Appendix 3-1 Site Specific Flood Risk Assessment

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CONSULTING STRUCTURAL and CIVIL ENGINEERS

SITE SPECIFIC FLOOD RISK ASSESSMENT for a Residential/Commercial project at Kilternan Village Development, Kilternan, Dublin 18.

PROJECT: **KILTERNAN VILLAGE LRD - 2104C**
CLIENT: **LISCOVE LTD**
DATE: **MAY 2024**
ISSUE NO: **LRD STAGE 3**
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1.0 Introduction

1.1 This document relates to the Flood Risk Assessment (FRA) for a proposed mixed residential/commercial development located on lands at Wayside, Enniskerry Road, Kilternan, Dublin 18.

1.2 We, Roger Mullarkey & Associates, were appointed by Liscove Ltd. to carry out the Site Specific Flood Risk Assessment report to accompany the suite of other drawings and documentation relating to a proposed residential and commercial development at the above noted address.

1.3 The site application area is c.14.2Ha and the total drained S/W area is 12.6Ha. The existing lands are currently predominately greenfield and with a derelict dwelling known as “Rockville” and associated derelict outbuildings and the former Kilternan Country Market.

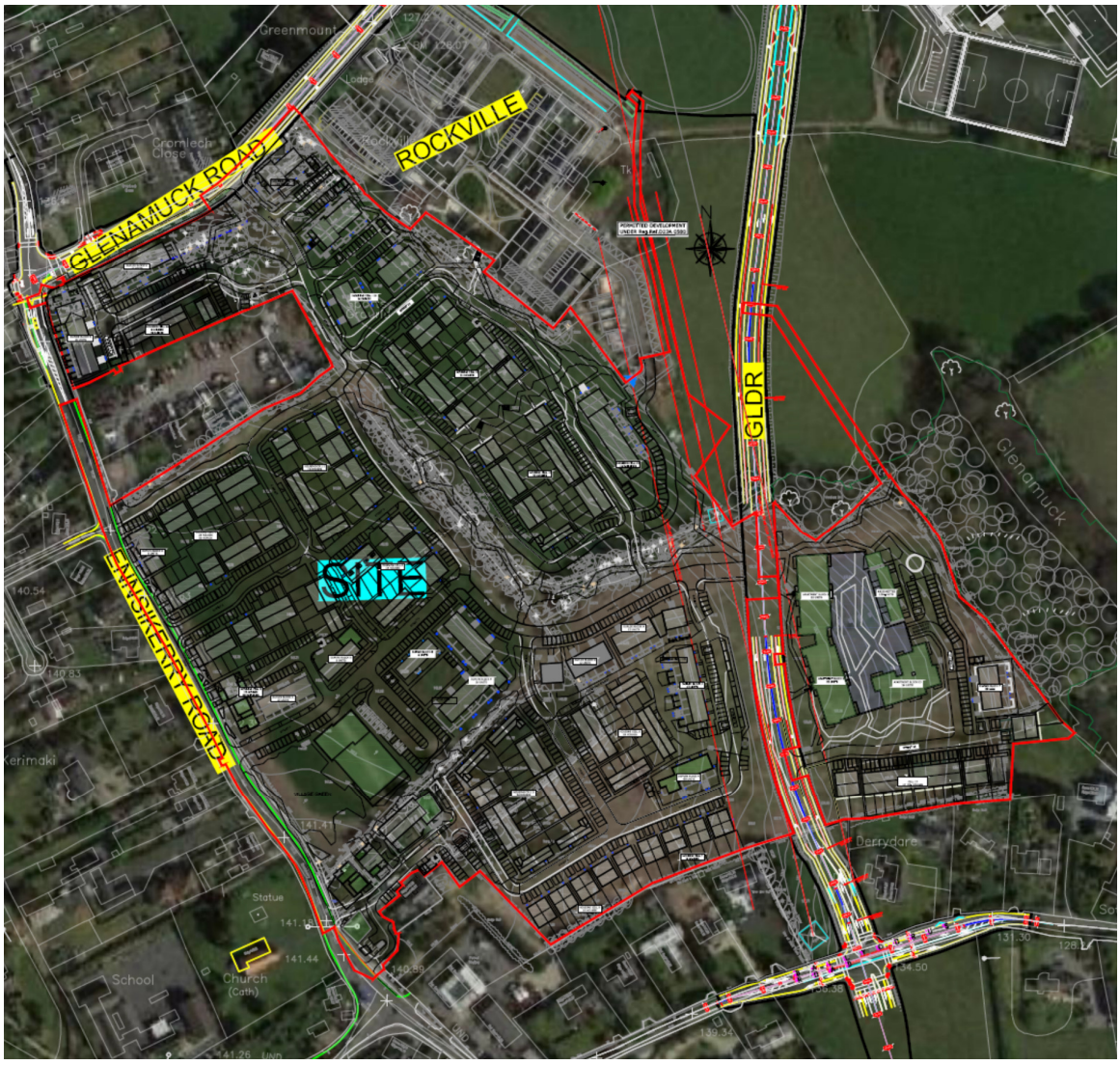


Fig.1 – Site Location

1.4 The development will principally consist of a mixed-use development consisting of 487No. residential units, a creche of 691m^2 floor space and a retail/commercial/community floor space of 5,434m^2. Please refer to Thornton O'Connor Planning Consultants for a full development description.

1.5 In accordance with the requirements set out in the DoEHLG and OPW published guidelines *The Planning System and Flood Risk Management 2009* (the Guidelines) and the Strategic Flood Risk Assessment Policy of Appendix 15 of the Dun Laoghaire Rathdown County Development Plan 2022 – 2028 a Site Specific Flood Risk Assessment (SSFRA) is carried out for this application.

1.6 The purpose of the SSFRA is to scope for possible sources of flooding, assess the types of flood risk for the proposed development and to consider if there are any possible impacts on flood risk elsewhere due to the development. Where appropriate, the SSFRA recommends flood mitigation and management measures and identifies residual risks, if any should remain after the implementation of the identified measures.

1.7 The report is intended for the sole use of the applicant, their elected agents and advisors and, further, solely for the purpose for which it was originally commissioned. It may not be assigned or copied to third parties or relied upon by third parties.

1.8 The criteria under which this Site Specific Flood Risk Assessment is carried out is in accordance with the DoEHLG and OPW requirements and the parameters ascertained by consultation with Drainage Department of Dun Laoghaire Rathdown County Council.

2.0 Flood Risk Guidelines and the Planning System

2.1 The Planning System and Flood Risk Management, Guidelines for Planning Authorities (the Guidelines) was published in November 2009. The main purpose of the Guidelines is to ensure that sustainable development can be delivered by integrating flood risk management into the planning process.

2.2 The core objectives of the guidelines are to;

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flooding elsewhere, including that which may arise from surface water runoff;
- Ensure effective management of residual risks for development permitted in floodplains;

- Avoid unnecessary restriction of national, regional, or local economic and social growth;

- Improve the understanding of flood risk among relevant stakeholders;

- Ensure that the requirements of EU and national law in relation to the environment and nature conservation are complied with at all stages of flood risk management.

2.3 A staged approach is adopted to the Flood Risk Assessment (FRA) as follows;

2.4 ***Stage 1 - Flood risk identification*** – identify whether there may be any flooding or surface water management issues related to either the area or regional planning guidelines, development plans and LAP's or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application levels.

2.5 ***Stage 2 - Initial flood risk assessment*** – to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed.

2.6 ***Stage 3 Detailed flood risk assessment*** – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

2.7 From the Guidelines Section 3.1, the broad philosophy underpinning the sequential approach in flood risk management is laid out as follows;

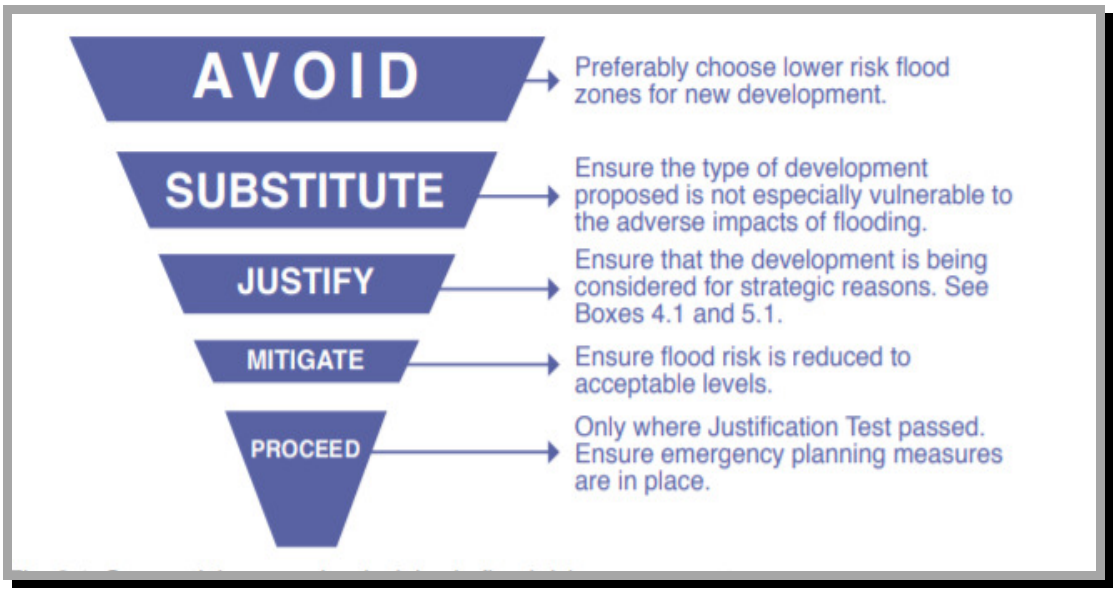


Fig.3 – Extract from *Section 3.1* of the *Guidelines*

2.8 The sequential approach to planning is a key tool in ensuring that development, particularly new development, is first and foremost directed towards land that is at low risk of flooding.

2.9 The sequential approach described in Fig.3 above should be applied to all stages of the planning and development management process and is applicable in the layout and design of development within a specific site at the development management stage.

2.10 The following flow chart from Section 3.2 of the Guidelines describes its mechanism for use in the planning process.

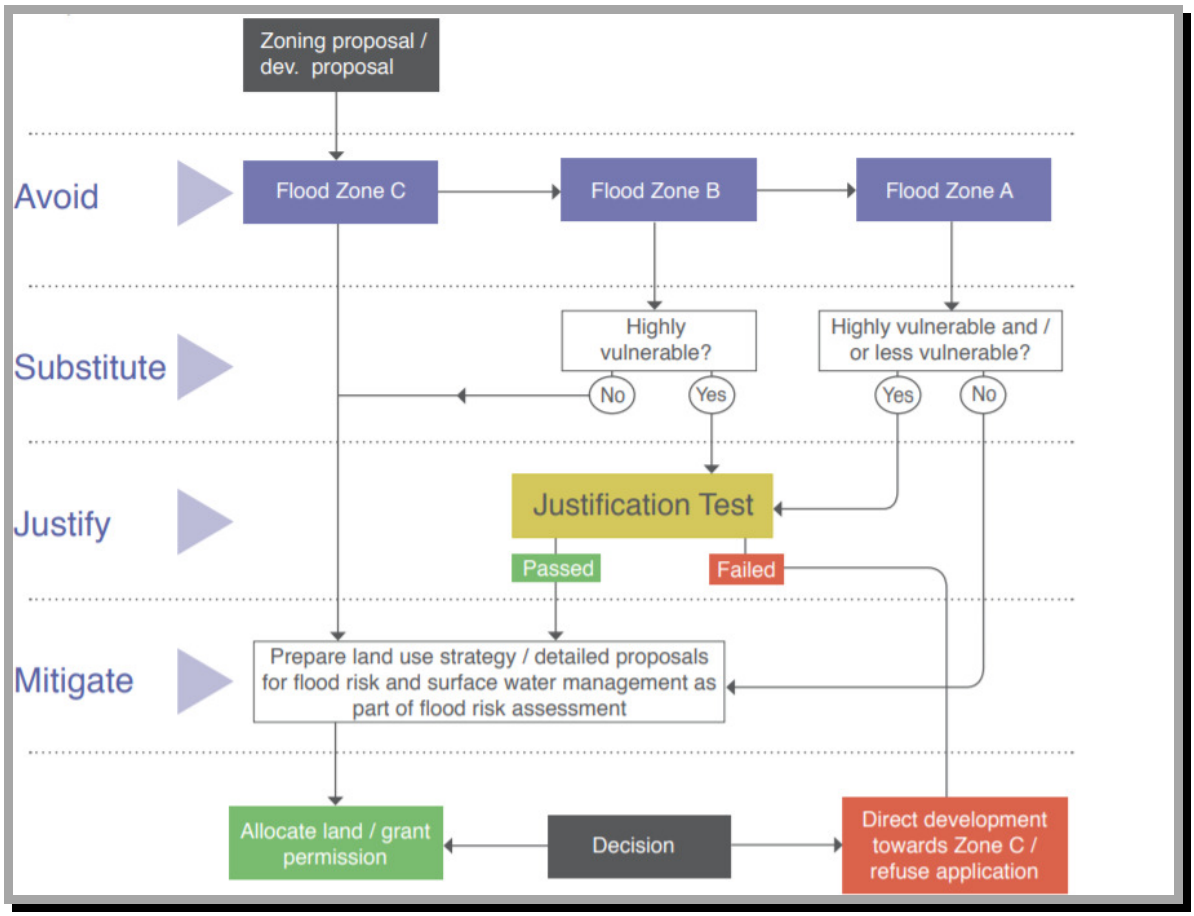


Fig.4 - Extract from *Section 3.2* of the *Guidelines*

2.11 There are 3 types or levels of flood zones defined in the Guidelines and are as described in Table 1 below;

Flood Zone	Description
A	Where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding)
B	Where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 years and 1% or 1 in 100 years for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding)
C	Where the probability of flooding from rivers and sea is low (less than 0.1% or 1 in 1000 years for both river and coastal flooding). Flood Zone C covers all areas of the plan which are non in Zones A or B.

Table 1 - Flood Zones

2.12 The following table extracted from the Guidelines section 3.5 defines the Vulnerability Classes of various types of development.

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).

*Uses not listed here should be considered on their own merits

Fig.5 – Extract from *Section 3.5* of the *Guidelines*

2.13 The vulnerability of class of a development and the identified flood zone are used to determine the appropriateness of the development proposed and which types of development would need to undergo a Justification Test as per the extracted table from section 3.6 of the Guidelines below;

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Fig.6 – Extract from *Section 3.6* of the *Guidelines*

2.14 Should the review of the sequential approach determine that a Justification test is necessary ,i.e., a development lies in a high/moderate risk of flooding and be inappropriate as per the Justification test able as above, the following table extracted from the Guidelines section 5.15 needs to be satisfied;

Box 5.1 Justification Test for development management (to be submitted by the applicant)

When considering proposals for development, which may be vulnerable to flooding, and that would generally be inappropriate as set out in Table 3.2, the following criteria must be satisfied:

1. The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:
   - (i) The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk;
   - (ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;
   - (iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and
   - (iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.

Fig.7- Extract from *Section 5.15* of the *Guidelines*

3.0 Site Specific Flood Risk Assessment

3.1 General

3.1.1 The lands are located just east of the Enniskerry Road and south of the Glenamuck Road in Kilternan, Dublin 18.

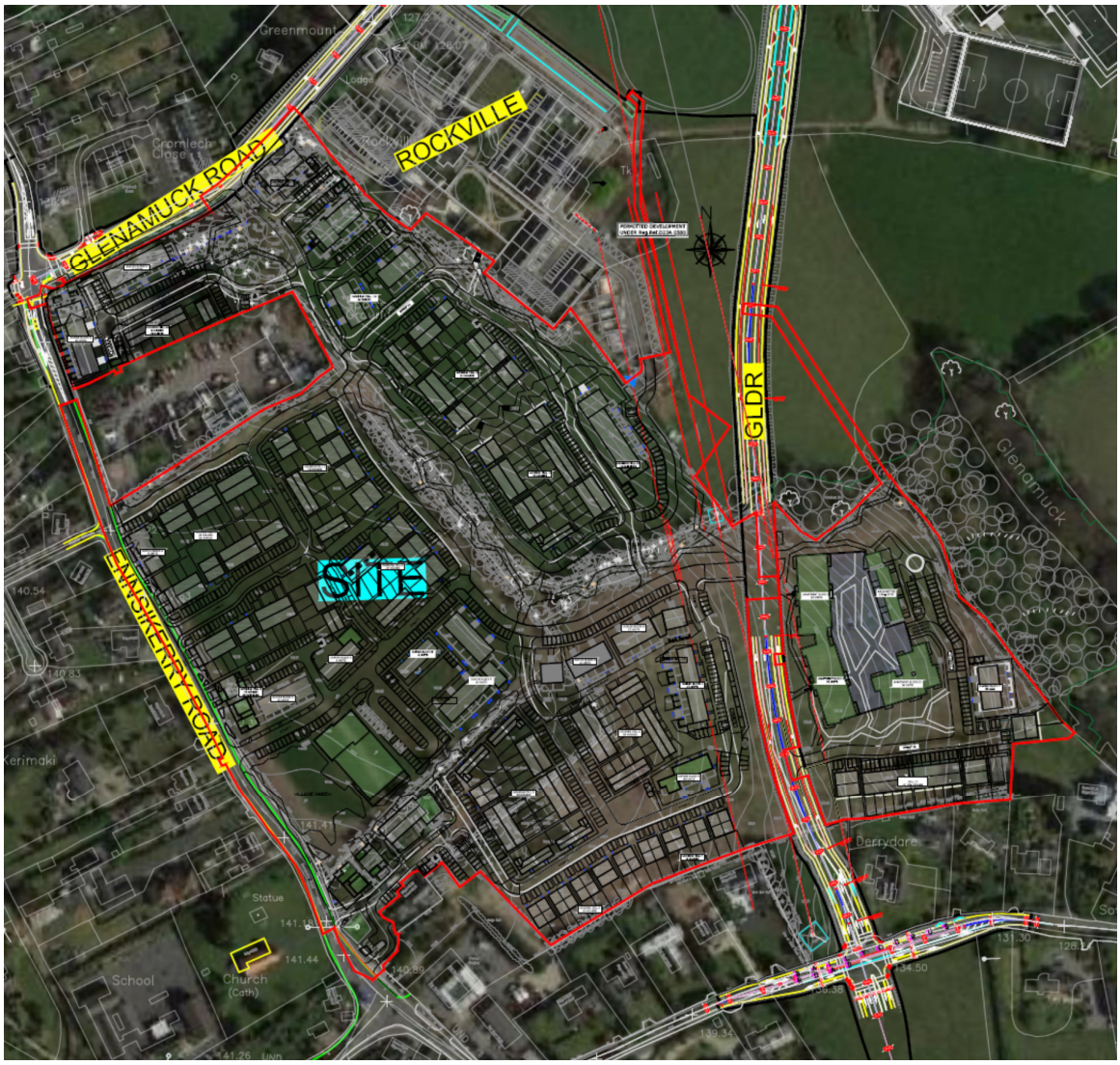


Fig.8 - Site Location from Google Maps

3.1.2 The application area c.14.2 Ha, is currently predominately greenfield but the drained area of the site is c.12.6Ha as discussed in detail in the Engineering Infrastructure & Stormwater Impact Assessment report accompanying this LRD Stage 3 submission.

3.1.3 The topography is generally a gradually increasing slope downwards from the Enniskerry Road (western boundary) in a North-easterly direction and then falls off sharply (c 1/10 gradient) towards the eastern boundary. A

site survey drawing is included in the application and can be viewed as background on the drawing RMA Dwg.No.2104C/300-302.

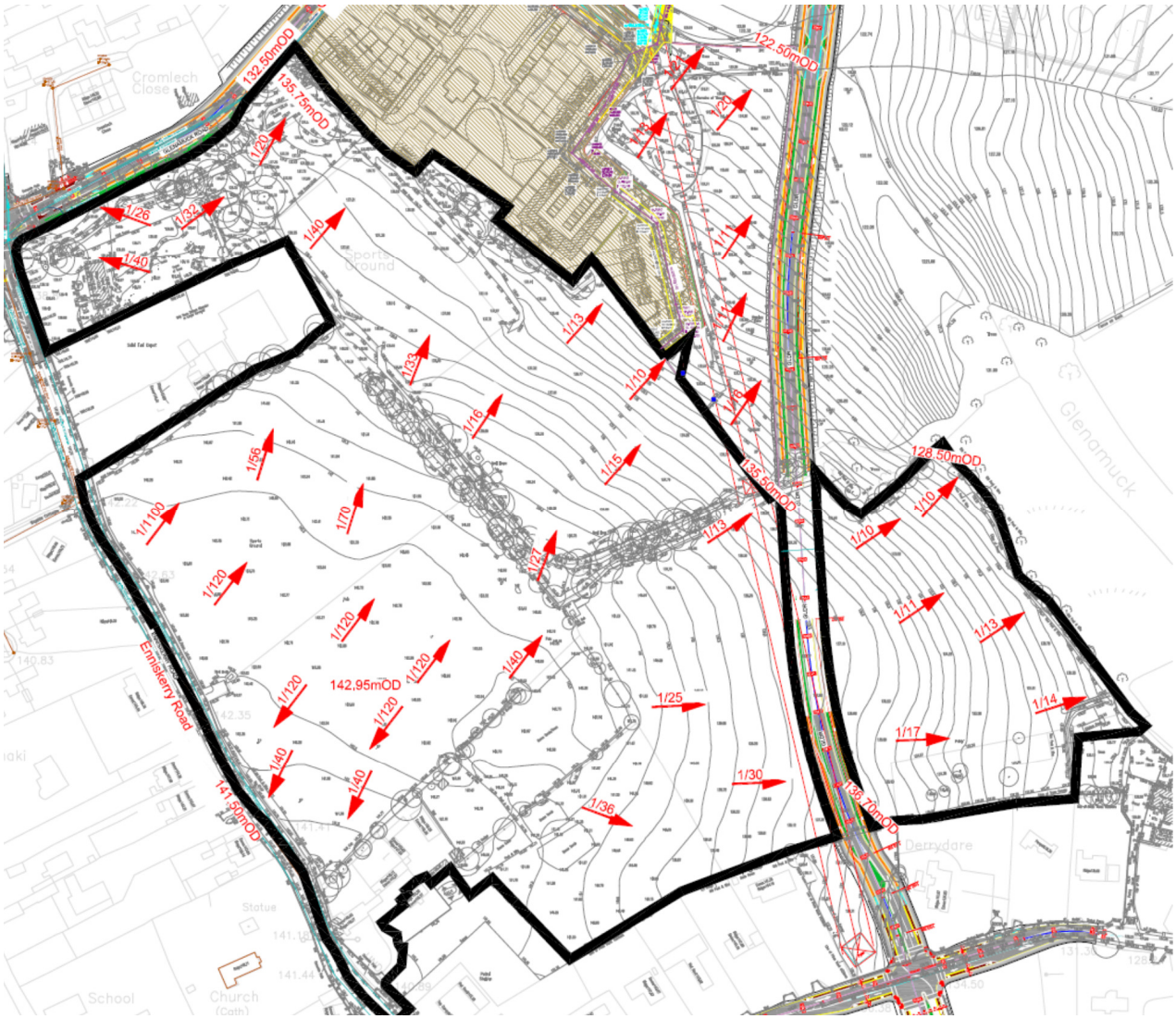


Fig.9 – Topography

3.1.4 The site is bounded by a c.1.2m high existing stone wall to the west (Enniskerry Rd), by hedgerows/trees to the northeast, by trees to the east and by hedgerow and green field along the southern boundary. The impending Glenamuck Link Distributor Road (GLDR) as part of the Glenamuck District Roads Scheme (GDRS) will cross the site in a south to north direction, effectively splitting the site as shown above.

