0.600	650797.559	658610.920
S6.2	0.000	1.350	Type C	62.223	61.521	0.477	650820.703	658610.885
S6.3	0.024	1.200	Unknown	62.292	61.466	0.601	650825.401	658604.075
S5.0	0.021	1.200	Unknown	63.385	62.314	0.845	650824.957	658576.711
S5.1	0.000	1.200	Unknown	62.766	61.395	1.146	650825.113	658593.342
S5.2	0.000	1.350	Type C	62.769	61.379	1.166	650827.585	658593.427
TANK 1	0.000	1.200	Type B	62.778	59.875	2.678	650832.915	658593.612

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S1.0	60.794	S1.1	60.589	Circ	0.225mØ	20.498	100.0	0.600	0.803	0.854
1.001	S1.1	60.343	S1.2	60.146	Circ	0.3mØ	39.298	200.0	0.600	1.025	1.543
2.000	S2.0	60.886	S2.1	60.832	Circ	0.225mØ	10.937	200.0	0.600	0.725	1.105
2.001	S2.1	60.757	S2.2	60.681	Circ	0.225mØ	15.209	200.0	0.600	1.180	1.034
2.002	S2.2	60.681	S1.2	60.535	Circ	0.225mØ	29.060	200.0	0.600	1.034	1.229
1.002	S1.2	60.146	S1.3	60.038	Circ	0.3mØ	26.951	250.0	0.600	1.543	2.425
3.000	S3.0	62.150	S3.1	61.938	Circ	0.225mØ	42.282	200.0	0.600	1.200	1.475
3.001	S3.1	61.938	S3.2	61.895	Circ	0.225mØ	8.656	200.0	0.600	1.475	1.639
4.000	S4.0	62.175	S3.2	61.895	Circ	0.225mØ	39.769	142.3	0.600	1.125	1.639
3.002	S3.2	61.895	S1.3	61.724	Circ	0.225mØ	34.185	200.0	0.600	1.639	0.814
1.003	S1.3	60.038	S1.4	60.006	Circ	0.3mØ	8.105	250.0	0.600	2.425	2.499
1.004	S1.4	60.006	TANK 1	59.977	Circ	0.3mØ	7.324	250.0	0.600	2.499	2.501
5.000	S6.0	62.350	S6.1	61.759	Circ	0.15mØ	35.445	60.0	0.600	0.700	0.591
5.001	S6.1	61.675	S6.2	61.521	Circ	0.225mØ	23.145	150.0	0.600	0.600	0.477
5.002	S6.2	61.521	S6.3	61.466	Circ	0.225mØ	8.273	150.0	0.600	0.477	0.601
5.003	S6.3	61.466	S5.1	61.395	Circ	0.225mØ	10.737	152.2	0.600	0.601	1.146
6.000	S5.0	62.314	S5.1	62.203	Circ	0.225mØ	16.632	150.0	0.600	0.845	0.337
5.004	S5.1	61.395	S5.2	61.379	Circ	0.225mØ	2.474	149.9	0.600	1.146	1.166
5.005	S5.2	61.379	TANK 1	59.875	Circ	0.225mØ	5.333	3.5	0.600	1.166	2.678

Outfall Details

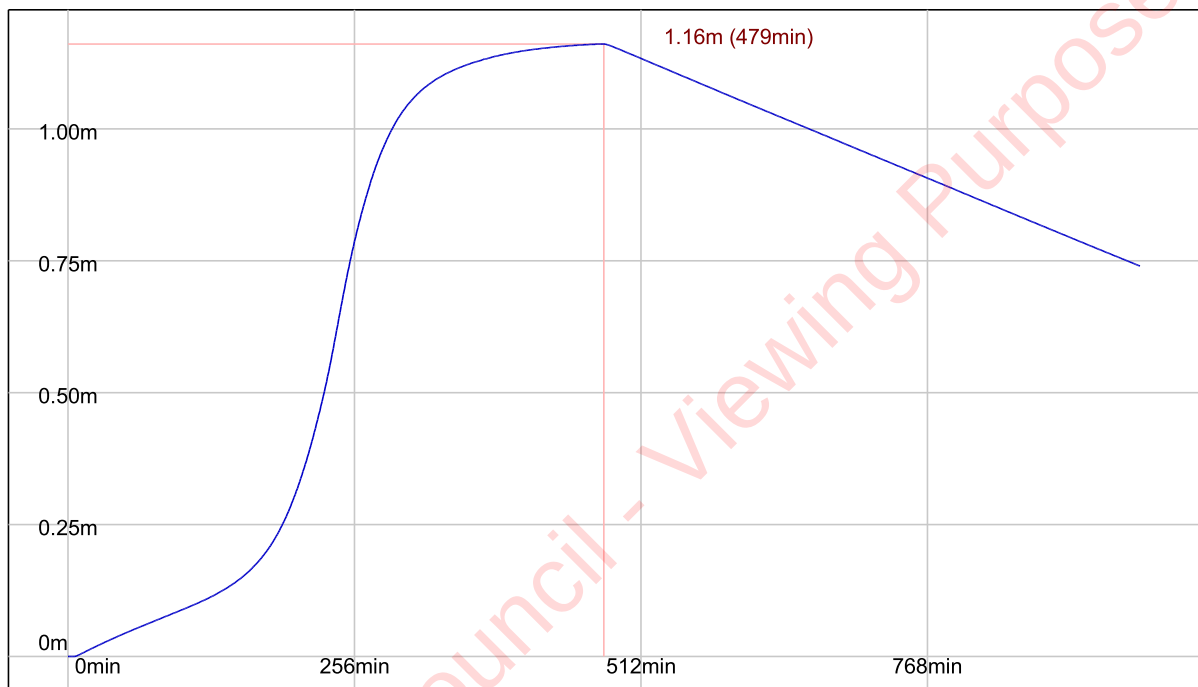
Outfall Manhole TANK 1 : Infiltration Tank

Flow Control Details

Tank Structure at Manhole TANK 1

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
59.875	1.350	95.00	240.053	228.050	307.867	0.06642000	0.06642000	1.50

Tank at TANK 1 (100Yr+20% 480Min Summer)



Simulation Settings

FSR: M5-60=16.20, R=0.35, Locale=Scotland and Northern Ireland
Summer (Cv: 0.75)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880

Return Periods (yrs) + Climate Change: (1, +20%), (5, +20%), (30, +20%), (100, +20%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
1Yr+20% 15Min Summer	31.047	0.00	-0.09	30Yr+20% 15Min Summer	79.204	0.00	0.00
1Yr+20% 30Min Summer	18.989	0.00	-0.07	30Yr+20% 30Min Summer	56.700	0.00	0.27
1Yr+20% 60Min Summer	14.020	0.00	-0.06	30Yr+20% 60Min Summer	29.417	0.00	0.28
1Yr+20% 120Min Summer	8.747	0.00	-0.03	30Yr+20% 120Min Summer	18.019	0.00	0.44
1Yr+20% 180Min Summer	6.606	0.00	0.00	30Yr+20% 180Min Summer	13.434	0.00	0.40
1Yr+20% 240Min Summer	5.408	0.00	0.00	30Yr+20% 240Min Summer	10.882	0.00	0.30
1Yr+20% 360Min Summer	4.085	0.00	0.00	30Yr+20% 360Min Summer	8.041	0.00	0.10
1Yr+20% 480Min Summer	3.340	0.00	0.00	30Yr+20% 480Min Summer	6.496	0.00	0.00
1Yr+20% 600Min Summer	2.856	0.00	0.00	30Yr+20% 600Min Summer	5.503	0.00	0.00
1Yr+20% 720Min Summer	2.513	0.00	0.00	30Yr+20% 720Min Summer	4.803	0.00	-0.01
1Yr+20% 960Min Summer	2.053	0.00	0.00	30Yr+20% 960Min Summer	3.875	0.00	0.00
1Yr+20% 1440Min Summer	1.544	0.00	0.00	30Yr+20% 1440Min Summer	2.860	0.00	0.00
1Yr+20% 2160Min Summer	1.160	0.00	0.00	30Yr+20% 2160Min Summer	2.111	0.00	0.00
1Yr+20% 2880Min Summer	0.948	0.00	0.00	30Yr+20% 2880Min Summer	1.701	0.00	0.00
5Yr+20% 15Min Summer	48.360	0.00	-0.11	100Yr+20% 15Min Summer	110.338	0.00	0.33
5Yr+20% 30Min Summer	31.864	0.00	-0.07	100Yr+20% 30Min Summer	83.513	0.00	1.21
5Yr+20% 60Min Summer	19.909	0.00	0.00	100Yr+20% 60Min Summer	38.241	0.00	0.90
5Yr+20% 120Min Summer	12.313	0.00	0.00	100Yr+20% 120Min Summer	23.273	0.00	1.05
5Yr+20% 180Min Summer	9.243	0.00	0.00	100Yr+20% 180Min Summer	17.272	0.00	1.00
5Yr+20% 240Min Summer	7.529	0.00	0.00	100Yr+20% 240Min Summer	13.939	0.00	0.91
5Yr+20% 360Min Summer	5.628	0.00	-0.02	100Yr+20% 360Min Summer	10.219	0.00	0.63
5Yr+20% 480Min Summer	4.575	0.00	0.00	100Yr+20% 480Min Summer	8.222	0.00	0.40
5Yr+20% 600Min Summer	3.895	0.00	0.00	100Yr+20% 600Min Summer	6.941	0.00	0.15
5Yr+20% 720Min Summer	3.414	0.00	0.00	100Yr+20% 720Min Summer	6.042	0.00	0.01
5Yr+20% 960Min Summer	2.773	0.00	0.00	100Yr+20% 960Min Summer	4.852	0.00	-0.01
5Yr+20% 1440Min Summer	2.067	0.00	0.00	100Yr+20% 1440Min Summer	3.559	0.00	0.00
5Yr+20% 2160Min Summer	1.540	0.00	0.00	100Yr+20% 2160Min Summer	2.608	0.00	0.00
5Yr+20% 2880Min Summer	1.250	0.00	0.00	100Yr+20% 2880Min Summer	2.092	0.00	0.00