3.1.5 Road & Block levels drawings have been prepared as part of this application and reference should be made to Dwg.No.2014C/300-302 in this regards. Generally, the proposed road levels and house levels follow the existing contours of the site topography.

3.1.6 The following assessment will identify the potential sources of flooding and categorise the risk as either very low, low, medium, high, and very high.

3.1.7 The risks categorised above are based on the judgement and experience of the Engineer carrying out the assessment and based on the documentation sourced from the Flood Risk Indicator sources as noted in Section 3.3 of this report.

3.1.8 The initial assessment process will involve examining the flood risk indicators. Where it is demonstrated that there is a risk of flooding the study will progress to a more detailed flood risk assessment, if required. Each of the below 5 potential sources of flood risk will be assessed in this regards.

3.1.9 A Hydrological and Hydrogeological Risk Assessment report prepared by Enviroguide Consulting has been completed and included with the planning application – refer to that report for further detail. That report details the risk based assessment carried out to determine any potential impacts on the receiving water environment.

3.2 Potential Sources of Flood Risk

3.2.1 **Tidal**
Coastal flooding is caused by higher sea levels than normal, largely because of storm surges, resulting in the sea overflowing onto the land.

3.2.2 **Fluvial**
Caused by the overtopping of rivers/streams when the capacity of a watercourse is exceeded or the channel is blocked or restricted, and excess water spills out from the channel onto adjacent low-lying area.

3.2.3 **Pluvial**
Caused when the intensity of rainfall events cannot be absorbed into the ground or urban drainage systems cannot effectively convey the flowrates.

3.2.4 **Groundwater**
Groundwater flooding occurs when the level of water stored in the ground, the water table, rises because of prolonged rainfall. Groundwater flooding tends to be very local and result from interactions of site specific factors such as tidal variations.

3.2.5 **Human/Mechanical Error**
Caused by blockages in piped systems or intervention of/failure of mechanical devices.

3.3 Flood Risk Indicators

3.3.1 The initial flood risk identification involves a scoping review of existing available information and datasets. The following source indicators were researched as part of the Stage 1 process;

- IW/DLRCC Drainage Records maps
- Available OPW flood maps and reports (from *floodmaps.ie*)
- DLRCC Carrickmines/Shanganagh River Catchment Study
- OPW Eastern CFRAM study
- OPW PFRM mapping
- Geological Survey of Ireland (GSI) website
- Teagasc soils data sets
- Ordnance Survey mapping
- Topographical survey
- Site Investigation reports
- Site walkover visits
- Discussions with DLRCC Drainage Department
- DLRCC Development Plan- Appendix 15-Strategic Flood Risk assessment
- A Hydrological and Hydrogeological Risk Assessment has been prepared by Enviroguide Consulting as part of the LRD Stage 3 application.

3.4 Tidal Flood Risk

3.4.1 Tidal flooding is caused by higher sea levels than normal, largely because of storm surges, resulting in the sea overflowing onto the land. There are also tidal effects on groundwater levels.

3.5 Tidal Flood Risk Indicators

3.5.1 Reference to land mapping websites such as google maps/OSI mapviewer indicate that this site is more than 5.5km from the coast. The site topographical survey demonstrates that the land is elevated at c.142mOD Malin Head.

3.6 Initial Tidal Flood Risk Assessment

3.6.1 Based on the remote distance from the coastline and the elevated nature of the site, in our opinion there is no risk of Tidal flooding on this site.

3.7 Fluvial Flood Risk

3.7.1 Fluvial river/stream flooding occurs when the capacity of a watercourse is exceeded or the channel is blocked or restricted, and excess water spills out from the channel onto adjacent low-lying area.

3.8 Fluvial Flood Risk Indicators

3.8.1 Reference to the site topographical survey and the OSI mapping website determined that there is no known watercourse or stream on the subject lands. Similarly, there are no known watercourses along the Enniskerry Road that could overspill onto the subject lands.

3.8.2 Reference to the topographical survey of the subject site shown that the ground slightly higher (200-300mm) than the Enniskerry Road along the site frontage and the site slopes easterly away from the Enniskerry Road thereafter.

3.8.3 Reference to survey mapping and site visits indicate that there is a roadside drainage channel along the northern side of the Glenamuck Road to the north of the site. This roadside drainage channel currently serves as the S/W drainage for the Glenamuck Road.

3.8.4 As part of the Glenamuck District Roads Scheme (GDRS) this roadside drainage channel will be incorporated into drainage infrastructure for that project. This surface water drainage infrastructure will involve the construction of new regional attenuation ponds.

3.8.5 Drainage and water supply infrastructure included in the GDRS project have been designed by DLRCC to facilitate future connections to the subject Kilternan Village LRD development lands subject to a successful grant of planning for this subject sites proposed development.

3.8.6 This subject planning application seeks to outfall the attenuated surface water flows into the existing piped S/W infrastructure recently constructed as part of the Rockville housing development (Reg.Ref.D17A/0793) located to the NE of the subject site. This existing 300mm S/W infrastructure currently drains the attenuated flows from the Rockville development and outfalls to the Glenamuck Road roadside drainage channel. This existing 300mm S/W pipe is to be diverted into the GLDR/GDRS regional attenuation ponds as part of the roads project and as part of the approved DLRCC Part 8 *Glenamuck Park* project. Refer to Dwg.2104C/306 for further detail.

3.8.7 As is recommended in the DLRCC Stormwater Management Policy, the HR Wallingford UKSuDS Greenfield runoff rate estimation tool was used to calculate the Qbar for the site. The overall total S/W outfall rate from the proposed development has been calculated using the drained site area of 12.5Ha (not the application "redline" area). **Qbar** was

determined to be = **54.6l/s**. But the application proposes to use a total Qbar of 49l/s, which is less than the allowable outfall rate. Refer to the main application submission Dwg.No.'s 2104C/303-306 for the layout and detail of the proposed S/W infrastructure.

3.8.8 The regional attenuation ponds included in the GDRS project local to the Glenamuck Road ultimately drains downstream to a watercourse known as the Glenamuck Stream & Golf/Golfcourse Stream, see Fig.10 below for context;

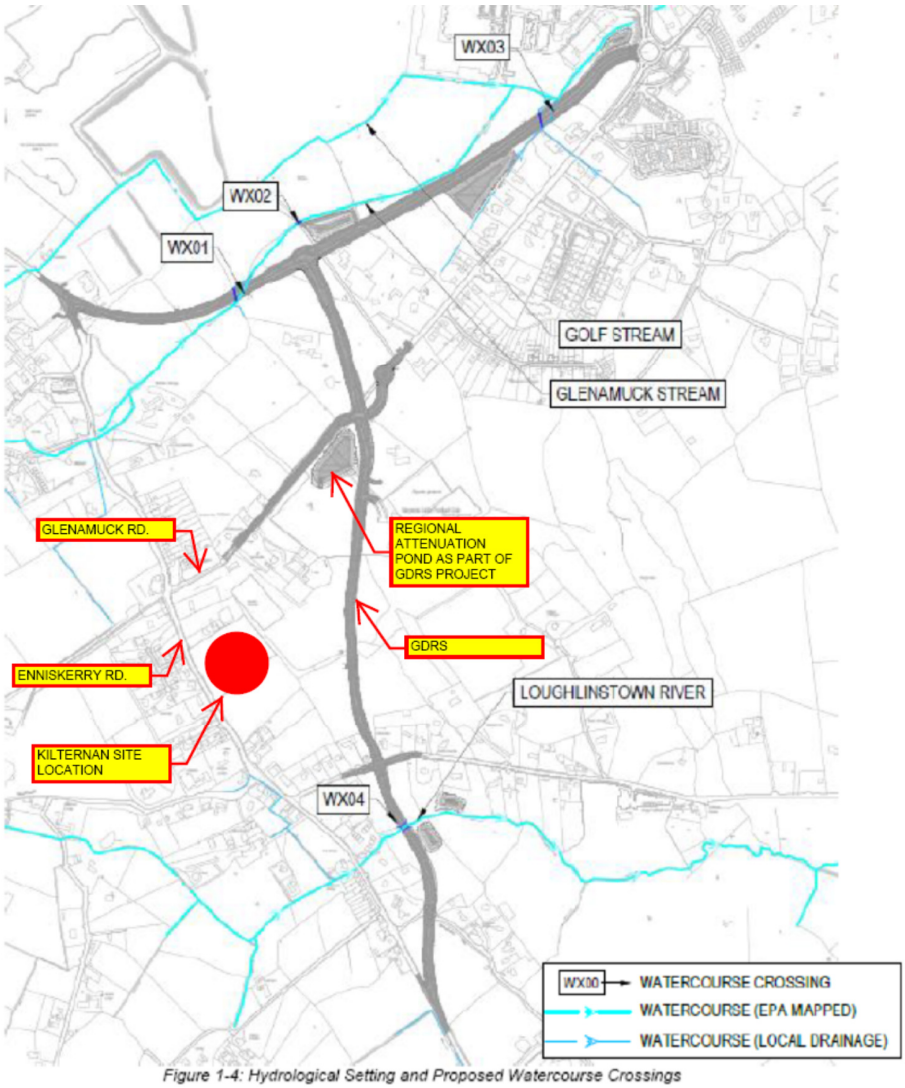
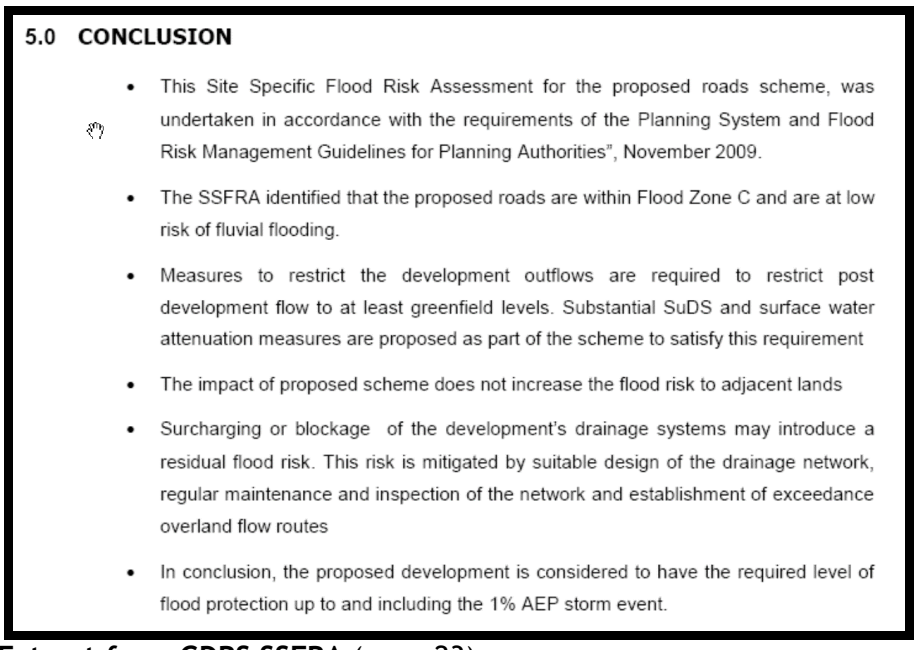


Figure 1-4: Hydrological Setting and Proposed Watercourse Crossings

Fig.10 - Extract from GDRS SSFRA (fig.1-4)

3.8.9 A Site Specific Flood Risk Assessment was carried out by DLRCC as part of their approved GDRS project and was included in the appendix of the Environmental Impact Assessment Report (EIAR) for that project. Review of that documentation is beyond the scope of this subject SSFRA relating to the Kilternan Village application but Fig.11 below is an extract from the GDRS SSFRA conclusion chapter. The reader is referred to the GDRS EIAR for further detail (Ref.ABP303945-19).



5.0 CONCLUSION

- This Site Specific Flood Risk Assessment for the proposed roads scheme, was undertaken in accordance with the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities", November 2009.
- The SSFRA identified that the proposed roads are within Flood Zone C and are at low risk of fluvial flooding.
- Measures to restrict the development outflows are required to restrict post development flow to at least greenfield levels. Substantial SuDS and surface water attenuation measures are proposed as part of the scheme to satisfy this requirement
- The impact of proposed scheme does not increase the flood risk to adjacent lands
- Surcharging or blockage of the development's drainage systems may introduce a residual flood risk. This risk is mitigated by suitable design of the drainage network, regular maintenance and inspection of the network and establishment of exceedance overland flow routes
- In conclusion, the proposed development is considered to have the required level of flood protection up to and including the 1% AEP storm event.

Fig.11 – Extract from GDRS SSFRA (page 23)

3.8.10 DLRCC commissioned RPS Consulting Engineers to carry out the Fluvial Flooding Report for Carrickmines/Shanganagh River Catchment Stage 1 Final Report 2008. Review of that report determined that there is no risk to flooding of property along the Golfcourse Stream between Enniskerry Road and Carrickmines River. The following Fig.12 is an extract taken from the DLRCC/RPS report.

3.2 GLENAMUCK AND GOLF COURSE STREAM AREA

This area consists of the catchments of the Stepaside Golf Course stream and the Glenamuck stream and the analysis covers the area between Enniskerry Road and the Carrickmines River. There is one predicted flooding location.

Location G1 – Beside Carrickmines Retail Park (DG2052)
Flooding in a field is predicted to occur south of Carrickmines Retail Park near the confluence of the Glenamuck Stream and a stream from the landfill area to the west. No properties are at risk. The flooding is caused by a 600mm diameter culvert restriction on the main Glenamuck Stream. The river is culverted at this location to facilitate a farm access track.

Fig.12 – Extract from DLRCC/RPS Carrickmines/Shanganagh River Catchment Study

3.8.11 Research into the flooding history of the area on *floodmaps.ie* website determined that there was no flooding in the immediate area of the site. Refer to the absence of any flood point markers on the OPW National Flood Hazard map extract shown below in Fig.13 and the OPW summary report in the appendix of this document.

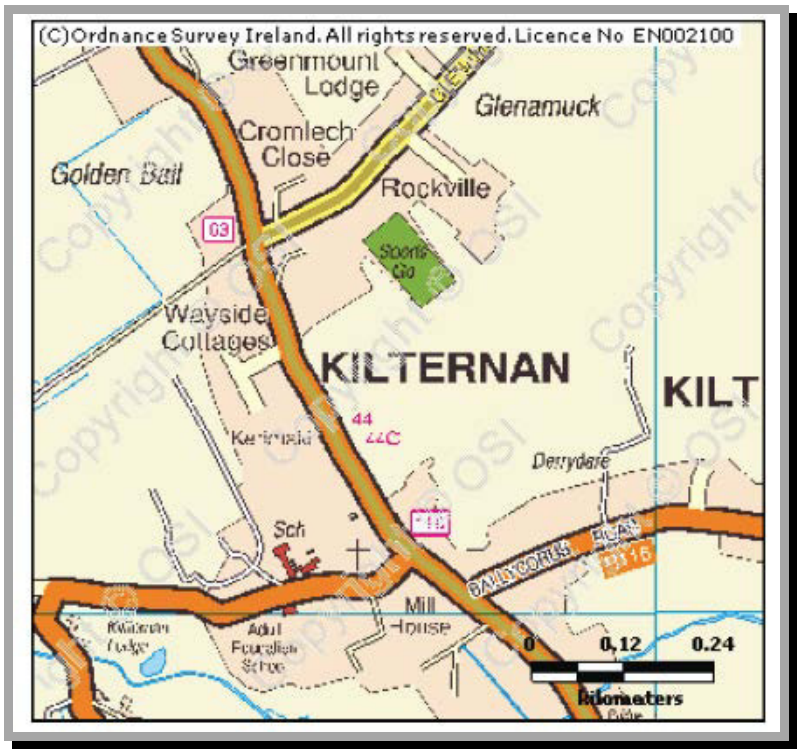


Fig.13 – Extract from the OPW National Flood Hazard Map (*floodmaps.ie*)

3.8.12 Reference to the topographical survey shows that the subject lands are elevated above the Glenamuck Road by a minimum of c.2.5m and the road falls away from the site.

3.8.13 The OPW has published the Catchment Flood Risk Assessment Management Studies and they have created a website portal for accessing the available results and mapping at *www.cfram.ie*. & *www.floodinfo.ie*

3.8.14 The mapping published indicates the flood extent boundaries for various return period events. These Annual Exceedance Probability (AEP) events of 10%, 1% and 0.1% (or 1 in 10 year, 1 in 100 year and 1 in 1000 year) were examined as part of the CFRAM mapping. Fig.14 below indicates the studied areas as shown in shaded blue.

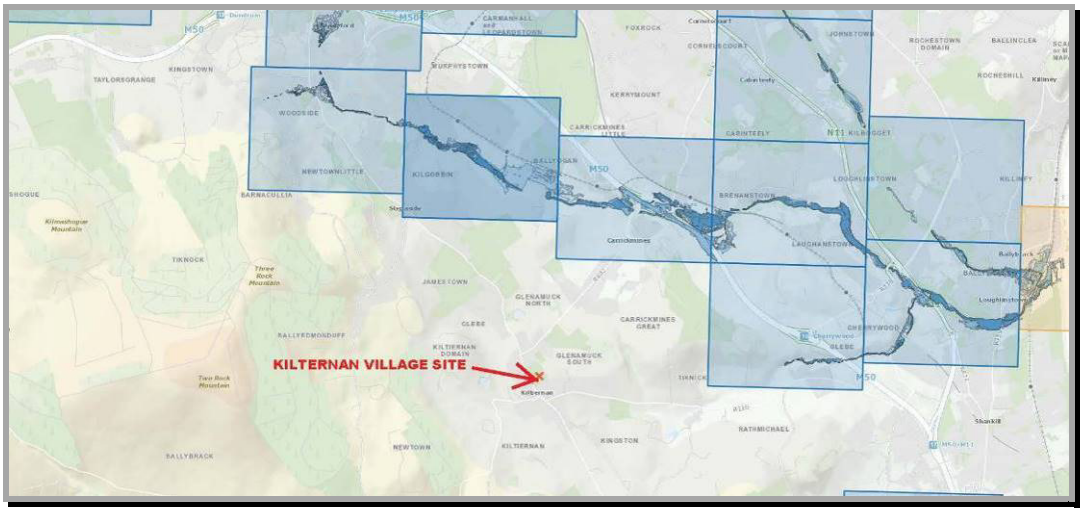


Fig.14 – Extract from CFRAM

3.8.15 It is apparent the CFRAM study (as shown in Fig.14 above in blue shading) has not been carried out in the immediate vicinity of Kilternan and is concentrated on the known Shanganagh-Carrickmines River Fluvial Extents area. Therefore, in accordance with the definition specified in the Guidelines, and as outlined in Section 2.11 above, it has been concluded that the **subject site location is within a Zone C**.

3.8.16 The draft Preliminary Flood Risk Assessment maps (No.2019/MAP/221/A) available from the OPW were also reviewed and the Kilternan Village site and general area is noted as having "*no fluvial data available*". Refer to appendix for an A3 not to scale map of same.

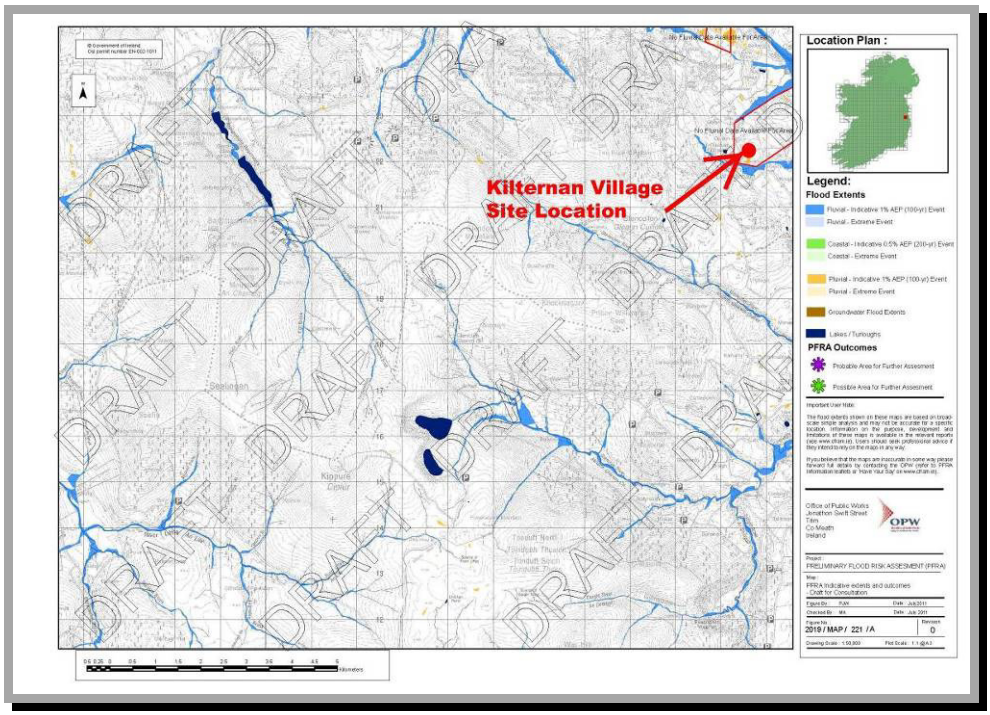


Fig.15 – OPW Preliminary Flood Risk Assessment maps (No.2019/MAP/221/A) *(Not to scale)*

3.8.17 Review of available DLRCC flood zone map No.9 was carried out and it was determined from the DLRCC map that there was no recorded Fluvial flooding at/adjacent to the subject site. Refer to appendix for a not to scale A3 map of same.

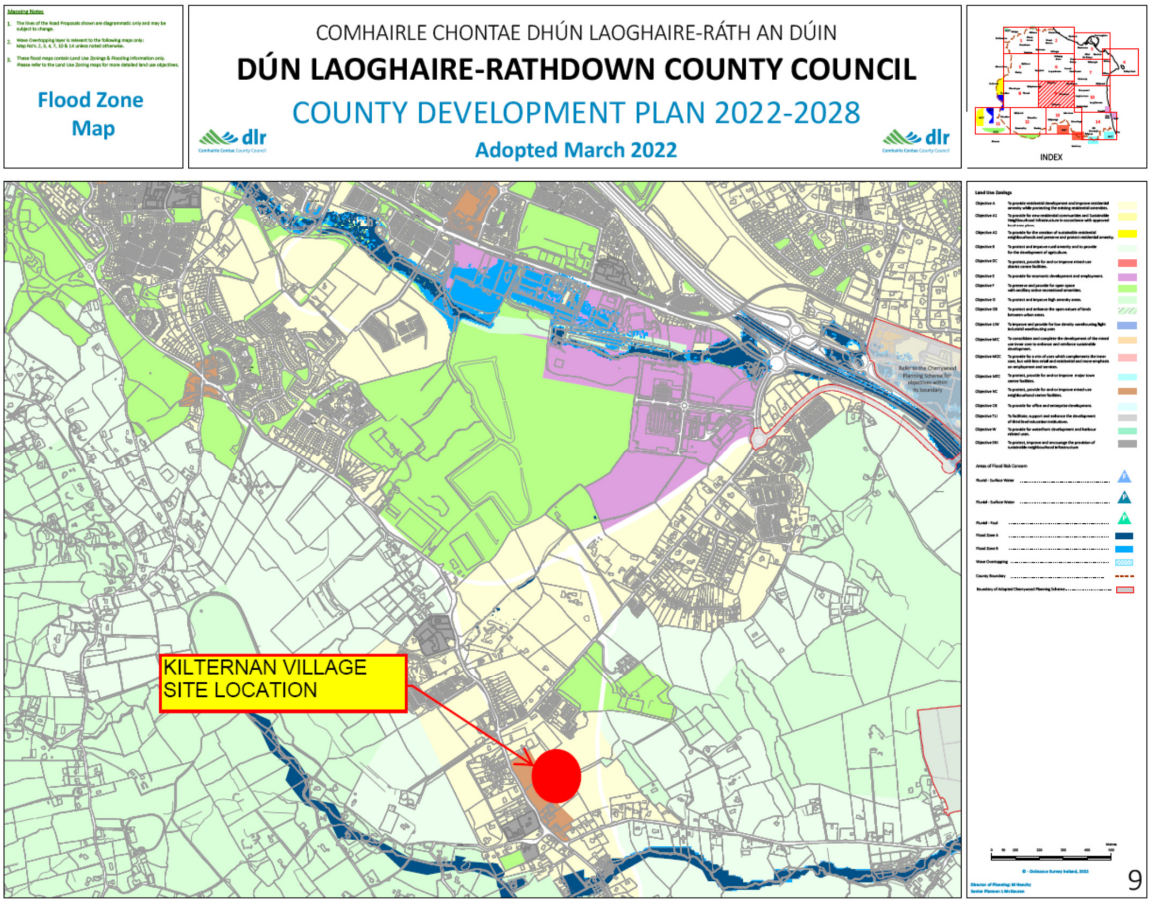


Fig.16 – DLRCC Flood Zone Map No.9 *(Not to scale)*

3.9 Initial Fluvial Flood Risk Assessment

3.9.1 As there are no known watercourses either on or upstream of the subject lands, and the roadside drainage channel along the Glenamuck Road is several meters below the subject lands, in our opinion there is a low risk fluvial of flooding onto the site.

3.10 Pluvial Flood Risk

3.10.1 Pluvial flooding is caused when the intensity of rainfall events cannot be absorbed into the ground or urban drainage systems cannot effectively convey the flowrates.

3.11 Pluvial Flood Risk Indicators

3.11.1 Reference was made to the available drainage records drawings of Irish Water/DLRCC. There is no known surface water drainage infrastructure system existing on the site. Refer to main Engineering Infrastructure & Stormwater Impact Assessment Report for copies of same.

3.11.2 Review of the drainage records drawings displayed no surface water pipelines along the Enniskerry Road fronting the site.

3.11.3 There is a noted 300mm diameter S/W pipeline in Glenamuck Road South some 500m northeast of the subject site.

3.11.4 As noted in 3.8.3 above, along the northern side of Glenamuck Road there is an existing roadside drainage channel. This drainage channel has a varying cross-section and is restricted by several different small diameter (c.300mm) pipes beneath road access points.

3.11.5 There is no known foul sewer network on the subject site.

3.11.6 In discussing the local drainage with the DLRCC Drainage Department staff, it was noted that rainfall flows along the surface of the Glenamuck Road from the Enniskerry Road downhill in an easterly direction. This is because there is no real existing piped infrastructure other than occasional road gullies that discharge directly into the northern side roadside drainage channel.

3.11.7 Also, in reference to the design calculations contained in the appendix of the main Engineering Infrastructure & Stormwater Impact Assessment report accompanying the application, the surface water discharge rate from the site has been restricted to less than the allowable agricultural greenfield run off rate, Qbar (54.6l/s allowable and 49 l/s applied), as determined from the DLRCC recommended HR Wallingford online assessment tool. The Qbar rate was determined based on the site topography, soil conditions and drained site area.

3.12 Initial Pluvial Flood Risk Assessment

3.12.1 As the risk of pluvial flooding from the new infrastructure planned is not deemed as a low risk occurrence and the vulnerability of residential development is deemed as high, it is seen as appropriate that a detailed pluvial flood risk assessment be reviewed.

3.13 Detailed Pluvial Flood Risk assessment

3.13.1 The proposed new drainage surface water infrastructure for the development has been designed to cater for flows generated by all storms up to the Q100+20%(climate change) without flooding occurring. The drainage design has also allowed for more than the min.10% Urban Creep allowance as required in the DLRCC Stormwater Management Policy document

3.13.2 The pipe sizes and gradients are designed to convey the storm water flows to a singular attenuation location where the storage capacity has been designed to exceed the Q100+20% event. Calculations for the critical rainfall events have been included in the appendix of the Engineering Infrastructure & Stormwater Impact Assessment report.

3.13.3 The calculated **Q30+20% Climate Change** storm water storage volume for total site is **c.4,910m³** as determined from the MicroDrainage simulation modelling software and is spread across 4No.catchments in the 10No. voided arch MC4500 & MC3500 systems.

3.13.4 The calculated **volume for the Q100 +20% Climate Change event** is **c.6,341m³** as determined from the MicroDrainage simulation modelling software results.

3.13.5 The freeboard achieved in the S/W design exceeds the minimum 500mm requirement as specified in the GDRS as noted in Section 6.32 of the main Engineering Infrastructure & Stormwater Impact Assessment report.

3.13.6 In reference to Section 6.41 of the main infrastructural report accompanying the application, it is noted that there is **additional interception storage volume of 1,717m³** has not been subtracted from the required attenuation volume nor has it been added to the available storage volume and is therefore considered to be a safer and more conservative approach to attenuation storage estimation.

3.13.7 SuDS elements included in the pluvial design include rear garden filter drains, roadside filter swales, bio-retention areas, rain gardens, house rainwater butts, “green” & “blue” roofs, permeable paving systems,

catchpits, filter drains, roadside swales, tree pits, void arch attenuation storage and petrol interceptors.

3.13.8 An overflow flood route map was prepared (Dwg.No.2104C/315) and is included in the appendix of this assessment report. These extreme event overflow follow the natural grassland ground contours overland to a low point grasslands on the subject site.

3.14 Conclusion of the Detailed Pluvial Flood Risk Assessment

3.14.1 In accordance with the sequential assessment approach as per the Guidelines flowchart (section 2.10 above) it is concluded that the requirements have been met and no further assessment is required regarding pluvial flood risk.

3.15 Groundwater Flood Risk

3.15.1 Groundwater flooding occurs when the level of water stored in the ground, the water table, rises because of prolonged rainfall. Groundwater flooding tends to be very local and result from interactions of site specific factors such as tidal variations.

3.15.2 A Hydrological and Hydrogeological Risk Assessment report prepared by Enviroguide Consulting is included with the LRD Stage 3 planning application – refer to that report for further detail.

3.16 Groundwater Flood Risk Indicators

3.16.1 Site investigations have revealed that sub surface soil conditions on this site are known to be sandy gravelly CLAY and SILTs overlying broken granite and bedrock. Soakaway testing & site investigations reports are included in the Appendix 12.8 of the main infrastructure report.

3.16.2 Reference was also made to the online web portal provided by the Geological Survey of Ireland (GSI) as well as the alluvial maps provided by the Teagasc link on the GSI website. Reference is also made to the Hydrological and Hydrological Risk Assessment included with the planning application – refer to that report for further detail.

3.16.3 No ground water was noted as encountered during the soakaway trial holes investigations but it is noted that ground water levels can vary depending on the time of year. Borehole testing carried out in 2006 noted ground water encountered between c.2.6-2.8m. Refer to

soakaway report in Appendix 12.8 of the main infrastructure report for more detail.

3.16.4 There were no recorded groundwater issues for the subject site/area on the Geological Survey of Ireland online datasets and reference can be made to the summary groundwater map report included in the appendix of this report.

3.16.5 Site walkovers were carried out in varying weather conditions and the water table was not evident during the visits.

3.16.6 In reference to the Road and Block Levels drawings 2104C/300-302 it is noted that all finished floor levels of buildings on the site are to be constructed above the ground level and above the adjacent roads.

3.17 Initial Groundwater Flood Risk Assessment

3.17.1 The indicators described above suggest that the site is not at risk of flooding from groundwater and accordingly a detailed assessment of the flooding mechanism is not required and, in our opinion, there is a low risk of groundwater flooding onto the site

3.18 Human/Mechanical Error Flood Risk

3.18.1 There are flood risks associated with misuse, neglect, damage, intervention of or lack of intervention attributable to mechanical failure or human error. Such a risk can be caused by blockages in piped systems or lack of maintenance of mechanical devices.

3.19 Human/Mechanical Error Flood Risk Indicators

3.19.1 Based on the experienced professional judgement of the engineering designer and in consultation with the Drainage Department of DLRCC, it has been considered that blockages can occur with systems for many reasons.

3.20 Initial Human/Mechanical Error Flood Risk Assessment

3.20.1 As there is some risk of pluvial flooding from human/mechanical error, the new infrastructure is not deemed as a low risk occurrence and the vulnerability of residential development is classified as high (refer to Section 2.12 of this report), it is seen as appropriate that a more detailed human/mechanical error flood risk assessment be reviewed.

3.21 Detailed Human/Mechanical Error Flood Risk Assessment

3.21.1 As part of the assessment for blockages in the system, the MicroDrainage design model was run on the basis that there was a near 100% blockage of the outfall vortex control devices for a 120 minute period. Therefore, the model was run with a reduction in the outfall rates from each Hydrobrake down to 0.1 l/s for a 120min duration in the Q100 + 20% event. These resulting volumes and top water level are contained beneath the ground level in 9 of the 10 storage areas and above ground flooding was noted in storage areas 2 & 3. An above ground flood path/exceedance flow route assessment was carried out to determine and manage the flooding routes across the site and these flow routes are represented on dwg.No.2104C/315. Dropped kerbs and profiling of the local landscape will be constructed to direct the overland flows to bunded landscaped areas. Refer to Dwg.No.2104C/315 and to Appendix 12.1 for these calculation results.

3.22 Conclusion of the Detailed Human/Mechanical Error Risk Assessment

3.22.1 In accordance with the sequential assessment approach as per the Guidelines flowchart (section 2.10 above) it is concluded that the requirements have been met and no further assessment is required regarding human/mechanical error flood risk.

4.0 Source Pathway Receptor Model

4.1 A source-pathway-receptor model as per the Appendix A 1.3 of the Technical Appendices accompanying *the Guidelines* was created and is shown in the Table 2 below. This model indicates the possible sources of flood water and the pathway to the receptors (the buildings/people) and the risks associated based on the findings of the FRA research.

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Tidal	>5.5km from coast and elevated >142m above sea level	People/ property	Remote	N/A	Very Low
Fluvial	Overtopping of drainage channel on Glenamuck Road	People/ property	Remote	N/A	Low
Pluvial (Surface water)	Flooding from drainage systems	People/ property	Possible	Low	Low
Groundwater	Rising water table	People/ property	Possible	Low	Low
Human/ Mechanical Error	Blockage of drainage	People/ property	Possible	Moderate	Low

Table 2

5.0 SSFRA Conclusion

5.1 As is required under the Dun Laoghaire Rathdown County Development Plan 2022 – 2028 Appendix 15 – Strategic Flood Risk assessment and in accordance with the requirements set out in the DoEHLG and OPW published guidelines *The Planning System and Flood Risk Management 2009* (the Guidelines), a Site Specific Flood Risk Assessment (SSFRA) has been carried out for this application.

5.2 In accordance with the above noted Guidelines, as sequential staged approach was adopted in assessing the flood risk for the subject development.

5.3 It was determined in accordance with the Guidelines that the lands on which the subject development is located is within a **flood Zone C** as defined in the Guidelines.

5.4 It is concluded that a mixed residential and commercial development is appropriate on the subject lands.

5.5 It is concluded that the above level of assessment is sufficient given the nature of the development and the level of flood risk identified for the site.

5.6 Based on the information available it is concluded that this site is suitable for development and has an overall low risk of being affected by flooding.

6.0 APPENDIX

Contents:

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.500	Add Flow / Climate Change (%)	0
Ratio R	0.277	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	90	Maximum Backdrop Height (m)	3.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.500
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	180

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	33.812	0.339	99.7	0.129	6.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	26.400	0.299	88.3	0.055	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	38.370	0.389	98.5	0.104	6.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	17.656	0.234	75.5	0.065	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.003	38.882	0.972	40.0	0.061	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.004	9.096	0.227	40.0	0.017	0.00	0.0	0.600	o	375	Pipe/Conduit	
S3.000	30.075	0.376	80.0	0.171	6.00	0.0	0.600	o	300	Pipe/Conduit	
S3.001	9.985	0.125	79.9	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.002	38.334	0.475	80.7	0.094	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.003	11.243	0.147	76.5	0.068	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	24.743	0.287	86.2	0.080	6.00	0.0	0.600	o	225	Pipe/Conduit	
S4.001	12.820	0.110	116.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.004	62.605	0.965	64.9	0.117	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	45.35	6.36	140.810	0.129	0.0	0.0	0.0	1.57	111.3	21.2
S1.001	44.60	6.62	140.450	0.184	0.0	0.0	0.0	1.67	118.3	29.7
S2.000	44.98	6.49	140.540	0.104	0.0	0.0	0.0	1.32	52.4	16.9
S1.002	44.21	6.76	140.050	0.354	0.0	0.0	0.0	2.09	230.6	56.5
S1.003	43.61	6.99	139.472	0.415	0.0	0.0	0.0	2.87	317.2	65.3
S1.004	43.47	7.04	138.500	0.431	0.0	0.0	0.0	2.87	317.2	67.7
S3.000	45.57	6.28	141.520	0.171	0.0	0.0	0.0	1.76	124.4	28.1
S3.001	45.29	6.38	141.144	0.195	0.0	0.0	0.0	1.76	124.5	31.8
S3.002	44.26	6.74	141.020	0.289	0.0	0.0	0.0	1.75	123.8	46.1
S3.003	43.98	6.85	140.540	0.356	0.0	0.0	0.0	1.80	127.2	56.6
S4.000	45.54	6.29	141.430	0.080	0.0	0.0	0.0	1.41	56.0	13.2
S4.001	45.03	6.47	141.140	0.080	0.0	0.0	0.0	1.21	48.1	13.2
S3.004	42.90	7.26	140.270	0.554	0.0	0.0	0.0	2.53	402.0	85.8

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S5.000	43.356	0.701	61.8	0.025	4.00	0.0	0.600	o	225	Pipe/Conduit	
S3.005	30.193	0.315	95.9	0.118	0.00	0.0	0.600	o	450	Pipe/Conduit	
S3.006	32.421	0.531	61.1	0.092	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.005	3.256	0.048	67.8	0.033	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.006	11.579	0.045	257.3	0.011	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.007	14.180	0.095	149.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.000	49.472	0.883	56.0	0.096	6.00	0.0	0.600	o	225	Pipe/Conduit	
S6.001	27.422	0.946	29.0	0.092	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.002	42.378	0.314	135.0	0.099	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.003	13.410	0.447	30.0	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	18.824	0.157	119.9	0.009	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.009	52.833	0.440	120.1	0.116	0.00	0.0	0.600	o	375	Pipe/Conduit	
S7.000	24.973	0.250	99.9	0.046	6.00	0.0	0.600	o	300	Pipe/Conduit	
S7.001	20.101	0.201	100.0	0.090	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.002	30.568	0.255	119.9	0.094	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.003	13.481	0.112	120.4	0.038	0.00	0.0	0.600	o	300	Pipe/Conduit	
S7.004	28.441	0.237	120.0	0.040	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.010	47.284	0.394	120.0	0.090	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.011	28.492	0.570	50.0	0.135	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.012	25.325	0.122	207.6	0.017	0.00	0.0	0.600	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S5.000	51.98	4.43	140.640	0.025	0.0	0.0	0.0	1.67	66.3	4.7
S3.005	42.30	7.50	139.300	0.697	0.0	0.0	0.0	2.08	330.3	106.5
S3.006	41.80	7.71	138.985	0.789	0.0	0.0	0.0	2.61	414.4	119.2
S1.005	41.76	7.73	138.200	1.254	0.0	0.0	0.0	2.96	836.9	189.1
S1.006	41.46	7.86	136.750	1.266	0.0	0.0	0.0	1.51	427.9	189.5
S1.007	53.03	4.18	136.650	0.000	30.0	0.0	0.0	1.28	90.8	30.0
S6.000	45.03	6.47	139.210	0.096	0.0	0.0	0.0	1.75	69.6	15.6
S6.001	44.59	6.63	138.260	0.188	0.0	0.0	0.0	2.93	207.2	30.3
S6.002	43.19	7.15	137.310	0.286	0.0	0.0	0.0	1.35	95.5	44.7
S6.003	42.99	7.23	136.996	0.314	0.0	0.0	0.0	2.88	203.7	48.8
S1.008	42.44	7.45	135.350	0.323	30.0	0.0	0.0	1.43	101.4	79.5
S1.009	41.18	7.98	135.120	0.439	30.0	0.0	0.0	1.65	182.5	95.2
S7.000	45.63	6.26	135.220	0.046	0.0	0.0	0.0	1.57	111.2	7.6
S7.001	45.01	6.48	134.980	0.136	0.0	0.0	0.0	1.57	111.1	22.1
S7.002	44.02	6.83	134.780	0.230	0.0	0.0	0.0	1.43	101.4	36.5
S7.003	43.60	6.99	134.520	0.268	0.0	0.0	0.0	1.43	101.2	42.1
S7.004	42.75	7.32	134.410	0.307	0.0	0.0	0.0	1.43	101.4	47.4
S1.010	40.24	8.40	133.980	0.836	30.0	0.0	0.0	1.85	295.0	151.5
S1.011	39.88	8.57	133.300	0.970	30.0	0.0	0.0	2.88	458.2	169.8
S1.012	39.37	8.82	131.500	0.987	30.0	0.0	0.0	1.69	476.8	170.3