Simulation Results

Return Period Yrs: 1.0

Climate Change %: 20

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1.0	15 min Summer	8	60.859	0.066	9.881		OK
S1.1	15 min Summer	8	60.462	0.119	27.329		OK
S2.0	15 min Summer	8	60.918	0.032	1.620		OK
S2.1	15 min Summer	9	60.801	0.044	3.129		OK
S2.2	15 min Summer	9	60.798	0.117	19.805		OK
S1.2	15 min Summer	9	60.352	0.206	54.007		OK
S3.0	15 min Summer	8	62.249	0.099	15.370		OK
S3.1	15 min Summer	9	62.071	0.132	17.321		OK
S4.0	15 min Summer	8	62.248	0.073	10.274		OK
S3.2	15 min Summer	9	62.067	0.172	35.938		OK
S1.3	15 min Summer	9	60.303	0.265	88.348		OK
S1.4	15 min Summer	9	60.254	0.248	87.735		OK
S6.0	15 min Summer	8	62.399	0.049	5.567		OK
S6.1	15 min Summer	9	61.729	0.054	5.426		OK
S6.2	15 min Summer	9	61.575	0.054	5.464		OK
S6.3	15 min Summer	9	61.535	0.069	8.555		OK
S5.0	15 min Summer	8	62.353	0.039	2.836		OK
S5.1	15 min Summer	9	61.473	0.078	11.307		OK
S5.2	15 min Summer	9	61.409	0.031	11.284		OK
TANK 1	480 min Summer	344	60.195	0.395	3.286		OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S1.0	S1.1	0.065	1.013	9.743	0.188	OK
1.001	15 min Summer	9	S1.1	S1.2	0.162	0.734	26.905	0.344	OK
2.000	15 min Summer	8	S2.0	S2.1	0.031	0.468	1.579	0.043	OK
2.001	15 min Summer	9	S2.1	S2.2	0.081	0.246	3.159	0.086	OK
2.002	15 min Summer	9	S2.2	S1.2	0.117	0.960	20.161	0.552	OK
1.002	15 min Summer	9	S1.2	S1.3	0.235	0.908	53.421	0.765	OK
3.000	15 min Summer	9	S3.0	S3.1	0.116	0.814	15.103	0.413	OK
3.001	15 min Summer	9	S3.1	S3.2	0.152	0.622	16.841	0.461	OK
4.000	15 min Summer	9	S4.0	S3.2	0.122	0.513	10.094	0.232	OK
3.002	15 min Summer	9	S3.2	S1.3	0.164	1.130	34.927	0.956	OK
1.003	15 min Summer	9	S1.3	S1.4	0.256	1.364	87.735	1.256	OK
1.004	15 min Summer	10	S1.4	TANK 1	0.239	1.454	87.729	1.256	OK
5.000	15 min Summer	9	S6.0	S6.1	0.049	1.071	5.426	0.236	OK
5.001	15 min Summer	9	S6.1	S6.2	0.054	0.746	5.464	0.129	OK
5.002	15 min Summer	9	S6.2	S6.3	0.062	0.618	5.431	0.128	OK
5.003	15 min Summer	9	S6.3	S5.1	0.074	0.753	8.542	0.203	OK
6.000	15 min Summer	8	S5.0	S5.1	0.039	0.611	2.769	0.065	OK
5.004	15 min Summer	9	S5.1	S5.2	0.055	1.513	11.284	0.267	OK
5.005	180 min Summer	105	S5.2	TANK 1	0.120	1.979	4.407	0.016	OK