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S8.000	24.985	0.999	25.0	0.078	4.00	0.0	0.600	o	225	Pipe/Conduit	
S8.001	20.163	0.672	30.0	0.045	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.002	12.595	0.210	60.0	0.057	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.003	55.339	0.922	60.0	0.059	0.00	0.0	0.600	o	300	Pipe/Conduit	
S8.004	20.225	0.337	60.0	0.089	0.00	0.0	0.600	o	300	Pipe/Conduit	
S9.000	28.233	0.387	73.0	0.038	4.00	0.0	0.600	o	225	Pipe/Conduit	
S8.005	8.527	0.426	20.0	0.041	0.00	0.0	0.600	o	300	Pipe/Conduit	
S8.006	20.255	1.013	20.0	0.014	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.013	45.182	0.400	113.0	0.055	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.014	8.407	0.191	44.0	0.066	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.015	17.953	0.211	85.1	0.011	0.00	0.0	0.600	o	600	Pipe/Conduit	
S10.000	37.341	0.467	80.0	0.063	8.00	0.0	0.600	o	300	Pipe/Conduit	
S11.000	33.089	0.276	120.0	0.170	4.00	0.0	0.600	o	300	Pipe/Conduit	
S11.001	15.353	0.128	120.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S10.001	16.798	0.210	80.0	0.049	0.00	0.0	0.600	o	375	Pipe/Conduit	
S12.000	25.931	0.259	100.1	0.122	6.00	0.0	0.600	o	300	Pipe/Conduit	
S12.001	32.766	0.327	100.2	0.033	0.00	0.0	0.600	o	300	Pipe/Conduit	
S10.002	24.348	0.298	81.7	0.023	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S8.000	53.14	4.16	138.510	0.078	0.0	0.0	0.0	2.63	104.5	14.9
S8.001	52.54	4.30	137.510	0.123	0.0	0.0	0.0	2.40	95.3	23.3
S8.002	52.03	4.42	136.830	0.179	0.0	0.0	0.0	1.69	67.3	33.7
S8.003	50.25	4.88	136.490	0.239	0.0	0.0	0.0	2.03	143.7	43.3
S8.004	49.63	5.04	135.570	0.327	0.0	0.0	0.0	2.03	143.7	58.7
S9.000	52.51	4.31	135.800	0.038	0.0	0.0	0.0	1.53	60.9	7.1
S8.005	49.49	5.08	135.200	0.406	0.0	0.0	0.0	3.53	249.6	72.5
S8.006	49.27	5.14	132.500	0.420	0.0	0.0	0.0	5.46	1544.3	74.6
S1.013	51.68	4.51	131.350	0.000	50.0	0.0	0.0	1.48	104.5	50.0
S1.014	51.49	4.55	130.659	0.066	50.0	0.0	0.0	3.07	488.4	62.3
S1.015	51.05	4.67	129.500	0.078	50.0	0.0	0.0	2.64	746.8	64.3
S10.000	40.34	8.35	140.800	0.063	0.0	0.0	0.0	1.76	124.4	9.1
S11.000	52.19	4.38	140.900	0.170	0.0	0.0	0.0	1.43	101.4	32.0
S11.001	51.46	4.56	140.620	0.170	0.0	0.0	0.0	1.43	101.4	32.0
S10.001	40.05	8.49	140.300	0.282	0.0	0.0	0.0	2.03	223.9	40.7
S12.000	45.59	6.28	141.000	0.122	0.0	0.0	0.0	1.57	111.1	20.1
S12.001	44.60	6.62	140.741	0.156	0.0	0.0	0.0	1.57	111.0	25.1
S10.002	39.62	8.69	140.090	0.460	0.0	0.0	0.0	2.01	221.5	65.9

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S13.000	12.657	0.091	138.9	0.106	8.00	0.0	0.600	o	450	Pipe/Conduit	
S14.000	22.410	0.280	80.0	0.164	4.00	0.0	0.600	o	300	Pipe/Conduit	
S14.001	4.678	0.019	246.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S13.001	12.532	0.105	119.4	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.002	24.676	0.480	51.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S10.003	39.509	0.263	150.0	0.053	0.00	0.0	0.600	o	375	Pipe/Conduit	
S10.004	40.749	0.272	149.8	0.076	0.00	0.0	0.600	o	375	Pipe/Conduit	
S10.005	4.422	0.029	152.5	0.021	0.00	0.0	0.600	o	375	Pipe/Conduit	
S10.006	36.693	0.155	236.7	0.026	0.00	0.0	0.600	o	600	Pipe/Conduit	
S10.007	7.609	0.044	172.9	0.061	0.00	0.0	0.600	o	225	Pipe/Conduit	
S10.008	25.517	0.172	148.4	0.051	0.00	0.0	0.600	o	225	Pipe/Conduit	
S10.009	52.902	1.079	49.0	0.118	0.00	0.0	0.600	o	300	Pipe/Conduit	
S10.010	26.211	1.006	26.1	0.053	0.00	0.0	0.600	o	300	Pipe/Conduit	
S10.011	6.682	0.327	20.5	0.010	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.000	21.354	0.267	80.0	0.137	4.00	0.0	0.600	o	375	Pipe/Conduit	
S16.000	25.721	0.322	80.0	0.099	4.00	0.0	0.600	o	225	Pipe/Conduit	
S15.001	28.157	0.282	99.8	0.002	0.00	0.0	0.600	o	375	Pipe/Conduit	
S15.002	25.423	0.254	100.1	0.070	0.00	0.0	0.600	o	375	Pipe/Conduit	
S15.003	12.459	0.125	99.7	0.023	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S13.000	40.85	8.12	140.600	0.106	0.0	0.0	0.0	1.72	274.1	15.6
S14.000	52.91	4.21	140.810	0.164	0.0	0.0	0.0	1.76	124.3	31.4
S14.001	52.65	4.27	140.550	0.164	0.0	0.0	0.0	1.29	205.3	31.4
S13.001	40.47	8.30	140.470	0.310	0.0	0.0	0.0	1.20	47.5	45.2
S13.002	39.98	8.52	140.365	0.310	0.0	0.0	0.0	1.83	72.7	45.2
S10.003	38.72	9.14	139.660	0.823	0.0	0.0	0.0	1.48	163.1	115.1
S10.004	37.85	9.60	139.400	0.899	0.0	0.0	0.0	1.48	163.2	122.9
S10.005	37.76	9.65	139.130	0.921	0.0	0.0	0.0	1.46	161.8	125.5
S10.006	37.06	10.04	139.110	0.947	0.0	0.0	0.0	1.58	446.3	126.8
S10.007	53.28	4.13	138.950	0.000	10.0	0.0	0.0	0.99	39.4	10.0
S10.008	51.61	4.52	138.900	0.051	10.0	0.0	0.0	1.07	42.6	19.4
S10.009	50.10	4.92	138.680	0.169	10.0	0.0	0.0	2.25	159.1	40.5
S10.010	49.58	5.06	137.600	0.221	10.0	0.0	0.0	3.09	218.6	49.6
S10.011	49.46	5.09	136.560	0.232	10.0	0.0	0.0	3.49	246.8	51.4
S15.000	53.07	4.18	139.850	0.137	0.0	0.0	0.0	2.03	223.9	26.2
S16.000	52.57	4.29	140.950	0.099	0.0	0.0	0.0	1.46	58.2	18.8
S15.001	51.51	4.55	139.550	0.238	0.0	0.0	0.0	1.81	200.3	44.3
S15.002	50.59	4.79	139.260	0.308	0.0	0.0	0.0	1.81	200.0	56.2
S15.003	50.16	4.90	139.000	0.331	0.0	0.0	0.0	1.81	200.5	60.0

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S17.000	56.062	0.820	68.4	0.137	6.00	0.0	0.600	o	300	Pipe/Conduit	
S15.004	21.046	0.210	100.2	0.079	0.00	0.0	0.600	o	375	Pipe/Conduit	
S15.005	35.877	0.422	85.0	0.080	0.00	0.0	0.600	o	375	Pipe/Conduit	
S15.006	34.315	0.429	80.0	0.129	0.00	0.0	0.600	o	375	Pipe/Conduit	
S18.000	9.277	0.093	100.0	0.043	4.00	0.0	0.600	o	225	Pipe/Conduit	
S18.001	47.815	0.912	52.4	0.114	0.00	0.0	0.600	o	225	Pipe/Conduit	
S18.002	42.670	1.255	34.0	0.183	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.007	65.208	1.124	58.0	0.193	0.00	0.0	0.600	o	450	Pipe/Conduit	
S15.008	8.108	0.111	73.0	0.123	0.00	0.0	0.600	o	450	Pipe/Conduit	
S15.009	20.506	0.101	203.0	0.024	0.00	0.0	0.600	o	450	Pipe/Conduit	
S15.010	34.067	0.236	144.4	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
S19.000	30.201	1.041	29.0	0.072	4.00	0.0	0.600	o	225	Pipe/Conduit	
S19.001	12.633	0.431	29.3	0.018	0.00	0.0	0.600	o	225	Pipe/Conduit	
S19.002	23.946	0.368	65.1	0.034	0.00	0.0	0.600	o	225	Pipe/Conduit	
S19.003	14.637	0.225	65.0	0.039	0.00	0.0	0.600	o	225	Pipe/Conduit	
S19.004	10.511	0.133	79.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S19.005	34.068	1.136	30.0	0.054	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.011	41.041	0.354	115.9	0.143	0.00	0.0	0.600	o	300	Pipe/Conduit	
S15.012	40.961	0.116	354.4	0.038	0.00	0.0	0.600	o	600	Pipe/Conduit	
S20.000	13.317	0.166	80.0	0.027	4.00	0.0	0.600	o	225	Pipe/Conduit	
S20.001	22.075	0.110	200.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S17.000	44.97	6.49	141.000	0.137	0.0	0.0	0.0	1.90	134.6	22.2
S15.004	44.43	6.68	138.850	0.547	0.0	0.0	0.0	1.81	199.9	87.7
S15.005	43.61	6.99	138.640	0.627	0.0	0.0	0.0	1.97	217.2	98.7
S15.006	42.88	7.27	138.220	0.755	0.0	0.0	0.0	2.03	223.9	116.9
S18.000	53.32	4.12	141.170	0.043	0.0	0.0	0.0	1.31	52.0	8.2
S18.001	51.48	4.56	141.050	0.157	0.0	0.0	0.0	1.81	72.0	29.1
S18.002	50.46	4.82	140.030	0.340	0.0	0.0	0.0	2.71	191.2	61.9
S15.007	41.88	7.68	137.700	1.288	0.0	0.0	0.0	2.67	425.2	194.8
S15.008	41.75	7.73	136.580	1.411	0.0	0.0	0.0	2.38	378.7	212.8
S15.009	41.19	7.97	135.920	1.436	0.0	0.0	0.0	1.42	226.3	213.5
S15.010	51.62	4.52	135.700	0.000	6.0	0.0	0.0	1.09	43.2	6.0
S19.000	52.94	4.21	140.200	0.072	0.0	0.0	0.0	2.44	97.0	13.7
S19.001	52.57	4.29	139.159	0.090	0.0	0.0	0.0	2.43	96.4	17.1
S19.002	51.56	4.54	138.728	0.124	0.0	0.0	0.0	1.62	64.6	23.1
S19.003	50.96	4.69	138.360	0.163	0.0	0.0	0.0	1.62	64.6	30.0
S19.004	50.51	4.81	138.130	0.163	0.0	0.0	0.0	1.47	58.5	30.0
S19.005	49.62	5.04	137.500	0.217	0.0	0.0	0.0	2.40	95.3	39.0
S15.011	47.99	5.51	135.380	0.360	6.0	0.0	0.0	1.46	103.2	68.4
S15.012	46.29	6.04	135.020	0.398	6.0	0.0	0.0	1.29	364.1	72.5
S20.000	53.17	4.15	137.500	0.027	0.0	0.0	0.0	1.46	58.2	5.3
S20.001	52.09	4.41	135.000	0.027	0.0	0.0	0.0	1.43	228.1	5.3

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S15.013	22.284	0.186	119.8	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit	
S10.012	12.180	0.122	100.0	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit	
S10.013	28.539	0.285	100.0	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit	
S10.014	29.525	0.984	30.0	0.033	0.00	0.0	0.600	o	300	Pipe/Conduit	
S10.015	28.903	0.500	57.8	0.041	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.016	37.394	0.831	45.0	0.031	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.017	35.441	1.772	20.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.018	38.753	1.938	20.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.019	34.116	0.853	40.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.020	13.590	0.412	33.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S21.000	15.759	0.050	315.2	0.000	4.00	2.0	0.600	o	450	Pipe/Conduit	
S1.021	10.662	0.089	120.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.022	8.163	0.068	120.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S22.000	29.214	0.487	60.0	0.096	4.00	0.0	0.600	o	300	Pipe/Conduit	
S22.001	4.899	0.024	204.1	0.014	0.00	0.0	0.600	o	450	Pipe/Conduit	
S22.002	8.910	0.074	120.4	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit	
S22.003	24.719	0.206	120.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S22.004	14.303	0.715	20.0	0.025	0.00	0.0	0.600	o	225	Pipe/Conduit	
S23.000	20.582	0.257	80.1	0.033	4.00	0.0	0.600	o	300	Pipe/Conduit	
S23.001	31.531	0.394	80.0	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S15.013	52.49	4.31	134.890	0.000	5.0	0.0	0.0	1.19	47.5	5.0
S10.012	49.00	5.22	134.630	0.256	15.0	0.0	0.0	1.57	111.1	60.3
S10.013	47.96	5.52	134.620	0.280	15.0	0.0	0.0	1.57	111.1	63.5
S10.014	47.40	5.69	132.800	0.313	15.0	0.0	0.0	2.88	203.7	68.5
S10.015	46.92	5.84	129.800	0.354	15.0	0.0	0.0	3.21	906.8	74.9
S1.016	52.69	4.27	129.200	0.000	42.0	0.0	0.0	2.35	166.1	42.0
S1.017	51.99	4.43	128.370	0.000	42.0	0.0	0.0	3.53	249.6	42.0
S1.018	51.25	4.62	126.600	0.000	42.0	0.0	0.0	3.53	249.7	42.0
S1.019	50.37	4.84	124.660	0.000	42.0	0.0	0.0	2.49	176.2	42.0
S1.020	50.06	4.93	123.750	0.000	42.0	0.0	0.0	2.75	194.1	42.0
S21.000	52.83	4.23	123.430	0.000	2.0	0.0	0.0	1.14	181.3	2.0
S1.021	49.61	5.05	122.060	0.000	44.0	0.0	0.0	1.43	101.4	44.0
S1.022	49.26	5.14	121.970	0.000	44.0	0.0	0.0	1.43	101.4	44.0
S22.000	52.80	4.24	134.620	0.096	0.0	0.0	0.0	2.03	143.7	18.2
S22.001	52.55	4.30	134.000	0.110	0.0	0.0	0.0	1.42	225.7	20.8
S22.002	53.29	4.12	133.870	0.000	1.5	0.0	0.0	1.19	47.3	1.5
S22.003	51.84	4.47	133.800	0.000	1.5	0.0	0.0	1.19	47.4	1.5
S22.004	51.51	4.55	133.594	0.025	1.5	0.0	0.0	2.94	116.9	6.1
S23.000	52.99	4.20	138.340	0.033	0.0	0.0	0.0	1.76	124.3	6.3
S23.001	51.74	4.49	138.080	0.083	0.0	0.0	0.0	1.76	124.4	15.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S23.002	33.707	0.421	80.0	0.109	0.00	0.0	0.600	o	300	Pipe/Conduit	
S23.003	8.329	0.139	60.0	0.122	0.00	0.0	0.600	o	300	Pipe/Conduit	
S23.004	17.817	0.073	244.1	0.036	0.00	0.0	0.600	o	300	Pipe/Conduit	
S23.005	9.399	0.085	110.6	0.059	0.00	0.0	0.600	o	225	Pipe/Conduit	
S23.006	12.146	0.101	120.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S23.007	6.866	0.057	120.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S24.000	22.728	1.136	20.0	0.069	4.00	0.0	0.600	o	225	Pipe/Conduit	
S24.001	52.087	1.736	30.0	0.124	0.00	0.0	0.600	o	225	Pipe/Conduit	
S25.000	20.287	0.203	100.0	0.059	4.00	0.0	0.600	o	225	Pipe/Conduit	
S24.002	51.014	0.855	59.7	0.121	0.00	0.0	0.600	o	375	Pipe/Conduit	
S24.003	20.698	0.342	60.5	0.064	0.00	0.0	0.600	o	375	Pipe/Conduit	
S24.004	43.564	0.726	60.0	0.059	0.00	0.0	0.600	o	375	Pipe/Conduit	
S24.005	32.234	0.161	200.0	0.049	0.00	0.0	0.600	o	600	Pipe/Conduit	
S26.000	37.265	0.373	100.0	0.072	4.00	0.0	0.600	o	225	Pipe/Conduit	
S26.001	43.747	0.437	100.1	0.069	0.00	0.0	0.600	o	225	Pipe/Conduit	
S26.002	11.219	0.187	60.0	0.054	0.00	0.0	0.600	o	225	Pipe/Conduit	
S27.000	41.246	0.412	100.0	0.066	4.00	0.0	0.600	o	225	Pipe/Conduit	
S27.001	42.022	0.408	103.0	0.039	0.00	0.0	0.600	o	225	Pipe/Conduit	
S26.003	6.815	0.170	40.1	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit	
S26.004	9.194	0.383	24.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S23.002	50.49	4.81	137.690	0.192	0.0	0.0	0.0	1.76	124.4	34.9
S23.003	50.23	4.88	137.270	0.313	0.0	0.0	0.0	2.03	143.7	56.8
S23.004	49.15	5.18	137.070	0.349	0.0	0.0	0.0	1.00	70.8	62.0
S23.005	53.28	4.13	136.970	0.000	1.5	0.0	0.0	1.24	49.4	1.5
S23.006	52.56	4.30	136.850	0.000	1.5	0.0	0.0	1.19	47.4	1.5
S23.007	52.16	4.39	136.750	0.000	1.5	0.0	0.0	1.19	47.3	1.5
S24.000	53.27	4.13	134.450	0.069	0.0	0.0	0.0	2.94	116.9	13.3
S24.001	51.75	4.49	133.000	0.193	0.0	0.0	0.0	2.40	95.3	36.1
S25.000	52.71	4.26	129.500	0.059	0.0	0.0	0.0	1.31	52.0	11.3
S24.002	50.34	4.85	129.000	0.374	0.0	0.0	0.0	2.35	259.5	68.0
S24.003	49.79	5.00	128.150	0.438	0.0	0.0	0.0	2.33	257.6	78.7
S24.004	48.68	5.31	127.810	0.497	0.0	0.0	0.0	2.34	258.8	87.3
S24.005	47.62	5.62	127.000	0.546	0.0	0.0	0.0	1.72	485.8	93.8
S26.000	51.82	4.48	132.300	0.072	0.0	0.0	0.0	1.31	52.0	13.5
S26.001	49.67	5.03	131.920	0.141	0.0	0.0	0.0	1.31	52.0	25.4
S26.002	49.27	5.14	131.480	0.196	0.0	0.0	0.0	1.69	67.3	34.8
S27.000	51.61	4.53	131.700	0.066	0.0	0.0	0.0	1.31	52.0	12.4
S27.001	49.53	5.07	131.300	0.106	0.0	0.0	0.0	1.29	51.2	18.9
S26.003	49.11	5.19	130.800	0.323	0.0	0.0	0.0	2.49	176.1	57.3
S26.004	48.94	5.24	130.600	0.323	0.0	0.0	0.0	3.22	227.8	57.3

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S28.000	23.452	0.235	100.0	0.103	4.00	0.0	0.600	o	225	Pipe/Conduit	
S28.001	31.798	0.318	100.0	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	
S28.002	13.068	0.131	100.0	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
S26.005	18.970	0.632	30.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S26.006	16.897	0.068	250.0	0.053	0.00	0.0	0.600	o	600	Pipe/Conduit	
S24.006	8.488	0.141	60.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S24.007	59.502	0.593	100.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S24.008	56.744	1.183	47.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S24.009	11.151	0.074	150.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S28.000	52.54	4.30	131.100	0.103	0.0	0.0	0.0	1.31	52.0	19.5
S28.001	50.91	4.70	130.850	0.133	0.0	0.0	0.0	1.31	52.0	24.4
S28.002	50.27	4.87	130.540	0.155	0.0	0.0	0.0	1.31	52.0	28.1
S26.005	48.56	5.35	130.000	0.478	0.0	0.0	0.0	2.88	203.7	83.8
S26.006	47.93	5.53	127.100	0.531	0.0	0.0	0.0	1.54	434.2	91.9
S24.006	53.47	4.08	126.750	0.000	4.0	0.0	0.0	1.69	67.1	4.0
S24.007	50.37	4.84	126.500	0.000	4.0	0.0	0.0	1.30	51.9	4.0
S24.008	48.57	5.34	125.910	0.000	4.0	0.0	0.0	1.89	75.3	4.0
S24.009	47.97	5.52	124.740	0.000	4.0	0.0	0.0	1.06	42.3	4.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.022	SExisting Mh	123.210	121.902	122.180	1200	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S22.004	SGlenamuck Rd	134.330	132.879	132.850	1200	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S23.007	S	137.800	136.693	136.700	1200	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S24.009	S	127.750	124.666	124.700	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	10	Number of Storage Structures	10	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	1.000
Region	Scotland and Ireland	Cv (Winter)	1.000
M5-60 (mm)	16.500	Storm Duration (mins)	30
Ratio R	0.277		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S19, DS/PN: S1.007, Volume (m³): 7.0

Unit Reference	MD-SHE-0012-1000-1600-1000
Design Head (m)	1.600
Design Flow (l/s)	0.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	12
Invert Level (m)	136.650
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	0.1	Kick-Flo®	0.108	0.0
Flush-Flo™	0.046	0.0	Mean Flow over Head Range	-	0.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.800	0.1	2.000	0.1	4.000	0.1	7.000	0.2
0.200	0.0	1.000	0.1	2.200	0.1	4.500	0.2	7.500	0.2
0.300	0.1	1.200	0.1	2.400	0.1	5.000	0.2	8.000	0.2
0.400	0.1	1.400	0.1	2.600	0.1	5.500	0.2	8.500	0.2
0.500	0.1	1.600	0.1	3.000	0.1	6.000	0.2	9.000	0.2
0.600	0.1	1.800	0.1	3.500	0.1	6.500	0.2	9.500	0.2