Return Period Yrs: 5.0

Climate Change %: 20

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1.0	15 min Summer	8	60.877	0.083	15.393		OK
S1.1	15 min Summer	10	60.587	0.244	34.803		OK
S2.0	15 min Summer	8	60.926	0.039	2.524		OK
S2.1	15 min Summer	9	60.837	0.081	4.871		OK
S2.2	15 min Summer	9	60.837	0.156	31.407		OK
S1.2	15 min Summer	10	60.556	0.410	74.229		Surcharged
S3.0	15 min Summer	8	62.279	0.130	23.943		OK
S3.1	15 min Summer	10	62.228	0.289	23.077		Surcharged
S4.0	15 min Summer	8	62.267	0.093	16.005		OK
S3.2	15 min Summer	10	62.211	0.315	48.961		Surcharged
S1.3	15 min Summer	10	60.438	0.400	126.088		Surcharged
S1.4	480 min Summer	380	60.377	0.371	3.058		Surcharged
S6.0	15 min Summer	8	62.413	0.063	8.673		OK
S6.1	15 min Summer	9	61.743	0.068	8.450		OK
S6.2	15 min Summer	9	61.590	0.069	8.509		OK
S6.3	15 min Summer	9	61.554	0.089	13.385		OK
S5.0	15 min Summer	8	62.363	0.048	4.417		OK
S5.1	15 min Summer	9	61.495	0.100	17.712		OK
S5.2	15 min Summer	9	61.417	0.038	17.716		OK
TANK 1	480 min Summer	381	60.377	0.577	3.426		OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S1.0	S1.1	0.083	1.148	15.208	0.293	OK
1.001	15 min Summer	10	S1.1	S1.2	0.272	0.791	38.117	0.487	OK
2.000	15 min Summer	8	S2.0	S2.1	0.039	0.533	2.477	0.068	OK
2.001	15 min Summer	9	S2.1	S2.2	0.119	0.270	5.480	0.150	OK
2.002	15 min Summer	9	S2.2	S1.2	0.152	1.093	31.273	0.856	OK
1.002	30 min Summer	16	S1.2	S1.3	0.300	0.986	69.671	0.997	Surcharged
3.000	15 min Summer	9	S3.0	S3.1	0.177	0.849	23.567	0.645	OK
3.001	30 min Summer	17	S3.1	S3.2	0.225	0.606	22.051	0.603	OK
4.000	15 min Summer	8	S4.0	S3.2	0.159	0.567	15.784	0.363	OK
3.002	15 min Summer	10	S3.2	S1.3	0.205	1.313	49.995	1.368	OK
1.003	30 min Summer	17	S1.3	S1.4	0.300	1.611	113.865	1.630	Surcharged
1.004	180 min Summer	126	S1.4	TANK 1	0.300	1.162	49.364	0.707	Surcharged
5.000	15 min Summer	8	S6.0	S6.1	0.063	1.210	8.478	0.369	OK
5.001	15 min Summer	9	S6.1	S6.2	0.069	0.836	8.509	0.201	OK
5.002	15 min Summer	9	S6.2	S6.3	0.079	0.688	8.520	0.201	OK
5.003	15 min Summer	9	S6.3	S5.1	0.094	0.846	13.410	0.319	OK
6.000	15 min Summer	8	S5.0	S5.1	0.048	0.695	4.338	0.103	OK
5.004	15 min Summer	9	S5.1	S5.2	0.069	1.706	17.716	0.419	OK
5.005	60 min Summer	35	S5.2	TANK 1	0.126	2.724	11.747	0.042	OK