Hydro-Brake® Optimum Manhole: S42, DS/PN: S1.013, Volume (m³): 15.8

Unit Reference	MD-SHE-0012-1000-1750-1000
Design Head (m)	1.750
Design Flow (l/s)	0.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	12
Invert Level (m)	131.350
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.750	0.1	Kick-Flo®	0.106	0.0
Flush-Flo™	0.041	0.0	Mean Flow over Head Range	-	0.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.500	0.1	1.200	0.1	2.000	0.1	3.000	0.1
0.200	0.0	0.600	0.1	1.400	0.1	2.200	0.1	3.500	0.1
0.300	0.0	0.800	0.1	1.600	0.1	2.400	0.1	4.000	0.1
0.400	0.1	1.000	0.1	1.800	0.1	2.600	0.1	4.500	0.1

Hydro-Brake® Optimum Manhole: S42, DS/PN: S1.013, Volume (m³): 15.8

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
5.000	0.2	6.000	0.2	7.000	0.2	8.000	0.2	9.000	0.2
5.500	0.2	6.500	0.2	7.500	0.2	8.500	0.2	9.500	0.2

Hydro-Brake® Optimum Manhole: S55, DS/PN: S13.001, Volume (m³): 5.7

Unit Reference	MD-SHE-0012-1000-1550-1000
Design Head (m)	1.550
Design Flow (l/s)	0.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	12
Invert Level (m)	140.470
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.550	0.1	Kick-Flo®	0.108	0.0
Flush-Flo™	0.045	0.0	Mean Flow over Head Range	-	0.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.800	0.1	2.000	0.1	4.000	0.1	7.000	0.2
0.200	0.0	1.000	0.1	2.200	0.1	4.500	0.2	7.500	0.2
0.300	0.1	1.200	0.1	2.400	0.1	5.000	0.2	8.000	0.2
0.400	0.1	1.400	0.1	2.600	0.1	5.500	0.2	8.500	0.2
0.500	0.1	1.600	0.1	3.000	0.1	6.000	0.2	9.000	0.2
0.600	0.1	1.800	0.1	3.500	0.1	6.500	0.2	9.500	0.2

Hydro-Brake® Optimum Manhole: S61, DS/PN: S10.007, Volume (m³): 15.7

Unit Reference	MD-SHE-0012-1000-1500-1000
Design Head (m)	1.500
Design Flow (l/s)	0.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	12
Invert Level (m)	138.950
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	0.1	Kick-Flo®	0.109	0.0
Flush-Flo™	0.044	0.0	Mean Flow over Head Range	-	0.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Hydro-Brake® Optimum Manhole: S61, DS/PN: S10.007, Volume (m³): 15.7

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.800	0.1	2.000	0.1	4.000	0.1	7.000	0.2
0.200	0.0	1.000	0.1	2.200	0.1	4.500	0.2	7.500	0.2
0.300	0.1	1.200	0.1	2.400	0.1	5.000	0.2	8.000	0.2
0.400	0.1	1.400	0.1	2.600	0.1	5.500	0.2	8.500	0.2
0.500	0.1	1.600	0.1	3.000	0.1	6.000	0.2	9.000	0.2
0.600	0.1	1.800	0.1	3.500	0.1	6.500	0.2	9.500	0.2

Hydro-Brake® Optimum Manhole: S81, DS/PN: S15.010, Volume (m³): 7.5

Unit Reference	MD-SHE-0012-1000-1500-1000
Design Head (m)	1.500
Design Flow (l/s)	0.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	12
Invert Level (m)	135.700
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	0.1	Kick-Flo®	0.109	0.0
Flush-Flo™	0.044	0.0	Mean Flow over Head Range	-	0.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.800	0.1	2.000	0.1	4.000	0.1	7.000	0.2
0.200	0.0	1.000	0.1	2.200	0.1	4.500	0.2	7.500	0.2
0.300	0.1	1.200	0.1	2.400	0.1	5.000	0.2	8.000	0.2
0.400	0.1	1.400	0.1	2.600	0.1	5.500	0.2	8.500	0.2
0.500	0.1	1.600	0.1	3.000	0.1	6.000	0.2	9.000	0.2
0.600	0.1	1.800	0.1	3.500	0.1	6.500	0.2	9.500	0.2

Hydro-Brake® Optimum Manhole: S92, DS/PN: S15.013, Volume (m³): 18.6

Unit Reference	MD-SHE-0011-1000-2000-1000
Design Head (m)	2.000
Design Flow (l/s)	0.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	12
Invert Level (m)	134.890
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	0.1	Kick-Flo®	0.104	0.0
Flush-Flo™	0.044	0.0	Mean Flow over Head Range	-	0.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Hydro-Brake® Optimum Manhole: S92, DS/PN: S15.013, Volume (m³): 18.6

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.800	0.1	2.000	0.1	4.000	0.1	7.000	0.2
0.200	0.0	1.000	0.1	2.200	0.1	4.500	0.1	7.500	0.2
0.300	0.0	1.200	0.1	2.400	0.1	5.000	0.1	8.000	0.2
0.400	0.1	1.400	0.1	2.600	0.1	5.500	0.2	8.500	0.2
0.500	0.1	1.600	0.1	3.000	0.1	6.000	0.2	9.000	0.2
0.600	0.1	1.800	0.1	3.500	0.1	6.500	0.2	9.500	0.2

Hydro-Brake® Optimum Manhole: S97, DS/PN: S1.016, Volume (m³): 16.5

Unit Reference	MD-SHE-0012-1000-1800-1000
Design Head (m)	1.800
Design Flow (l/s)	0.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	12
Invert Level (m)	129.200
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	0.1	Kick-Flo®	0.105	0.0
Flush-Flo™	0.042	0.0	Mean Flow over Head Range	-	0.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.800	0.1	2.000	0.1	4.000	0.1	7.000	0.2
0.200	0.0	1.000	0.1	2.200	0.1	4.500	0.1	7.500	0.2
0.300	0.0	1.200	0.1	2.400	0.1	5.000	0.2	8.000	0.2
0.400	0.1	1.400	0.1	2.600	0.1	5.500	0.2	8.500	0.2
0.500	0.1	1.600	0.1	3.000	0.1	6.000	0.2	9.000	0.2
0.600	0.1	1.800	0.1	3.500	0.1	6.500	0.2	9.500	0.2

Hydro-Brake® Optimum Manhole: S107, DS/PN: S22.002, Volume (m³): 3.8

Unit Reference	MD-SHE-0013-1000-1270-1000
Design Head (m)	1.270
Design Flow (l/s)	0.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	13
Invert Level (m)	133.870
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.270	0.1	Kick-Flo®	0.114	0.0
Flush-Flo™	0.048	0.0	Mean Flow over Head Range	-	0.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these

Hydro-Brake® Optimum Manhole: S107, DS/PN: S22.002, Volume (m³): 3.8

storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.800	0.1	2.000	0.1	4.000	0.2	7.000	0.2
0.200	0.0	1.000	0.1	2.200	0.1	4.500	0.2	7.500	0.2
0.300	0.1	1.200	0.1	2.400	0.1	5.000	0.2	8.000	0.2
0.400	0.1	1.400	0.1	2.600	0.1	5.500	0.2	8.500	0.2
0.500	0.1	1.600	0.1	3.000	0.1	6.000	0.2	9.000	0.2
0.600	0.1	1.800	0.1	3.500	0.2	6.500	0.2	9.500	0.2

Hydro-Brake® Optimum Manhole: S115, DS/PN: S23.005, Volume (m³): 3.8

Unit Reference	MD-SHE-0012-1000-1600-1000
Design Head (m)	1.600
Design Flow (l/s)	0.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	12
Invert Level (m)	136.970
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	0.1	Kick-Flo®	0.108	0.0
Flush-Flo™	0.046	0.0	Mean Flow over Head Range	-	0.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.800	0.1	2.000	0.1	4.000	0.1	7.000	0.2
0.200	0.0	1.000	0.1	2.200	0.1	4.500	0.2	7.500	0.2
0.300	0.1	1.200	0.1	2.400	0.1	5.000	0.2	8.000	0.2
0.400	0.1	1.400	0.1	2.600	0.1	5.500	0.2	8.500	0.2
0.500	0.1	1.600	0.1	3.000	0.1	6.000	0.2	9.000	0.2
0.600	0.1	1.800	0.1	3.500	0.1	6.500	0.2	9.500	0.2

Hydro-Brake® Optimum Manhole: S137, DS/PN: S24.006, Volume (m³): 17.9

Unit Reference	MD-SHE-0012-1000-1720-1000
Design Head (m)	1.720
Design Flow (l/s)	0.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	12
Invert Level (m)	126.750
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.720	0.1	Kick-Flo®	0.107	0.0
Flush-Flo™	0.043	0.0	Mean Flow over Head Range	-	0.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as

Hydro-Brake® Optimum Manhole: S137, DS/PN: S24.006, Volume (m³): 17.9

specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.0	0.800	0.1	2.000	0.1	4.000	0.1	7.000	0.2
0.200	0.0	1.000	0.1	2.200	0.1	4.500	0.1	7.500	0.2
0.300	0.0	1.200	0.1	2.400	0.1	5.000	0.2	8.000	0.2
0.400	0.1	1.400	0.1	2.600	0.1	5.500	0.2	8.500	0.2
0.500	0.1	1.600	0.1	3.000	0.1	6.000	0.2	9.000	0.2
0.600	0.1	1.800	0.1	3.500	0.1	6.500	0.2	9.500	0.2

Storage Structures for Storm

Cellular Storage Manhole: S19, DS/PN: S1.007

Invert Level (m) 136.650 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00006 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00006

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	300.0	300.0	1.850	300.0	300.0	1.851	0.0	300.0

Cellular Storage Manhole: S42, DS/PN: S1.013

Invert Level (m) 131.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00005 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00005

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	400.0	400.0	1.850	400.0	400.0	1.851	0.0	400.0

Cellular Storage Manhole: S55, DS/PN: S13.001

Invert Level (m) 140.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00006 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00006

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	150.0	1.500	150.0	150.0	1.501	0.0	150.0

Cellular Storage Manhole: S61, DS/PN: S10.007

Invert Level (m) 139.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00006 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00006

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	220.0	220.0	1.850	220.0	220.0	1.851	0.0	220.0

Cellular Storage Manhole: S81, DS/PN: S15.010

Invert Level (m) 135.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	700.0	700.0	1.850	700.0	700.0	1.851	0.0	700.0

Cellular Storage Manhole: S92, DS/PN: S15.013

Invert Level (m) 134.900 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00006 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00006

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	500.0	500.0	1.850	500.0	500.0	1.851	0.0	500.0

Cellular Storage Manhole: S97, DS/PN: S1.016

Invert Level (m) 129.250 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00005 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00005

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	950.0	950.0	1.850	950.0	950.0	1.851	0.0	950.0

Cellular Storage Manhole: S107, DS/PN: S22.002

Invert Level (m) 133.950 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00006 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00006

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	50.0	100.0	1.450	50.0	100.0	1.451	0.0	100.0

Cellular Storage Manhole: S115, DS/PN: S23.005

Invert Level (m) 137.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00001 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00001

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	200.0	200.0	1.850	200.0	200.0	1.851	0.0	200.0

Cellular Storage Manhole: S137, DS/PN: S24.006

Invert Level (m) 126.750 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00001 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00001

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	550.0	550.0	1.850	550.0	550.0	1.851	0.0	550.0

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 10 Number of Storage Structures 10 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 16.500 Cv (Summer) 1.000
Region Scotland and Ireland Ratio R 0.277 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 150.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 120
Return Period(s) (years) 2, 30, 100
Climate Change (%) 20, 20, 20

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Maximum Velocity (m/s)
S1.000	S1	120 minute 2 year Summer I+20%	142.310	140.882	-0.228	0.000	0.13		0.076	1.0
S1.001	S2	120 minute 2 year Summer I+20%	142.000	140.536	-0.214	0.000	0.18		0.129	1.2
S2.000	S3	120 minute 2 year Summer I+20%	142.040	140.611	-0.154	0.000	0.22		0.075	1.0
S1.002	S4	120 minute 2 year Summer I+20%	141.750	140.162	-0.263	0.000	0.19		0.164	1.3
S1.003	S5	120 minute 2 year Summer I+20%	141.420	139.569	-0.278	0.000	0.15		0.132	1.9
S1.004	S6	120 minute 2 year Summer I+20%	140.100	138.625	-0.250	0.000	0.24		0.241	1.4
S3.000	S7	120 minute 2 year Summer I+20%	142.780	141.600	-0.220	0.000	0.16		0.084	1.2
S3.001	S8	120 minute 2 year Summer I+20%	142.900	141.241	-0.203	0.000	0.23		0.165	1.0
S3.002	S9	120 minute 2 year Summer I+20%	142.840	141.124	-0.196	0.000	0.26		0.175	1.4
S3.003	S10	120 minute 2 year Summer I+20%	142.500	140.670	-0.170	0.000	0.38		0.266	1.3
S4.000	S11	120 minute 2 year Summer I+20%	142.930	141.491	-0.164	0.000	0.16		0.063	1.0
S4.001	S12	120 minute 2 year Summer I+20%	142.670	141.209	-0.156	0.000	0.20		0.107	0.8
S3.004	S13	120 minute 2 year Summer I+20%	142.570	140.388	-0.332	0.000	0.15		0.166	1.7
S5.000	S14	120 minute 2 year Summer I+20%	142.140	140.669	-0.196	0.000	0.04		0.028	0.9
S3.005	S15	120 minute 2 year Summer I+20%	141.390	139.455	-0.295	0.000	0.25		0.415	1.5
S3.006	S16	120 minute 2 year Summer I+20%	140.960	139.131	-0.304	0.000	0.22		0.475	1.8
S1.005	S17	120 minute 2 year Summer I+20%	140.110	138.456	-0.344	0.000	0.37		0.595	1.1
S1.006	S18	120 minute 2 year Winter I+20%	140.000	137.579	0.229	0.000	0.33		1.457	0.8
S1.007	S19	120 minute 2 year Winter I+20%	139.000	137.579	0.629	0.000	0.00		269.360	0.0
S6.000	S20	120 minute 2 year Summer I+20%	140.710	139.268	-0.167	0.000	0.15		0.060	1.2
S6.001	S21	120 minute 2 year Summer I+20%	139.860	138.325	-0.235	0.000	0.10		0.069	1.8
S6.002	S22	120 minute 2 year Summer I+20%	139.070	137.430	-0.180	0.000	0.33		0.166	1.1
S6.003	S23	120 minute 2 year Summer I+20%	138.870	137.086	-0.210	0.000	0.19		0.191	1.8
S1.008	S24	120 minute 2 year Summer I+20%	138.190	135.479	-0.171	0.000	0.38		0.141	1.2
S1.009	S25	120 minute 2 year Summer I+20%	137.490	135.253	-0.242	0.000	0.26		0.232	1.3
S7.000	S26	120 minute 2 year Summer I+20%	136.470	135.262	-0.258	0.000	0.05		0.042	0.8
S7.001	S27	120 minute 2 year Summer I+20%	137.770	135.056	-0.224	0.000	0.15		0.158	1.0
S7.002	S28	120 minute 2 year Summer I+20%	137.290	134.884	-0.196	0.000	0.26		0.193	1.1
S7.003	S29	120 minute 2 year Summer I+20%	136.510	134.640	-0.180	0.000	0.33		0.275	1.1
S7.004	S30	120 minute 2 year Summer I+20%	136.000	134.533	-0.177	0.000	0.34		0.292	1.2
S1.010	S31	120 minute 2 year Summer I+20%	136.480	134.158	-0.272	0.000	0.32		0.247	1.5
S1.011	S32	120 minute 2 year Summer I+20%	135.840	133.456	-0.294	0.000	0.25		0.216	2.1
S1.012	S33	120 minute 2 year Winter I+20%	135.000	132.193	0.093	0.000	0.20		1.215	0.8
S8.000	S34	120 minute 2 year Summer I+20%	139.810	138.554	-0.181	0.000	0.09		0.044	1.5

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Pipe Flow (l/s)	Status
S1.000	S1	13.5	OK
S1.001	S2	19.1	OK
S2.000	S3	10.8	OK
S1.002	S4	36.7	OK
S1.003	S5	42.7	OK
S1.004	S6	44.4	OK
S3.000	S7	17.8	OK
S3.001	S8	20.2	OK
S3.002	S9	29.8	OK
S3.003	S10	36.7	OK
S4.000	S11	8.4	OK
S4.001	S12	8.3	OK
S3.004	S13	56.7	OK
S5.000	S14	2.7	OK
S3.005	S15	71.5	OK
S3.006	S16	80.3	OK
S1.005	S17	127.9	OK
S1.006	S18	91.6	SURCHARGED
S1.007	S19	0.1	SURCHARGED
S6.000	S20	9.9	OK
S6.001	S21	19.6	OK
S6.002	S22	29.5	OK
S6.003	S23	32.3	OK
S1.008	S24	33.1	OK
S1.009	S25	44.5	OK
S7.000	S26	4.8	OK
S7.001	S27	14.2	OK
S7.002	S28	23.7	OK
S7.003	S29	27.5	OK
S7.004	S30	31.3	OK
S1.010	S31	84.3	OK
S1.011	S32	98.2	OK
S1.012	S33	71.3	SURCHARGED
S8.000	S34	8.2	OK

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)
S8.001	S35	120 minute 2 year Summer I+20%	139.050	137.568	-0.167	0.000	0.15		0.068
S8.002	S36	120 minute 2 year Summer I+20%	138.330	136.918	-0.137	0.000	0.32		0.108
S8.003	S37	120 minute 2 year Summer I+20%	138.090	136.577	-0.213	0.000	0.18		0.092
S8.004	S38	120 minute 2 year Summer I+20%	137.240	135.677	-0.193	0.000	0.27		0.176
S9.000	S39	120 minute 2 year Summer I+20%	137.000	135.839	-0.186	0.000	0.07		0.038
S8.005	S40	120 minute 2 year Summer I+20%	136.960	135.304	-0.196	0.000	0.26		0.130
S8.006	S41	120 minute 2 year Summer I+20%	136.000	132.580	-0.520	0.000	0.04		0.133
S1.013	S42	120 minute 2 year Summer I+20%	133.500	132.193	0.543	0.000	0.00		311.505
S1.014	S43	120 minute 2 year Summer I+20%	133.480	130.709	-0.400	0.000	0.03		0.064
S1.015	S44	120 minute 2 year Summer I+20%	134.000	129.551	-0.549	0.000	0.02		0.081
S10.000	S45	120 minute 2 year Summer I+20%	142.140	140.846	-0.254	0.000	0.06		0.059
S11.000	S46	120 minute 2 year Summer I+20%	142.100	140.989	-0.211	0.000	0.19		0.095
S11.001	S47	120 minute 2 year Summer I+20%	142.500	140.713	-0.207	0.000	0.21		0.177
S10.001	S48	120 minute 2 year Summer I+20%	142.630	140.402	-0.273	0.000	0.16		0.162
S12.000	S49	120 minute 2 year Summer I+20%	142.750	141.071	-0.229	0.000	0.13		0.075
S12.001	S50	120 minute 2 year Summer I+20%	142.510	140.821	-0.220	0.000	0.16		0.146
S10.002	S51	120 minute 2 year Summer I+20%	142.760	140.218	-0.247	0.000	0.25		0.316
S13.000	S52	120 minute 2 year Summer I+20%	142.800	140.923	-0.127	0.000	0.06		0.455
S14.000	S53	120 minute 2 year Summer I+20%	142.620	140.924	-0.186	0.000	0.16		0.123
S14.001	S54	120 minute 2 year Winter I+20%	142.800	140.923	-0.077	0.000	0.10		1.737
S13.001	S55	120 minute 2 year Winter I+20%	142.800	140.923	0.228	0.000	0.00		62.877
S13.002	S56	120 minute 2 year Summer I+20%	142.630	140.366	-0.224	0.000	0.00		0.000
S10.003	S57	120 minute 2 year Summer I+20%	142.970	139.816	-0.219	0.000	0.36		0.232
S10.004	S58	120 minute 2 year Summer I+20%	142.920	139.630	-0.145	0.000	0.41		1.381
S10.005	S59	120 minute 2 year Summer I+20%	142.400	139.627	0.122	0.000	0.64		4.652
S10.006	S60	120 minute 2 year Summer I+20%	142.400	139.627	-0.083	0.000	0.17		1.252
S10.007	S61	120 minute 2 year Summer I+20%	142.200	139.627	0.452	0.000	0.00		141.872
S10.008	S62	120 minute 2 year Summer I+20%	142.100	138.955	-0.170	0.000	0.13		0.091
S10.009	S63	120 minute 2 year Summer I+20%	141.380	138.748	-0.232	0.000	0.12		0.085
S10.010	S64	120 minute 2 year Summer I+20%	139.110	137.668	-0.232	0.000	0.12		0.097
S10.011	S65	120 minute 2 year Summer I+20%	138.060	136.643	-0.217	0.000	0.17		0.094
S15.000	S66	120 minute 2 year Summer I+20%	141.720	139.918	-0.307	0.000	0.08		0.090
S16.000	S67	120 minute 2 year Summer I+20%	142.150	141.017	-0.158	0.000	0.19		0.070
S15.001	S68	120 minute 2 year Summer I+20%	141.930	139.644	-0.281	0.000	0.14		0.151
S15.002	S69	120 minute 2 year Summer I+20%	142.140	139.369	-0.266	0.000	0.19		0.239
S15.003	S70	120 minute 2 year Summer I+20%	141.860	139.127	-0.248	0.000	0.25		0.336
S17.000	S71	120 minute 2 year Summer I+20%	142.650	141.067	-0.233	0.000	0.11		0.070
S15.004	S72	120 minute 2 year Summer I+20%	141.700	139.001	-0.224	0.000	0.34		0.376
S15.005	S73	120 minute 2 year Summer I+20%	141.500	138.790	-0.225	0.000	0.33		0.521
S15.006	S74	120 minute 2 year Summer I+20%	141.000	138.383	-0.212	0.000	0.39		0.567
S18.000	S75	120 minute 2 year Summer I+20%	142.800	141.218	-0.177	0.000	0.11		0.049
S18.001	S76	120 minute 2 year Summer I+20%	142.680	141.124	-0.151	0.000	0.24		0.099
S18.002	S77	120 minute 2 year Summer I+20%	141.530	140.121	-0.209	0.000	0.20		0.097
S15.007	S78	120 minute 2 year Summer I+20%	140.500	137.882	-0.268	0.000	0.34		0.382
S15.008	S79	120 minute 2 year Summer I+20%	139.000	136.883	-0.147	0.000	0.77		1.390
S15.009	S80	120 minute 2 year Winter I+20%	139.000	136.271	-0.099	0.000	0.59		0.495
S15.010	S81	120 minute 2 year Summer I+20%	138.250	136.261	0.336	0.000	0.00		309.930
S19.000	S82	120 minute 2 year Summer I+20%	141.700	140.243	-0.182	0.000	0.08		0.043
S19.001	S83	120 minute 2 year Summer I+20%	140.640	139.209	-0.175	0.000	0.11		0.061
S19.002	S84	120 minute 2 year Summer I+20%	140.260	138.799	-0.154	0.000	0.22		0.088
S19.003	S85	120 minute 2 year Summer I+20%	140.000	138.444	-0.141	0.000	0.30		0.125
S19.004	S86	120 minute 2 year Summer I+20%	139.850	138.222	-0.133	0.000	0.35		0.131
S19.005	S87	120 minute 2 year Summer I+20%	139.620	137.577	-0.148	0.000	0.25		0.081
S15.011	S88	120 minute 2 year Summer I+20%	138.250	135.511	-0.169	0.000	0.39		0.259
S15.012	S89	120 minute 2 year Summer I+20%	138.250	135.166	-0.454	0.000	0.13		0.483
S20.000	S90	120 minute 2 year Summer I+20%	139.100	137.535	-0.190	0.000	0.06		0.034
S20.001	S91	120 minute 2 year Summer I+20%	139.250	135.106	-0.344	0.000	0.02		0.145
S15.013	S92	120 minute 2 year Summer I+20%	137.250	135.106	-0.009	0.000	0.00		101.337
S10.012	S93	120 minute 2 year Summer I+20%	137.750	134.758	-0.172	0.000	0.30		0.173

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S8.001	S35	1.6	12.9	OK
S8.002	S36	1.3	18.8	OK
S8.003	S37	1.5	24.8	OK
S8.004	S38	1.5	34.0	OK
S9.000	S39	0.9	4.0	OK
S8.005	S40	2.0	42.2	OK
S8.006	S41	2.0	43.4	OK
S1.013	S42	0.0	0.1	SURCHARGED
S1.014	S43	0.8	7.0	OK
S1.015	S44	0.8	8.1	OK
S10.000	S45	1.0	6.5	OK
S11.000	S46	1.0	17.9	OK
S11.001	S47	1.0	17.9	OK
S10.001	S48	1.2	29.5	OK
S12.000	S49	1.0	12.8	OK
S12.001	S50	1.1	16.1	OK
S10.002	S51	1.5	47.7	OK
S13.000	S52	0.5	10.6	OK
S14.000	S53	1.2	17.3	OK
S14.001	S54	0.4	11.5	OK
S13.001	S55	0.1	0.1	SURCHARGED
S13.002	S56	0.1	0.1	OK
S10.003	S57	1.2	52.9	OK
S10.004	S58	1.3	60.4	OK
S10.005	S59	0.9	60.6	SURCHARGED
S10.006	S60	0.7	62.4	OK
S10.007	S61	0.1	0.1	SURCHARGED
S10.008	S62	0.7	5.3	OK
S10.009	S63	1.5	17.6	OK
S10.010	S64	1.9	23.1	OK
S10.011	S65	1.5	24.1	OK
S15.000	S66	1.1	14.4	OK
S16.000	S67	1.1	10.4	OK
S15.001	S68	1.2	25.1	OK
S15.002	S69	1.2	32.3	OK
S15.003	S70	1.1	34.7	OK
S17.000	S71	1.2	14.2	OK
S15.004	S72	1.4	57.1	OK
S15.005	S73	1.6	65.0	OK
S15.006	S74	1.7	78.1	OK
S18.000	S75	0.7	4.5	OK
S18.001	S76	1.4	16.3	OK
S18.002	S77	2.0	35.5	OK
S15.007	S78	2.2	132.7	OK
S15.008	S79	1.3	145.4	OK
S15.009	S80	1.2	104.9	OK
S15.010	S81	0.1	0.1	SURCHARGED
S19.000	S82	1.4	7.6	OK
S19.001	S83	1.4	9.4	OK
S19.002	S84	1.2	13.0	OK
S19.003	S85	1.3	17.1	OK
S19.004	S86	1.1	17.1	OK
S19.005	S87	1.9	22.6	OK
S15.011	S88	1.3	37.3	OK
S15.012	S89	0.8	40.7	OK
S20.000	S90	0.7	2.9	OK
S20.001	S91	0.5	2.8	OK
S15.013	S92	0.0	0.0	OK

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S10.012	S93	0.9	26.4	OK

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)
S10.013	S94	120 minute 2 year Summer I+20%	137.500	134.731	-0.189	0.000	0.28		0.651
S10.014	S95	120 minute 2 year Summer I+20%	136.500	132.885	-0.215	0.000	0.17		0.090
S10.015	S96	120 minute 2 year Summer I+20%	133.000	129.888	-0.512	0.000	0.05		0.147
S1.016	S97	120 minute 2 year Winter I+20%	131.500	129.361	-0.139	0.000	0.00		100.562
S1.017	S98	120 minute 2 year Winter I+20%	129.750	128.370	-0.300	0.000	0.00		0.000
S1.018	S99	120 minute 2 year Winter I+20%	127.750	126.600	-0.300	0.000	0.00		0.000
S1.019	S100	120 minute 2 year Winter I+20%	126.250	124.660	-0.300	0.000	0.00		0.000
S1.020	S101	120 minute 2 year Winter I+20%	126.000	123.750	-0.300	0.000	0.00		0.000
S21.000	S102	120 minute 2 year Summer I+20%	124.750	123.460	-0.420	0.000	0.01		0.036
S1.021	S103	120 minute 2 year Winter I+20%	125.000	122.093	-0.267	0.000	0.03		0.040
S1.022	S104	120 minute 2 year Winter I+20%	123.500	122.004	-0.266	0.000	0.03		0.059
S22.000	S105	120 minute 2 year Summer I+20%	136.200	134.675	-0.245	0.000	0.08		0.057
S22.001	S106	120 minute 2 year Winter I+20%	136.270	134.420	-0.030	0.000	0.06		1.130
S22.002	S107	120 minute 2 year Winter I+20%	136.160	134.420	0.325	0.000	0.00		23.598
S22.003	S108	120 minute 2 year Winter I+20%	136.030	133.802	-0.223	0.000	0.00		0.001
S22.004	S109	120 minute 2 year Summer I+20%	135.100	133.618	-0.201	0.000	0.03		0.037
S23.000	S110	120 minute 2 year Summer I+20%	139.460	138.375	-0.265	0.000	0.03		0.034
S23.001	S111	120 minute 2 year Summer I+20%	139.660	138.135	-0.245	0.000	0.08		0.086
S23.002	S112	120 minute 2 year Summer I+20%	139.940	137.774	-0.216	0.000	0.17		0.149
S23.003	S113	120 minute 2 year Summer I+20%	139.050	137.442	-0.128	0.000	0.35		0.441
S23.004	S114	120 minute 2 year Summer I+20%	139.100	137.440	0.070	0.000	0.59		0.814
S23.005	S115	120 minute 2 year Summer I+20%	139.250	137.439	0.244	0.000	0.00		85.184
S23.006	S116	120 minute 2 year Summer I+20%	139.000	136.852	-0.223	0.000	0.00		0.000
S23.007	S117	120 minute 2 year Summer I+20%	139.000	136.752	-0.223	0.000	0.00		0.000
S24.000	S118	120 minute 2 year Summer I+20%	136.450	134.488	-0.187	0.000	0.07		0.038
S24.001	S119	120 minute 2 year Summer I+20%	134.980	133.072	-0.153	0.000	0.22		0.075
S25.000	S120	120 minute 2 year Summer I+20%	131.230	129.554	-0.171	0.000	0.13		0.056
S24.002	S121	120 minute 2 year Summer I+20%	132.400	129.101	-0.274	0.000	0.16		0.137
S24.003	S122	120 minute 2 year Summer I+20%	131.980	128.267	-0.258	0.000	0.21		0.263
S24.004	S123	120 minute 2 year Summer I+20%	131.800	127.929	-0.256	0.000	0.22		0.258
S24.005	S124	120 minute 2 year Winter I+20%	130.750	127.181	-0.419	0.000	0.10		0.372
S26.000	S125	120 minute 2 year Summer I+20%	133.500	132.359	-0.166	0.000	0.15		0.061
S26.001	S126	120 minute 2 year Summer I+20%	133.500	132.004	-0.141	0.000	0.30		0.135
S26.002	S127	120 minute 2 year Summer I+20%	133.500	131.573	-0.132	0.000	0.36		0.157
S27.000	S128	120 minute 2 year Summer I+20%	132.900	131.756	-0.169	0.000	0.14		0.058
S27.001	S129	120 minute 2 year Summer I+20%	132.900	131.372	-0.153	0.000	0.23		0.146
S26.003	S130	120 minute 2 year Summer I+20%	132.900	130.918	-0.182	0.000	0.33		0.139
S26.004	S131	120 minute 2 year Summer I+20%	132.500	130.695	-0.205	0.000	0.22		0.112
S28.000	S132	120 minute 2 year Summer I+20%	132.300	131.172	-0.153	0.000	0.23		0.076
S28.001	S133	120 minute 2 year Summer I+20%	132.300	130.932	-0.143	0.000	0.29		0.122
S28.002	S134	120 minute 2 year Summer I+20%	132.300	130.633	-0.132	0.000	0.36		0.176
S26.005	S135	120 minute 2 year Summer I+20%	132.000	130.109	-0.191	0.000	0.28		0.117
S26.006	S136	120 minute 2 year Summer I+20%	131.000	127.269	-0.431	0.000	0.17		0.290
S24.006	S137	120 minute 2 year Winter I+20%	129.500	127.181	0.206	0.000	0.00		229.820
S24.007	S138	120 minute 2 year Winter I+20%	128.650	126.501	-0.224	0.000	0.00		0.000
S24.008	S139	120 minute 2 year Winter I+20%	127.750	125.911	-0.224	0.000	0.00		0.000
S24.009	S140	120 minute 2 year Winter I+20%	127.730	124.742	-0.223	0.000	0.00		0.015

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S10.013	S94	1.2	28.6	OK
S10.014	S95	2.0	31.9	OK
S10.015	S96	1.4	35.9	OK
S1.016	S97	0.0	0.0	OK
S1.017	S98	0.0	0.0	OK
S1.018	S99	0.0	0.0	OK

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S1.019	S100	0.0	0.0	OK
S1.020	S101	0.0	0.0	OK
S21.000	S102	0.4	2.0	OK
S1.021	S103	0.5	2.0	OK
S1.022	S104	0.5	2.0	OK
S22.000	S105	1.1	10.1	OK
S22.001	S106	0.4	7.7	OK
S22.002	S107	0.1	0.1	SURCHARGED
S22.003	S108	0.1	0.1	OK
S22.004	S109	1.3	2.6	OK
S23.000	S110	0.8	3.5	OK
S23.001	S111	1.0	8.7	OK
S23.002	S112	1.2	20.0	OK
S23.003	S113	1.2	32.6	OK
S23.004	S114	0.9	35.7	SURCHARGED
S23.005	S115	0.1	0.1	SURCHARGED
S23.006	S116	0.1	0.1	OK
S23.007	S117	0.1	0.1	OK
S24.000	S118	1.6	7.3	OK
S24.001	S119	1.9	20.2	OK
S25.000	S120	0.8	6.2	OK
S24.002	S121	1.6	39.1	OK
S24.003	S122	1.6	45.5	OK
S24.004	S123	1.7	51.4	OK
S24.005	S124	0.9	40.0	OK
S26.000	S125	0.9	7.6	OK
S26.001	S126	1.1	14.8	OK
S26.002	S127	1.3	20.5	OK
S27.000	S128	0.9	7.0	OK
S27.001	S129	1.0	11.0	OK
S26.003	S130	1.3	33.6	OK
S26.004	S131	1.8	33.6	OK
S28.000	S132	1.0	10.8	OK
S28.001	S133	1.1	13.9	OK
S28.002	S134	1.0	16.3	OK
S26.005	S135	2.2	49.6	OK
S26.006	S136	0.9	55.0	OK
S24.006	S137	0.1	0.1	SURCHARGED
S24.007	S138	0.1	0.1	OK
S24.008	S139	0.1	0.1	OK
S24.009	S140	0.1	0.1	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 10 Number of Storage Structures 10 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	16.500
Region	Scotland and Ireland	Ratio R	0.277
Cv (Summer)	1.000		
Cv (Winter)	1.000		

Margin for Flood Risk Warning (mm) 150.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	120
Return Period(s) (years)	2, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)
S1.000	S1	120 minute 30 year Summer I+20%	142.310	140.908	-0.202	0.000	0.23		0.106
S1.001	S2	120 minute 30 year Summer I+20%	142.000	140.567	-0.183	0.000	0.32		0.207
S2.000	S3	120 minute 30 year Summer I+20%	142.040	140.638	-0.127	0.000	0.39		0.105
S1.002	S4	120 minute 30 year Summer I+20%	141.750	140.203	-0.222	0.000	0.35		0.277
S1.003	S5	120 minute 30 year Summer I+20%	141.420	139.604	-0.243	0.000	0.27		0.182
S1.004	S6	120 minute 30 year Summer I+20%	140.100	138.672	-0.203	0.000	0.43		0.383
S3.000	S7	120 minute 30 year Summer I+20%	142.780	141.628	-0.192	0.000	0.28		0.117
S3.001	S8	120 minute 30 year Summer I+20%	142.900	141.278	-0.166	0.000	0.41		0.288
S3.002	S9	120 minute 30 year Summer I+20%	142.840	141.165	-0.155	0.000	0.46		0.308
S3.003	S10	120 minute 30 year Summer I+20%	142.500	140.724	-0.116	0.000	0.68		0.472
S4.000	S11	120 minute 30 year Summer I+20%	142.930	141.513	-0.142	0.000	0.29		0.088
S4.001	S12	120 minute 30 year Summer I+20%	142.670	141.233	-0.132	0.000	0.36		0.148
S3.004	S13	120 minute 30 year Summer I+20%	142.570	140.431	-0.289	0.000	0.27		0.241
S5.000	S14	120 minute 30 year Summer I+20%	142.140	140.680	-0.185	0.000	0.07		0.040
S3.005	S15	120 minute 30 year Summer I+20%	141.390	139.514	-0.236	0.000	0.45		0.690
S3.006	S16	120 minute 30 year Summer I+20%	140.960	139.185	-0.250	0.000	0.40		0.785
S1.005	S17	120 minute 30 year Summer I+20%	140.110	138.562	-0.238	0.000	0.66		1.107
S1.006	S18	120 minute 30 year Winter I+20%	140.000	138.308	0.958	0.000	0.58		2.812
S1.007	S19	120 minute 30 year Winter I+20%	139.000	138.308	1.358	0.000	0.00		478.407
S6.000	S20	120 minute 30 year Summer I+20%	140.710	139.289	-0.146	0.000	0.26		0.084
S6.001	S21	120 minute 30 year Summer I+20%	139.860	138.348	-0.212	0.000	0.19		0.096
S6.002	S22	120 minute 30 year Summer I+20%	139.070	137.478	-0.132	0.000	0.60		0.265
S6.003	S23	120 minute 30 year Summer I+20%	138.870	137.118	-0.178	0.000	0.35		0.325
S1.008	S24	120 minute 30 year Summer I+20%	138.190	135.533	-0.117	0.000	0.68		0.202
S1.009	S25	120 minute 30 year Summer I+20%	137.490	135.304	-0.191	0.000	0.48		0.391
S7.000	S26	120 minute 30 year Summer I+20%	136.470	135.279	-0.241	0.000	0.09		0.061
S7.001	S27	120 minute 30 year Summer I+20%	137.770	135.084	-0.196	0.000	0.26		0.234
S7.002	S28	120 minute 30 year Summer I+20%	137.290	134.924	-0.156	0.000	0.46		0.370
S7.003	S29	120 minute 30 year Summer I+20%	136.510	134.688	-0.132	0.000	0.60		0.515
S7.004	S30	120 minute 30 year Summer I+20%	136.000	134.582	-0.128	0.000	0.62		0.506
S1.010	S31	120 minute 30 year Summer I+20%	136.480	134.228	-0.202	0.000	0.58		0.397
S1.011	S32	120 minute 30 year Summer I+20%	135.840	133.515	-0.235	0.000	0.46		0.301
S1.012	S33	120 minute 30 year Summer I+20%	135.000	132.817	0.717	0.000	0.52		2.422
S8.000	S34	120 minute 30 year Summer I+20%	139.810	138.568	-0.167	0.000	0.15		0.060

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S1.000	S1	1.2	23.9	OK
S1.001	S2	1.3	34.1	OK
S2.000	S3	1.2	19.3	OK
S1.002	S4	1.6	65.4	OK
S1.003	S5	2.2	76.3	OK
S1.004	S6	1.6	79.5	OK
S3.000	S7	1.4	31.7	OK
S3.001	S8	1.2	36.0	OK
S3.002	S9	1.6	53.1	OK
S3.003	S10	1.5	65.7	OK
S4.000	S11	1.1	14.9	OK
S4.001	S12	1.0	14.9	OK
S3.004	S13	2.0	101.8	OK
S5.000	S14	1.0	4.7	OK
S3.005	S15	1.7	128.4	OK
S3.006	S16	2.2	145.1	OK
S1.005	S17	1.3	230.4	OK
S1.006	S18	0.8	163.8	SURCHARGED
S1.007	S19	0.1	0.1	SURCHARGED
S6.000	S20	1.4	17.7	OK
S6.001	S21	2.0	34.9	OK
S6.002	S22	1.3	53.0	OK
S6.003	S23	2.2	58.1	OK
S1.008	S24	1.3	59.7	OK
S1.009	S25	1.5	81.1	OK
S7.000	S26	0.9	8.5	OK
S7.001	S27	1.2	25.2	OK
S7.002	S28	1.3	42.7	OK
S7.003	S29	1.2	49.7	OK
S7.004	S30	1.4	57.0	OK
S1.010	S31	1.7	154.7	OK
S1.011	S32	2.4	179.8	OK
S1.012	S33	0.7	182.0	SURCHARGED
S8.000	S34	1.8	14.6	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m^3)
S8.001	S35	120 minute 30 year Summer I+20%	139.050	137.589	-0.146	0.000	0.27		0.096
S8.002	S36	120 minute 30 year Summer I+20%	138.330	136.953	-0.102	0.000	0.58		0.163
S8.003	S37	120 minute 30 year Summer I+20%	138.090	136.608	-0.182	0.000	0.33		0.130
S8.004	S38	120 minute 30 year Summer I+20%	137.240	135.718	-0.152	0.000	0.49		0.308
S9.000	S39	120 minute 30 year Summer I+20%	137.000	135.852	-0.173	0.000	0.12		0.054
S8.005	S40	120 minute 30 year Summer I+20%	136.960	135.343	-0.157	0.000	0.46		0.230
S8.006	S41	120 minute 30 year Summer I+20%	136.000	132.817	-0.283	0.000	0.08		0.552
S1.013	S42	120 minute 30 year Summer I+20%	133.500	132.817	1.167	0.000	0.00		552.772
S1.014	S43	120 minute 30 year Summer I+20%	133.480	130.724	-0.385	0.000	0.05		0.085
S1.015	S44	120 minute 30 year Summer I+20%	134.000	129.569	-0.531	0.000	0.03		0.114
S10.000	S45	120 minute 30 year Summer I+20%	142.140	140.864	-0.236	0.000	0.10		0.084
S11.000	S46	120 minute 30 year Summer I+20%	142.100	141.021	-0.179	0.000	0.34		0.131
S11.001	S47	120 minute 30 year Summer I+20%	142.500	140.746	-0.174	0.000	0.37		0.311
S10.001	S48	120 minute 30 year Summer I+20%	142.630	140.438	-0.237	0.000	0.29		0.281
S12.000	S49	120 minute 30 year Summer I+20%	142.750	141.097	-0.203	0.000	0.23		0.104
S12.001	S50	120 minute 30 year Summer I+20%	142.510	140.850	-0.191	0.000	0.28		0.213
S10.002	S51	120 minute 30 year Winter I+20%	142.760	140.348	-0.117	0.000	0.32		1.014
S13.000	S52	120 minute 30 year Summer I+20%	142.800	141.258	0.208	0.000	0.11		0.935
S14.000	S53	120 minute 30 year Summer I+20%	142.620	141.259	0.149	0.000	0.28		0.502
S14.001	S54	120 minute 30 year Winter I+20%	142.800	141.258	0.258	0.000	0.17		2.529
S13.001	S55	120 minute 30 year Winter I+20%	142.800	141.258	0.563	0.000	0.00		111.442
S13.002	S56	120 minute 30 year Summer I+20%	142.630	140.367	-0.223	0.000	0.00		0.000
S10.003	S57	120 minute 30 year Winter I+20%	142.970	140.319	0.284	0.000	0.44		3.849
S10.004	S58	120 minute 30 year Winter I+20%	142.920	140.232	0.457	0.000	0.46		5.403
S10.005	S59	120 minute 30 year Winter I+20%	142.400	140.134	0.629	0.000	0.71		5.785
S10.006	S60	120 minute 30 year Winter I+20%	142.400	140.134	0.424	0.000	0.19		2.148
S10.007	S61	120 minute 30 year Winter I+20%	142.200	140.134	0.959	0.000	0.00		249.109
S10.008	S62	120 minute 30 year Summer I+20%	142.100	138.975	-0.150	0.000	0.24		0.127
S10.009	S63	120 minute 30 year Summer I+20%	141.380	138.773	-0.207	0.000	0.21		0.118
S10.010	S64	120 minute 30 year Summer I+20%	139.110	137.693	-0.207	0.000	0.21		0.135
S10.011	S65	120 minute 30 year Summer I+20%	138.060	136.673	-0.187	0.000	0.30		0.134
S15.000	S66	120 minute 30 year Summer I+20%	141.720	139.941	-0.284	0.000	0.14		0.123
S16.000	S67	120 minute 30 year Summer I+20%	142.150	141.041	-0.134	0.000	0.34		0.097
S15.001	S68	120 minute 30 year Summer I+20%	141.930	139.678	-0.247	0.000	0.25		0.253
S15.002	S69	120 minute 30 year Summer I+20%	142.140	139.408	-0.227	0.000	0.33		0.440
S15.003	S70	120 minute 30 year Summer I+20%	141.860	139.175	-0.200	0.000	0.45		0.585
S17.000	S71	120 minute 30 year Summer I+20%	142.650	141.091	-0.209	0.000	0.20		0.097
S15.004	S72	120 minute 30 year Summer I+20%	141.700	139.061	-0.164	0.000	0.60		0.633
S15.005	S73	120 minute 30 year Summer I+20%	141.500	138.849	-0.166	0.000	0.60		0.868
S15.006	S74	120 minute 30 year Summer I+20%	141.000	138.453	-0.142	0.000	0.70		1.011
S18.000	S75	120 minute 30 year Summer I+20%	142.800	141.235	-0.160	0.000	0.19		0.068
S18.001	S76	120 minute 30 year Summer I+20%	142.680	141.152	-0.123	0.000	0.43		0.138
S18.002	S77	120 minute 30 year Summer I+20%	141.530	140.153	-0.177	0.000	0.36		0.139
S15.007	S78	120 minute 30 year Summer I+20%	140.500	137.954	-0.196	0.000	0.61		0.701
S15.008	S79	120 minute 30 year Summer I+20%	139.000	137.116	0.086	0.000	1.40		3.744
S15.009	S80	120 minute 30 year Winter I+20%	139.000	136.706	0.336	0.000	1.05		1.510
S15.010	S81	120 minute 30 year Winter I+20%	138.250	136.621	0.696	0.000	0.00		550.544
S19.000	S82	120 minute 30 year Summer I+20%	141.700	140.257	-0.168	0.000	0.15		0.059
S19.001	S83	120 minute 30 year Summer I+20%	140.640	139.227	-0.157	0.000	0.20		0.085
S19.002	S84	120 minute 30 year Summer I+20%	140.260	138.825	-0.128	0.000	0.39		0.122
S19.003	S85	120 minute 30 year Summer I+20%	140.000	138.478	-0.107	0.000	0.54		0.194
S19.004	S86	120 minute 30 year Summer I+20%	139.850	138.259	-0.096	0.000	0.62		0.216
S19.005	S87	120 minute 30 year Summer I+20%	139.620	137.606	-0.119	0.000	0.45		0.114
S15.011	S88	120 minute 30 year Summer I+20%	138.250	135.566	-0.114	0.000	0.70		0.434
S15.012	S89	120 minute 30 year Summer I+20%	138.250	135.259	-0.361	0.000	0.24		1.105
S20.000	S90	120 minute 30 year Summer I+20%	139.100	137.548	-0.177	0.000	0.10		0.048
S20.001	S91	120 minute 30 year Summer I+20%	139.250	135.259	-0.191	0.000	0.03		0.364
S15.013	S92	120 minute 30 year Summer I+20%	137.250	135.259	0.144	0.000	0.00		179.076
S10.012	S93	120 minute 30 year Summer I+20%	137.750	134.811	-0.119	0.000	0.55		0.307