Return Period Yrs: 30.0

Climate Change %: 20

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1.0	15 min Summer	10	61.032	0.238	20.063		Surcharged
S1.1	15 min Summer	10	61.004	0.661	56.121		Surcharged
S2.0	15 min Summer	10	61.081	0.195	3.289		OK
S2.1	15 min Summer	10	61.083	0.326	9.512		Surcharged
S2.2	15 min Summer	10	61.074	0.393	40.838		Surcharged
S1.2	15 min Summer	10	60.910	0.764	110.783		Surcharged
S3.0	15 min Summer	10	62.707	0.557	31.207		Surcharged
S3.1	15 min Summer	10	62.565	0.627	36.218		Surcharged
S4.0	15 min Summer	10	62.582	0.407	20.860		Surcharged
S3.2	30 min Summer	18	62.528	0.633	70.357		Surcharged
S1.3	480 min Summer	446	60.680	0.642	3.278		Surcharged
S1.4	480 min Summer	446	60.680	0.674	3.278		Surcharged
S6.0	15 min Summer	8	62.434	0.084	14.205		OK
S6.1	15 min Summer	9	61.763	0.088	13.832		OK
S6.2	15 min Summer	9	61.613	0.093	13.932		OK
S6.3	15 min Summer	9	61.584	0.119	21.975		OK
S5.0	15 min Summer	8	62.376	0.062	7.235		OK
S5.1	15 min Summer	9	61.530	0.135	29.078		OK
S5.2	15 min Summer	9	61.427	0.048	29.116		OK
TANK 1	480 min Summer	446	60.680	0.880	3.690		OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	10	S1.0	S1.1	0.225	1.261	23.615	0.455	OK
1.001	30 min Summer	16	S1.1	S1.2	0.300	0.807	57.043	0.729	Surcharged
2.000	15 min Summer	11	S2.0	S2.1	0.210	0.557	6.394	0.175	OK
2.001	30 min Summer	20	S2.1	S2.2	0.225	0.359	13.084	0.358	OK
2.002	30 min Summer	16	S2.2	S1.2	0.225	1.142	43.346	1.186	OK
1.002	30 min Summer	18	S1.2	S1.3	0.300	1.530	108.158	1.548	Surcharged
3.000	30 min Summer	16	S3.0	S3.1	0.225	0.830	32.484	0.889	OK
3.001	30 min Summer	18	S3.1	S3.2	0.225	0.863	34.332	0.939	OK
4.000	30 min Summer	16	S4.0	S3.2	0.225	0.673	21.385	0.492	OK
3.002	30 min Summer	18	S3.2	S1.3	0.217	1.806	71.014	1.943	OK
1.003	30 min Summer	18	S1.3	S1.4	0.300	2.536	179.295	2.567	Surcharged
1.004	30 min Summer	18	S1.4	TANK 1	0.300	2.537	179.318	2.567	Surcharged
5.000	15 min Summer	8	S6.0	S6.1	0.084	1.371	13.932	0.607	OK
5.001	15 min Summer	9	S6.1	S6.2	0.090	0.941	13.932	0.329	OK
5.002	15 min Summer	9	S6.2	S6.3	0.106	0.769	14.007	0.331	OK
5.003	15 min Summer	9	S6.3	S5.1	0.127	0.952	22.044	0.525	OK
6.000	15 min Summer	8	S5.0	S5.1	0.062	0.802	7.133	0.169	OK
5.004	15 min Summer	9	S5.1	S5.2	0.092	1.908	29.116	0.688	OK
5.005	30 min Summer	17	S5.2	TANK 1	0.136	3.450	27.961	0.101	OK