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S8.001	S35	1.9	23.0	OK
S8.002	S36	1.5	33.6	OK
S8.003	S37	1.7	44.6	OK
S8.004	S38	1.8	61.2	OK
S9.000	S39	1.0	7.0	OK
S8.005	S40	2.3	75.9	OK
S8.006	S41	2.2	78.5	OK
S1.013	S42	0.1	0.1	SURCHARGED
S1.014	S43	0.9	12.5	OK
S1.015	S44	0.8	14.6	OK
S10.000	S45	1.1	11.6	OK
S11.000	S46	1.2	31.7	OK
S11.001	S47	1.1	31.7	OK
S10.001	S48	1.4	52.5	OK
S12.000	S49	1.2	22.7	OK
S12.001	S50	1.3	28.7	OK
S10.002	S51	1.5	60.2	OK
S13.000	S52	0.5	18.6	SURCHARGED
S14.000	S53	1.3	30.2	SURCHARGED
S14.001	S54	0.4	19.7	SURCHARGED
S13.001	S55	0.1	0.1	SURCHARGED
S13.002	S56	0.1	0.1	OK
S10.003	S57	1.3	65.8	SURCHARGED
S10.004	S58	1.3	68.3	SURCHARGED
S10.005	S59	0.9	67.5	SURCHARGED
S10.006	S60	0.7	70.2	SURCHARGED
S10.007	S61	0.1	0.1	SURCHARGED
S10.008	S62	0.8	9.5	OK
S10.009	S63	1.7	31.6	OK
S10.010	S64	2.2	41.4	OK
S10.011	S65	1.8	43.4	OK
S15.000	S66	1.2	25.6	OK
S16.000	S67	1.2	18.5	OK
S15.001	S68	1.3	44.5	OK
S15.002	S69	1.4	57.6	OK
S15.003	S70	1.2	61.9	OK
S17.000	S71	1.4	25.3	OK
S15.004	S72	1.6	101.8	OK
S15.005	S73	1.8	116.4	OK
S15.006	S74	2.0	140.3	OK
S18.000	S75	0.8	8.0	OK
S18.001	S76	1.7	29.3	OK
S18.002	S77	2.3	63.5	OK
S15.007	S78	2.6	239.8	OK
S15.008	S79	1.7	262.7	SURCHARGED
S15.009	S80	1.3	188.0	SURCHARGED
S15.010	S81	0.1	0.1	SURCHARGED
S19.000	S82	1.7	13.4	OK
S19.001	S83	1.6	16.8	OK
S19.002	S84	1.4	23.2	OK
S19.003	S85	1.5	30.5	OK
S19.004	S86	1.3	30.5	OK
S19.005	S87	2.2	40.7	OK
S15.011	S88	1.5	67.4	OK
S15.012	S89	0.9	74.4	OK
S20.000	S90	0.8	5.1	OK
S20.001	S91	0.5	4.9	OK
S15.013	S92	0.1	0.1	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S10.012	S93	1.1	48.0	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)
S10.013	S94	120 minute 30 year Summer I+20%	137.500	134.774	-0.146	0.000	0.52		0.830
S10.014	S95	120 minute 30 year Summer I+20%	136.500	132.916	-0.184	0.000	0.32		0.125
S10.015	S96	120 minute 30 year Summer I+20%	133.000	129.923	-0.477	0.000	0.09		0.208
S1.016	S97	120 minute 30 year Winter I+20%	131.500	129.446	-0.054	0.000	0.00		178.066
S1.017	S98	120 minute 30 year Winter I+20%	129.750	128.370	-0.300	0.000	0.00		0.000
S1.018	S99	120 minute 30 year Winter I+20%	127.750	126.600	-0.300	0.000	0.00		0.000
S1.019	S100	120 minute 30 year Winter I+20%	126.250	124.660	-0.300	0.000	0.00		0.000
S1.020	S101	120 minute 30 year Winter I+20%	126.000	123.750	-0.300	0.000	0.00		0.000
S21.000	S102	120 minute 30 year Summer I+20%	124.750	123.460	-0.420	0.000	0.01		0.036
S1.021	S103	120 minute 30 year Winter I+20%	125.000	122.093	-0.267	0.000	0.03		0.040
S1.022	S104	120 minute 30 year Winter I+20%	123.500	122.005	-0.265	0.000	0.03		0.059
S22.000	S105	120 minute 30 year Summer I+20%	136.200	134.773	-0.147	0.000	0.14		0.167
S22.001	S106	120 minute 30 year Winter I+20%	136.270	134.772	0.322	0.000	0.10		2.917
S22.002	S107	120 minute 30 year Winter I+20%	136.160	134.772	0.677	0.000	0.00		40.885
S22.003	S108	120 minute 30 year Winter I+20%	136.030	133.802	-0.223	0.000	0.00		0.002
S22.004	S109	120 minute 30 year Summer I+20%	135.100	133.625	-0.194	0.000	0.05		0.050
S23.000	S110	120 minute 30 year Summer I+20%	139.460	138.386	-0.254	0.000	0.06		0.046
S23.001	S111	120 minute 30 year Summer I+20%	139.660	138.153	-0.227	0.000	0.14		0.118
S23.002	S112	120 minute 30 year Summer I+20%	139.940	137.805	-0.185	0.000	0.31		0.233
S23.003	S113	120 minute 30 year Summer I+20%	139.050	137.782	0.212	0.000	0.59		2.476
S23.004	S114	120 minute 30 year Summer I+20%	139.100	137.779	0.409	0.000	0.97		1.300
S23.005	S115	120 minute 30 year Summer I+20%	139.250	137.776	0.581	0.000	0.00		149.444
S23.006	S116	120 minute 30 year Summer I+20%	139.000	136.852	-0.223	0.000	0.00		0.000
S23.007	S117	120 minute 30 year Summer I+20%	139.000	136.752	-0.223	0.000	0.00		0.000
S24.000	S118	120 minute 30 year Summer I+20%	136.450	134.502	-0.173	0.000	0.12		0.053
S24.001	S119	120 minute 30 year Summer I+20%	134.980	133.098	-0.127	0.000	0.40		0.105
S25.000	S120	120 minute 30 year Summer I+20%	131.230	129.574	-0.151	0.000	0.23		0.078
S24.002	S121	120 minute 30 year Summer I+20%	132.400	129.137	-0.238	0.000	0.29		0.190
S24.003	S122	120 minute 30 year Summer I+20%	131.980	128.309	-0.216	0.000	0.38		0.426
S24.004	S123	120 minute 30 year Summer I+20%	131.800	127.973	-0.212	0.000	0.39		0.423
S24.005	S124	120 minute 30 year Summer I+20%	130.750	127.507	-0.093	0.000	0.25		2.367
S26.000	S125	120 minute 30 year Summer I+20%	133.500	132.380	-0.145	0.000	0.27		0.085
S26.001	S126	120 minute 30 year Summer I+20%	133.500	132.037	-0.108	0.000	0.53		0.215
S26.002	S127	120 minute 30 year Summer I+20%	133.500	131.611	-0.094	0.000	0.64		0.278
S27.000	S128	120 minute 30 year Summer I+20%	132.900	131.776	-0.149	0.000	0.25		0.080
S27.001	S129	120 minute 30 year Summer I+20%	132.900	131.399	-0.126	0.000	0.41		0.209
S26.003	S130	120 minute 30 year Summer I+20%	132.900	130.965	-0.135	0.000	0.58		0.233
S26.004	S131	120 minute 30 year Summer I+20%	132.500	130.730	-0.170	0.000	0.39		0.174
S28.000	S132	120 minute 30 year Summer I+20%	132.300	131.199	-0.126	0.000	0.40		0.106
S28.001	S133	120 minute 30 year Summer I+20%	132.300	130.964	-0.111	0.000	0.51		0.189
S28.002	S134	120 minute 30 year Summer I+20%	132.300	130.672	-0.093	0.000	0.65		0.314
S26.005	S135	120 minute 30 year Summer I+20%	132.000	130.151	-0.149	0.000	0.51		0.166
S26.006	S136	120 minute 30 year Summer I+20%	131.000	127.503	-0.197	0.000	0.32		0.704
S24.006	S137	120 minute 30 year Summer I+20%	129.500	127.503	0.528	0.000	0.00		406.290
S24.007	S138	120 minute 30 year Summer I+20%	128.650	126.502	-0.223	0.000	0.00		0.000
S24.008	S139	120 minute 30 year Summer I+20%	127.750	125.911	-0.224	0.000	0.00		0.000
S24.009	S140	120 minute 30 year Summer I+20%	127.730	124.742	-0.223	0.000	0.00		0.016

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S10.013	S94	1.4	52.4	OK
S10.014	S95	2.3	58.6	OK
S10.015	S96	1.6	66.2	OK
S1.016	S97	0.0	0.0	OK
S1.017	S98	0.0	0.0	OK
S1.018	S99	0.0	0.0	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S1.019	S100	0.0	0.0	OK
S1.020	S101	0.0	0.0	OK
S21.000	S102	0.4	2.0	OK
S1.021	S103	0.5	2.0	OK
S1.022	S104	0.5	2.0	OK
S22.000	S105	1.3	17.9	OK
S22.001	S106	0.4	13.0	SURCHARGED
S22.002	S107	0.1	0.1	SURCHARGED
S22.003	S108	0.1	0.1	OK
S22.004	S109	1.4	4.7	OK
S23.000	S110	0.9	6.2	OK
S23.001	S111	1.2	15.5	OK
S23.002	S112	1.4	35.8	OK
S23.003	S113	1.3	55.0	SURCHARGED
S23.004	S114	0.9	58.9	SURCHARGED
S23.005	S115	0.1	0.1	SURCHARGED
S23.006	S116	0.1	0.1	OK
S23.007	S117	0.1	0.1	OK
S24.000	S118	1.9	12.9	OK
S24.001	S119	2.2	36.2	OK
S25.000	S120	1.0	11.1	OK
S24.002	S121	1.9	69.9	OK
S24.003	S122	1.8	81.9	OK
S24.004	S123	2.0	92.9	OK
S24.005	S124	1.2	101.4	OK
S26.000	S125	1.1	13.5	OK
S26.001	S126	1.3	26.4	OK
S26.002	S127	1.5	36.6	OK
S27.000	S128	1.0	12.4	OK
S27.001	S129	1.2	19.8	OK
S26.003	S130	1.5	60.4	OK
S26.004	S131	2.1	60.4	OK
S28.000	S132	1.1	19.2	OK
S28.001	S133	1.2	24.8	OK
S28.002	S134	1.2	29.0	OK
S26.005	S135	2.5	89.4	OK
S26.006	S136	1.0	99.2	OK
S24.006	S137	0.1	0.1	SURCHARGED
S24.007	S138	0.1	0.1	OK
S24.008	S139	0.1	0.1	OK
S24.009	S140	0.1	0.1	OK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 10 Number of Storage Structures 10 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	16.500
Region	Scotland and Ireland	Ratio R	0.277
Cv (Summer)	1.000		
Cv (Winter)	1.000		

Margin for Flood Risk Warning (mm) 150.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 120
Return Period(s) (years) 2, 30, 100
Climate Change (%) 20, 20, 20

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)
S1.000	S1	120 minute 100 year Summer I+20%	142.310	140.923	-0.187	0.000	0.30		0.122
S1.001	S2	120 minute 100 year Summer I+20%	142.000	140.585	-0.165	0.000	0.41		0.277
S2.000	S3	120 minute 100 year Summer I+20%	142.040	140.653	-0.112	0.000	0.50		0.123
S1.002	S4	120 minute 100 year Summer I+20%	141.750	140.226	-0.199	0.000	0.45		0.343
S1.003	S5	120 minute 100 year Summer I+20%	141.420	139.624	-0.223	0.000	0.34		0.211
S1.004	S6	120 minute 100 year Summer I+20%	140.100	139.148	0.273	0.000	0.55		2.866
S3.000	S7	120 minute 100 year Summer I+20%	142.780	141.645	-0.175	0.000	0.36		0.136
S3.001	S8	120 minute 100 year Summer I+20%	142.900	141.299	-0.145	0.000	0.52		0.372
S3.002	S9	120 minute 100 year Summer I+20%	142.840	141.189	-0.131	0.000	0.60		0.388
S3.003	S10	120 minute 100 year Summer I+20%	142.500	140.761	-0.079	0.000	0.88		0.644
S4.000	S11	120 minute 100 year Summer I+20%	142.930	141.525	-0.130	0.000	0.37		0.102
S4.001	S12	120 minute 100 year Summer I+20%	142.670	141.248	-0.117	0.000	0.46		0.178
S3.004	S13	120 minute 100 year Summer I+20%	142.570	140.456	-0.264	0.000	0.35		0.284
S5.000	S14	120 minute 100 year Summer I+20%	142.140	140.687	-0.178	0.000	0.10		0.047
S3.005	S15	120 minute 100 year Summer I+20%	141.390	139.549	-0.201	0.000	0.58		0.941
S3.006	S16	120 minute 100 year Summer I+20%	140.960	139.218	-0.217	0.000	0.52		1.083
S1.005	S17	120 minute 100 year Summer I+20%	140.110	139.142	0.342	0.000	0.86		6.554
S1.006	S18	120 minute 100 year Summer I+20%	140.000	139.073	1.723	0.000	1.05		4.592
S1.007	S19	120 minute 100 year Summer I+20%	139.000	139.073	2.123	72.814	0.00		607.142
S6.000	S20	120 minute 100 year Summer I+20%	140.710	139.301	-0.134	0.000	0.34		0.097
S6.001	S21	120 minute 100 year Summer I+20%	139.860	138.360	-0.200	0.000	0.24		0.110
S6.002	S22	120 minute 100 year Summer I+20%	139.070	137.509	-0.101	0.000	0.77		0.330
S6.003	S23	120 minute 100 year Summer I+20%	138.870	137.137	-0.159	0.000	0.45		0.433
S1.008	S24	120 minute 100 year Summer I+20%	138.190	135.570	-0.080	0.000	0.88		0.243
S1.009	S25	120 minute 100 year Summer I+20%	137.490	135.335	-0.160	0.000	0.62		0.513
S7.000	S26	120 minute 100 year Summer I+20%	136.470	135.286	-0.234	0.000	0.11		0.070
S7.001	S27	120 minute 100 year Summer I+20%	137.770	135.100	-0.180	0.000	0.34		0.306
S7.002	S28	120 minute 100 year Summer I+20%	137.290	134.948	-0.132	0.000	0.60		0.477
S7.003	S29	120 minute 100 year Summer I+20%	136.510	134.719	-0.101	0.000	0.77		0.672
S7.004	S30	120 minute 100 year Summer I+20%	136.000	134.615	-0.095	0.000	0.80		0.648
S1.010	S31	120 minute 100 year Summer I+20%	136.480	134.274	-0.156	0.000	0.75		0.515
S1.011	S32	120 minute 100 year Summer I+20%	135.840	133.551	-0.199	0.000	0.59		0.353
S1.012	S33	120 minute 100 year Summer I+20%	135.000	133.228	1.128	0.000	0.67		5.078
S8.000	S34	120 minute 100 year Summer I+20%	139.810	138.577	-0.158	0.000	0.19		0.070