Return Period Yrs: 100.0

Climate Change %: 20

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1.0	30 min Summer	18	61.611	0.817	25.907		Flood Risk
S1.1	30 min Summer	18	61.559	1.217	73.278		Flood Risk
S2.0	30 min Summer	18	61.688	0.802	4.246		Flood Risk
S2.1	30 min Summer	18	61.689	0.932	8.882		Surcharged
S2.2	30 min Summer	18	61.682	1.001	51.756		Flood Risk
S1.2	30 min Summer	18	61.396	1.250	146.901		Surcharged
S3.0	30 min Summer	18	63.373	1.223	40.297		Flood Risk
S3.1	30 min Summer	18	63.118	1.180	48.316		Surcharged
S4.0	30 min Summer	18	63.146	0.971	26.936		Surcharged
S3.2	30 min Summer	18	63.051	1.156	97.954		Surcharged
S1.3	30 min Summer	19	60.990	0.951	231.741		Surcharged
S1.4	480 min Summer	477	60.961	0.955	3.682		Surcharged
S6.0	30 min Summer	16	62.457	0.107	19.987		OK
S6.1	30 min Summer	16	61.783	0.108	19.956		OK
S6.2	30 min Summer	16	61.637	0.116	19.937		OK
S6.3	30 min Summer	16	61.617	0.152	31.439		OK
S5.0	30 min Summer	16	62.389	0.074	10.181		OK
S5.1	30 min Summer	16	61.570	0.175	41.427		OK
S5.2	30 min Summer	16	61.436	0.058	41.194		OK
TANK 1	480 min Summer	478	60.961	1.161	3.860		OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	30 min Summer	17	S1.0	S1.1	0.225	1.178	28.761	0.554	OK
1.001	30 min Summer	17	S1.1	S1.2	0.300	1.115	78.805	1.008	Surcharged
2.000	30 min Summer	20	S2.0	S2.1	0.225	0.545	6.585	0.180	OK
2.001	30 min Summer	21	S2.1	S2.2	0.225	0.380	15.115	0.414	OK
2.002	30 min Summer	18	S2.2	S1.2	0.225	1.324	52.659	1.441	OK
1.002	30 min Summer	18	S1.2	S1.3	0.300	2.059	145.519	2.083	Surcharged
3.000	30 min Summer	17	S3.0	S3.1	0.225	1.123	44.641	1.221	OK
3.001	30 min Summer	18	S3.1	S3.2	0.225	1.171	46.579	1.274	OK
4.000	30 min Summer	17	S4.0	S3.2	0.225	0.702	27.901	0.642	OK
3.002	30 min Summer	18	S3.2	S1.3	0.225	2.388	94.956	2.598	OK
1.003	30 min Summer	18	S1.3	S1.4	0.300	3.370	238.243	3.410	Surcharged
1.004	30 min Summer	18	S1.4	TANK 1	0.300	3.341	236.195	3.381	Surcharged
5.000	30 min Summer	16	S6.0	S6.1	0.107	1.475	19.956	0.869	OK
5.001	30 min Summer	16	S6.1	S6.2	0.112	1.009	19.937	0.471	OK
5.002	30 min Summer	16	S6.2	S6.3	0.134	0.817	19.732	0.467	OK
5.003	30 min Summer	16	S6.3	S5.1	0.164	1.009	31.242	0.744	OK
6.000	30 min Summer	16	S5.0	S5.1	0.074	0.889	10.185	0.241	OK
5.004	30 min Summer	16	S5.1	S5.2	0.117	1.982	41.194	0.974	OK
5.005	30 min Summer	16	S5.2	TANK 1	0.141	3.297	41.152	0.148	OK

Appendix C

Soakaway Test Report

**Report on Soakaway Test
at
Ballyfoyle Rd., Kilkenny
on behalf of
Ormonde Homes Ltd.**

Date : July 2025

1. INTRODUCTION

It is understood that it will be necessary to dispose of the storm water from the proposed Development at Ballyfoyle Rd., Kilkenny by means of a soakaway system on site.

An investigation has been carried out to assess the suitability of the sub-soils for this purpose and to determine soakaway requirements.

2. FIELDWORK

One trial pit was excavated in the location indicated on the site layout plan in order to ascertain subsoil conditions and the depth to groundwater.

The trial pit details are as follows:

Trial Pit ST1

Trial pit ST1 revealed 0.30m of topsoil over brown sandy gravelly CLAY (mottled from 0.70m) to the excavated depth of 2.20m. Groundwater was not encountered at a depth of 2.20m.

3. TESTING

To determine the soil infiltration rate, water was poured into the pits and records made of the fall in water level against time. Testing was continued until a constant rate of fall was established.

From the rate of fall in water level and measurement of the average internal surface area of the test pits over the test zone, the soil infiltration rate "f" was calculated.

The infiltration rate in the area of trial pit ST1 was determined to be 0.001107 m/min.

The soakaway system should be designed by the project engineer.

Appendix 1 **Site Photographs**
& Test Location

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Soakaway Test at Ballyfoyle Rd., Kilkenny



Figure 1. Testhole ST1



Figure 2. View of SA1 Location

Soakaway Test at Ballyfoyle Rd., Kilkenny



Figure 3. View of ST1 Arisings



Figure 4. Filling ST1 with water



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Appendix 1 Site Plan, Calculations & Field Data

$f = 0.001107 \text{ m/min}$ or $1.845\text{E-}05 \text{ m/sec}$