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S1.000	S1	1.3	30.9	OK
S1.001	S2	1.4	43.9	OK
S2.000	S3	1.3	24.8	OK
S1.002	S4	1.7	84.3	OK
S1.003	S5	2.4	98.4	OK
S1.004	S6	1.7	102.4	SURCHARGED
S3.000	S7	1.5	40.9	OK
S3.001	S8	1.3	46.4	OK
S3.002	S9	1.7	68.5	OK
S3.003	S10	1.5	84.6	OK
S4.000	S11	1.2	19.2	OK
S4.001	S12	1.0	19.1	OK
S3.004	S13	2.1	131.2	OK
S5.000	S14	1.0	6.1	OK
S3.005	S15	1.9	165.5	OK
S3.006	S16	2.3	186.9	OK
S1.005	S17	1.4	296.8	SURCHARGED
S1.006	S18	1.1	296.2	SURCHARGED
S1.007	S19	0.1	0.1	FLOOD
S6.000	S20	1.5	22.8	OK
S6.001	S21	2.2	44.9	OK
S6.002	S22	1.4	68.3	OK
S6.003	S23	2.3	74.9	OK
S1.008	S24	1.4	77.0	OK
S1.009	S25	1.6	104.4	OK
S7.000	S26	1.0	11.0	OK
S7.001	S27	1.2	32.5	OK
S7.002	S28	1.4	55.0	OK
S7.003	S29	1.3	64.1	OK
S7.004	S30	1.4	73.5	OK
S1.010	S31	1.8	199.3	OK
S1.011	S32	2.6	231.6	OK
S1.012	S33	0.8	234.3	SURCHARGED
S8.000	S34	1.9	18.8	OK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)
S8.001	S35	120 minute 100 year Summer I+20%	139.050	137.601	-0.134	0.000	0.34		0.111
S8.002	S36	120 minute 100 year Summer I+20%	138.330	136.976	-0.079	0.000	0.75		0.206
S8.003	S37	120 minute 100 year Summer I+20%	138.090	136.626	-0.164	0.000	0.42		0.153
S8.004	S38	120 minute 100 year Summer I+20%	137.240	135.743	-0.127	0.000	0.63		0.388
S9.000	S39	120 minute 100 year Summer I+20%	137.000	135.860	-0.165	0.000	0.16		0.062
S8.005	S40	120 minute 100 year Summer I+20%	136.960	135.367	-0.133	0.000	0.60		0.292
S8.006	S41	120 minute 100 year Summer I+20%	136.000	133.228	0.128	0.000	0.10		1.277
S1.013	S42	120 minute 100 year Summer I+20%	133.500	133.228	1.578	0.000	0.00		709.892
S1.014	S43	120 minute 100 year Summer I+20%	133.480	130.733	-0.376	0.000	0.07		0.099
S1.015	S44	120 minute 100 year Summer I+20%	134.000	129.578	-0.522	0.000	0.04		0.128
S10.000	S45	120 minute 100 year Summer I+20%	142.140	140.872	-0.228	0.000	0.13		0.096
S11.000	S46	120 minute 100 year Summer I+20%	142.100	141.039	-0.161	0.000	0.44		0.152
S11.001	S47	120 minute 100 year Summer I+20%	142.500	140.766	-0.154	0.000	0.48		0.412
S10.001	S48	120 minute 100 year Winter I+20%	142.630	140.715	0.040	0.000	0.27		2.332
S12.000	S49	120 minute 100 year Summer I+20%	142.750	141.111	-0.189	0.000	0.29		0.120
S12.001	S50	120 minute 100 year Summer I+20%	142.510	140.867	-0.174	0.000	0.36		0.288
S10.002	S51	120 minute 100 year Winter I+20%	142.760	140.704	0.239	0.000	0.41		3.502
S13.000	S52	120 minute 100 year Summer I+20%	142.800	141.483	0.433	0.000	0.14		1.256
S14.000	S53	120 minute 100 year Summer I+20%	142.620	141.484	0.374	0.000	0.34		0.756
S14.001	S54	120 minute 100 year Summer I+20%	142.800	141.482	0.482	0.000	0.31		2.850
S13.001	S55	120 minute 100 year Summer I+20%	142.800	141.482	0.787	0.000	0.00		143.730
S13.002	S56	120 minute 100 year Winter I+20%	142.630	140.663	0.073	0.000	0.02		0.765
S10.003	S57	120 minute 100 year Winter I+20%	142.970	140.663	0.628	0.000	0.55		4.899
S10.004	S58	120 minute 100 year Winter I+20%	142.920	140.565	0.790	0.000	0.62		5.879
S10.005	S59	120 minute 100 year Winter I+20%	142.400	140.466	0.961	0.000	1.00		6.260
S10.006	S60	120 minute 100 year Winter I+20%	142.400	140.466	0.756	0.000	0.26		2.735
S10.007	S61	120 minute 100 year Winter I+20%	142.200	140.466	1.291	0.000	0.00		319.062
S10.008	S62	120 minute 100 year Summer I+20%	142.100	138.986	-0.139	0.000	0.31		0.147
S10.009	S63	120 minute 100 year Summer I+20%	141.380	138.786	-0.194	0.000	0.27		0.137
S10.010	S64	120 minute 100 year Summer I+20%	139.110	137.706	-0.194	0.000	0.27		0.156
S10.011	S65	120 minute 100 year Summer I+20%	138.060	136.690	-0.170	0.000	0.39		0.164
S15.000	S66	120 minute 100 year Summer I+20%	141.720	139.955	-0.270	0.000	0.17		0.143
S16.000	S67	120 minute 100 year Summer I+20%	142.150	141.055	-0.120	0.000	0.44		0.113
S15.001	S68	120 minute 100 year Summer I+20%	141.930	139.697	-0.228	0.000	0.33		0.324
S15.002	S69	120 minute 100 year Summer I+20%	142.140	139.431	-0.204	0.000	0.43		0.554
S15.003	S70	120 minute 100 year Summer I+20%	141.860	139.204	-0.171	0.000	0.58		0.734
S17.000	S71	120 minute 100 year Summer I+20%	142.650	141.103	-0.197	0.000	0.26		0.111
S15.004	S72	120 minute 100 year Summer I+20%	141.700	139.100	-0.125	0.000	0.78		0.848
S15.005	S73	120 minute 100 year Summer I+20%	141.500	138.888	-0.127	0.000	0.77		1.194
S15.006	S74	120 minute 100 year Summer I+20%	141.000	138.499	-0.096	0.000	0.90		1.387
S18.000	S75	120 minute 100 year Summer I+20%	142.800	141.244	-0.151	0.000	0.24		0.079
S18.001	S76	120 minute 100 year Summer I+20%	142.680	141.169	-0.106	0.000	0.55		0.179
S18.002	S77	120 minute 100 year Summer I+20%	141.530	140.172	-0.158	0.000	0.46		0.167
S15.007	S78	120 minute 100 year Summer I+20%	140.500	138.002	-0.148	0.000	0.78		0.949
S15.008	S79	120 minute 100 year Summer I+20%	139.000	137.261	0.231	0.000	1.80		5.305
S15.009	S80	120 minute 100 year Summer I+20%	139.000	136.952	0.582	0.000	1.90		2.463
S15.010	S81	120 minute 100 year Summer I+20%	138.250	136.856	0.931	0.000	0.00		707.609
S19.000	S82	120 minute 100 year Summer I+20%	141.700	140.266	-0.159	0.000	0.19		0.069
S19.001	S83	120 minute 100 year Summer I+20%	140.640	139.237	-0.147	0.000	0.26		0.097
S19.002	S84	120 minute 100 year Summer I+20%	140.260	138.841	-0.112	0.000	0.50		0.147
S19.003	S85	120 minute 100 year Summer I+20%	140.000	138.498	-0.087	0.000	0.69		0.253
S19.004	S86	120 minute 100 year Summer I+20%	139.850	138.283	-0.072	0.000	0.80		0.282
S19.005	S87	120 minute 100 year Summer I+20%	139.620	137.624	-0.101	0.000	0.58		0.134
S15.011	S88	120 minute 100 year Summer I+20%	138.250	135.603	-0.077	0.000	0.91		0.602
S15.012	S89	120 minute 100 year Summer I+20%	138.250	135.362	-0.258	0.000	0.31		2.020
S20.000	S90	120 minute 100 year Summer I+20%	139.100	137.554	-0.171	0.000	0.13		0.055
S20.001	S91	120 minute 100 year Winter I+20%	139.250	135.360	-0.090	0.000	0.02		0.508
S15.013	S92	120 minute 100 year Summer I+20%	137.250	135.360	0.245	0.000	0.00		230.090
S10.012	S93	120 minute 100 year Summer I+20%	137.750	134.861	-0.069	0.000	0.71		0.489

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S8.001	S35	2.0	29.6	OK
S8.002	S36	1.6	43.3	OK
S8.003	S37	1.9	57.5	OK
S8.004	S38	1.9	78.9	OK
S9.000	S39	1.1	9.1	OK
S8.005	S40	2.4	97.8	OK
S8.006	S41	2.3	101.1	SURCHARGED
S1.013	S42	0.1	0.1	SURCHARGED
S1.014	S43	0.9	16.0	OK
S1.015	S44	0.9	18.8	OK
S10.000	S45	1.2	14.9	OK
S11.000	S46	1.3	40.9	OK
S11.001	S47	1.2	40.9	OK
S10.001	S48	1.4	47.6	SURCHARGED
S12.000	S49	1.2	29.2	OK
S12.001	S50	1.3	37.0	OK
S10.002	S51	1.6	77.5	SURCHARGED
S13.000	S52	0.5	24.3	SURCHARGED
S14.000	S53	1.3	37.4	SURCHARGED
S14.001	S54	0.4	36.2	SURCHARGED
S13.001	S55	0.1	0.1	SURCHARGED
S13.002	S56	0.1	1.2	SURCHARGED
S10.003	S57	1.3	81.1	SURCHARGED
S10.004	S58	1.3	91.6	SURCHARGED
S10.005	S59	0.9	94.5	SURCHARGED
S10.006	S60	0.8	96.8	SURCHARGED
S10.007	S61	0.1	0.1	SURCHARGED
S10.008	S62	0.9	12.3	OK
S10.009	S63	1.8	40.7	OK
S10.010	S64	2.4	53.4	OK
S10.011	S65	1.9	55.9	OK
S15.000	S66	1.3	33.0	OK
S16.000	S67	1.3	23.8	OK
S15.001	S68	1.4	57.4	OK
S15.002	S69	1.5	74.2	OK
S15.003	S70	1.3	79.8	OK
S17.000	S71	1.5	32.6	OK
S15.004	S72	1.7	131.2	OK
S15.005	S73	1.9	150.0	OK
S15.006	S74	2.1	180.8	OK
S18.000	S75	0.9	10.3	OK
S18.001	S76	1.8	37.7	OK
S18.002	S77	2.5	81.9	OK
S15.007	S78	2.7	309.0	OK
S15.008	S79	2.1	338.4	SURCHARGED
S15.009	S80	2.1	340.6	SURCHARGED
S15.010	S81	0.1	0.1	SURCHARGED
S19.000	S82	1.8	17.3	OK
S19.001	S83	1.8	21.7	OK
S19.002	S84	1.5	29.9	OK
S19.003	S85	1.5	39.3	OK
S19.004	S86	1.4	39.3	OK
S19.005	S87	2.3	52.4	OK
S15.011	S88	1.5	86.9	OK
S15.012	S89	1.0	95.5	OK
S20.000	S90	0.9	6.6	OK
S20.001	S91	0.5	4.4	OK
S15.013	S92	0.1	0.1	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S10.012	S93	1.1	61.8	OK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)
S10.013	S94	120 minute 100 year Summer I+20%	137.500	134.800	-0.120	0.000	0.67		0.939
S10.014	S95	120 minute 100 year Summer I+20%	136.500	132.933	-0.167	0.000	0.41		0.145
S10.015	S96	120 minute 100 year Summer I+20%	133.000	129.938	-0.462	0.000	0.12		0.235
S1.016	S97	120 minute 100 year Winter I+20%	131.500	129.502	0.002	0.000	0.00		229.182
S1.017	S98	120 minute 100 year Winter I+20%	129.750	128.370	-0.300	0.000	0.00		0.000
S1.018	S99	120 minute 100 year Winter I+20%	127.750	126.600	-0.300	0.000	0.00		0.000
S1.019	S100	120 minute 100 year Winter I+20%	126.250	124.660	-0.300	0.000	0.00		0.000
S1.020	S101	120 minute 100 year Winter I+20%	126.000	123.750	-0.300	0.000	0.00		0.000
S21.000	S102	120 minute 100 year Summer I+20%	124.750	123.460	-0.420	0.000	0.01		0.036
S1.021	S103	120 minute 100 year Winter I+20%	125.000	122.093	-0.267	0.000	0.03		0.040
S1.022	S104	120 minute 100 year Winter I+20%	123.500	122.005	-0.265	0.000	0.03		0.059
S22.000	S105	120 minute 100 year Summer I+20%	136.200	135.013	0.093	0.000	0.18		0.439
S22.001	S106	120 minute 100 year Summer I+20%	136.270	135.012	0.562	0.000	0.19		3.416
S22.002	S107	120 minute 100 year Summer I+20%	136.160	135.012	0.917	0.000	0.00		52.615
S22.003	S108	120 minute 100 year Summer I+20%	136.030	133.802	-0.223	0.000	0.00		0.002
S22.004	S109	120 minute 100 year Summer I+20%	135.100	133.629	-0.190	0.000	0.06		0.059
S23.000	S110	120 minute 100 year Summer I+20%	139.460	138.393	-0.247	0.000	0.07		0.055
S23.001	S111	120 minute 100 year Summer I+20%	139.660	138.164	-0.216	0.000	0.18		0.137
S23.002	S112	120 minute 100 year Summer I+20%	139.940	138.008	0.018	0.000	0.39		1.271
S23.003	S113	120 minute 100 year Summer I+20%	139.050	138.003	0.433	0.000	0.76		3.122
S23.004	S114	120 minute 100 year Summer I+20%	139.100	138.000	0.630	0.000	1.30		1.550
S23.005	S115	120 minute 100 year Winter I+20%	139.250	137.995	0.800	0.000	0.00		191.467
S23.006	S116	120 minute 100 year Winter I+20%	139.000	136.852	-0.223	0.000	0.00		0.000
S23.007	S117	120 minute 100 year Winter I+20%	139.000	136.753	-0.222	0.000	0.00		0.000
S24.000	S118	120 minute 100 year Summer I+20%	136.450	134.509	-0.166	0.000	0.16		0.061
S24.001	S119	120 minute 100 year Summer I+20%	134.980	133.114	-0.111	0.000	0.51		0.123
S25.000	S120	120 minute 100 year Summer I+20%	131.230	129.584	-0.141	0.000	0.30		0.090
S24.002	S121	120 minute 100 year Summer I+20%	132.400	129.159	-0.216	0.000	0.37		0.220
S24.003	S122	120 minute 100 year Summer I+20%	131.980	128.334	-0.191	0.000	0.49		0.523
S24.004	S123	120 minute 100 year Summer I+20%	131.800	127.999	-0.186	0.000	0.51		0.522
S24.005	S124	120 minute 100 year Winter I+20%	130.750	127.722	0.122	0.000	0.23		4.121
S26.000	S125	120 minute 100 year Summer I+20%	133.500	132.392	-0.133	0.000	0.35		0.099
S26.001	S126	120 minute 100 year Summer I+20%	133.500	132.057	-0.088	0.000	0.69		0.290
S26.002	S127	120 minute 100 year Summer I+20%	133.500	131.637	-0.068	0.000	0.83		0.374
S27.000	S128	120 minute 100 year Summer I+20%	132.900	131.788	-0.137	0.000	0.32		0.094
S27.001	S129	120 minute 100 year Summer I+20%	132.900	131.415	-0.110	0.000	0.52		0.271
S26.003	S130	120 minute 100 year Summer I+20%	132.900	130.995	-0.105	0.000	0.75		0.293
S26.004	S131	120 minute 100 year Summer I+20%	132.500	130.750	-0.150	0.000	0.50		0.216
S28.000	S132	120 minute 100 year Summer I+20%	132.300	131.215	-0.110	0.000	0.52		0.124
S28.001	S133	120 minute 100 year Summer I+20%	132.300	130.983	-0.092	0.000	0.66		0.257
S28.002	S134	120 minute 100 year Summer I+20%	132.300	130.697	-0.068	0.000	0.83		0.411
S26.005	S135	120 minute 100 year Summer I+20%	132.000	130.177	-0.123	0.000	0.65		0.195
S26.006	S136	120 minute 100 year Summer I+20%	131.000	127.722	0.022	0.000	0.41		1.090
S24.006	S137	120 minute 100 year Winter I+20%	129.500	127.722	0.747	0.000	0.00		522.362
S24.007	S138	120 minute 100 year Winter I+20%	128.650	126.502	-0.223	0.000	0.00		0.000
S24.008	S139	120 minute 100 year Winter I+20%	127.750	125.911	-0.224	0.000	0.00		0.000
S24.009	S140	120 minute 100 year Winter I+20%	127.730	124.742	-0.223	0.000	0.00		0.016

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S10.013	S94	1.5	67.6	OK
S10.014	S95	2.5	75.5	OK
S10.015	S96	1.7	85.3	OK
S1.016	S97	0.0	0.0	SURCHARGED
S1.017	S98	0.0	0.0	OK
S1.018	S99	0.0	0.0	OK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S1.019	S100	0.0	0.0	OK
S1.020	S101	0.0	0.0	OK
S21.000	S102	0.4	2.0	OK
S1.021	S103	0.5	2.0	OK
S1.022	S104	0.5	2.0	OK
S22.000	S105	1.4	23.0	SURCHARGED
S22.001	S106	0.4	23.5	SURCHARGED
S22.002	S107	0.1	0.1	SURCHARGED
S22.003	S108	0.1	0.1	OK
S22.004	S109	1.5	6.0	OK
S23.000	S110	0.9	8.0	OK
S23.001	S111	1.2	20.0	OK
S23.002	S112	1.5	44.9	SURCHARGED
S23.003	S113	1.3	70.9	SURCHARGED
S23.004	S114	1.1	79.1	SURCHARGED
S23.005	S115	0.1	0.1	SURCHARGED
S23.006	S116	0.1	0.1	OK
S23.007	S117	0.1	0.1	OK
S24.000	S118	2.0	16.7	OK
S24.001	S119	2.3	46.6	OK
S25.000	S120	1.0	14.2	OK
S24.002	S121	2.0	90.1	OK
S24.003	S122	2.0	105.5	OK
S24.004	S123	2.1	119.7	OK
S24.005	S124	1.1	90.5	SURCHARGED
S26.000	S125	1.1	17.4	OK
S26.001	S126	1.3	34.1	OK
S26.002	S127	1.6	47.2	OK
S27.000	S128	1.1	16.0	OK
S27.001	S129	1.2	25.5	OK
S26.003	S130	1.6	77.8	OK
S26.004	S131	2.2	77.8	OK
S28.000	S132	1.2	24.8	OK
S28.001	S133	1.3	32.0	OK
S28.002	S134	1.3	37.4	OK
S26.005	S135	2.7	115.2	OK
S26.006	S136	1.1	127.9	SURCHARGED
S24.006	S137	0.1	0.1	SURCHARGED
S24.007	S138	0.1	0.1	OK
S24.008	S139	0.1	0.1	OK
S24.009	S140	0.1	0.1	OK

A3 Scale 1:2000

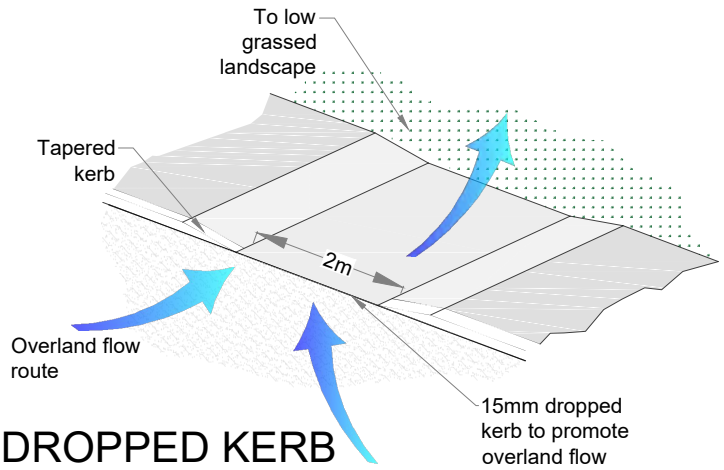
0m 50m 100m 150m 200m

Notes:

1. Read this drawing in conjunction with all other relevant Engineers and Architects drawings.
2. Do not scale this drawing, use only written dimensions.
3. This drawing is relevant to flood exceedence routing of storm events greater than the Q100 + 20% climate change as outlined in the RMA Drainage Infrastructure Report prepared as part of the planning application - refer to that document for further information.

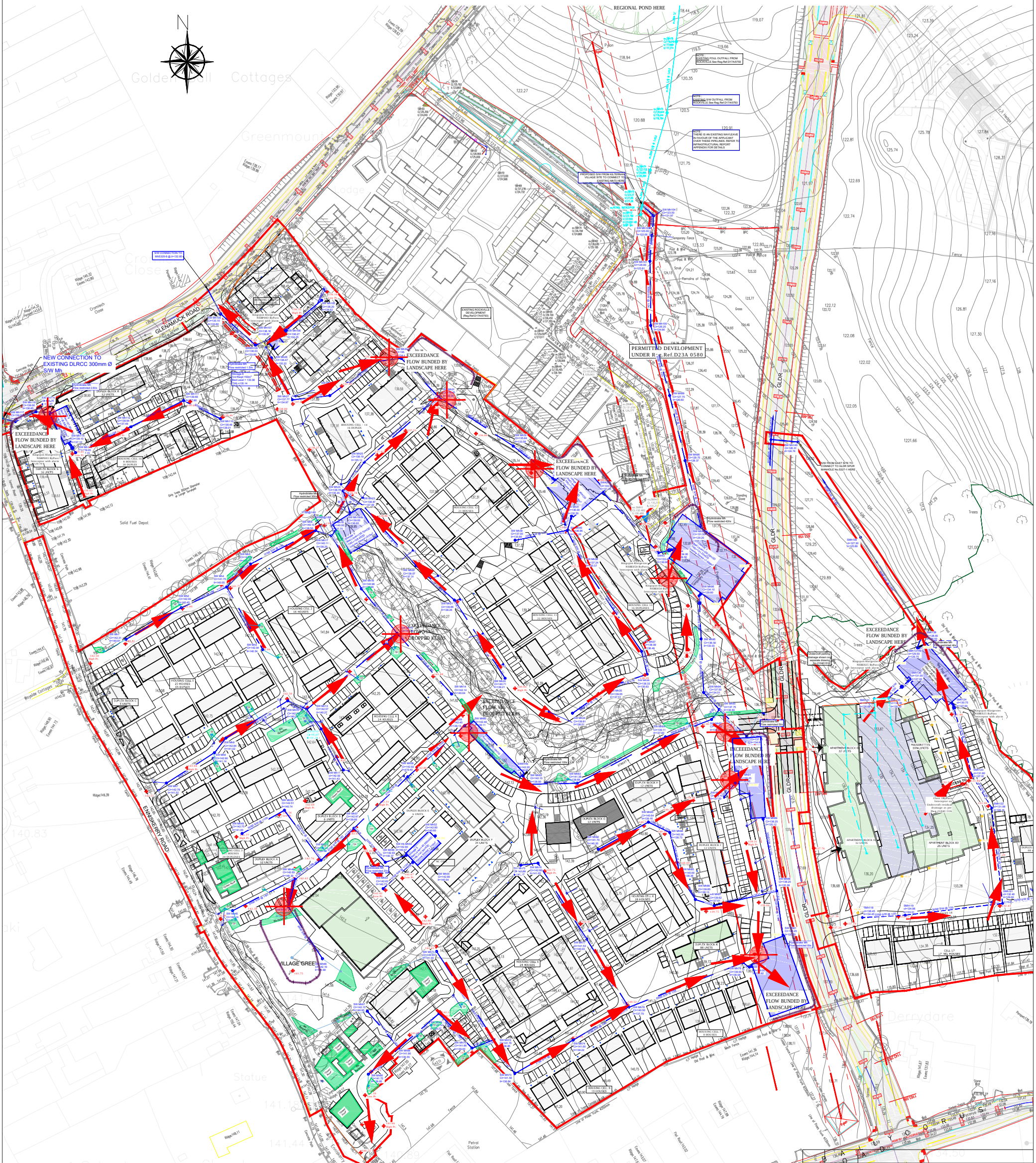
Dropped kerb locations shown thus

Exceedance flow bunding shown thus



DROPPED KERB

Scale 1:100



REV	DATE	DESCRIPTION

ROGER MULLARKEY & ASSOCIATES
Consulting Structural and Civil Engineers

Duncreevan, Kilcock, Co.Kildare
Tel: +353 1 610 3755 Mob: +353 87 232 4917
E-mail. info@rmullarkey.ie www.rmullarkey.ie

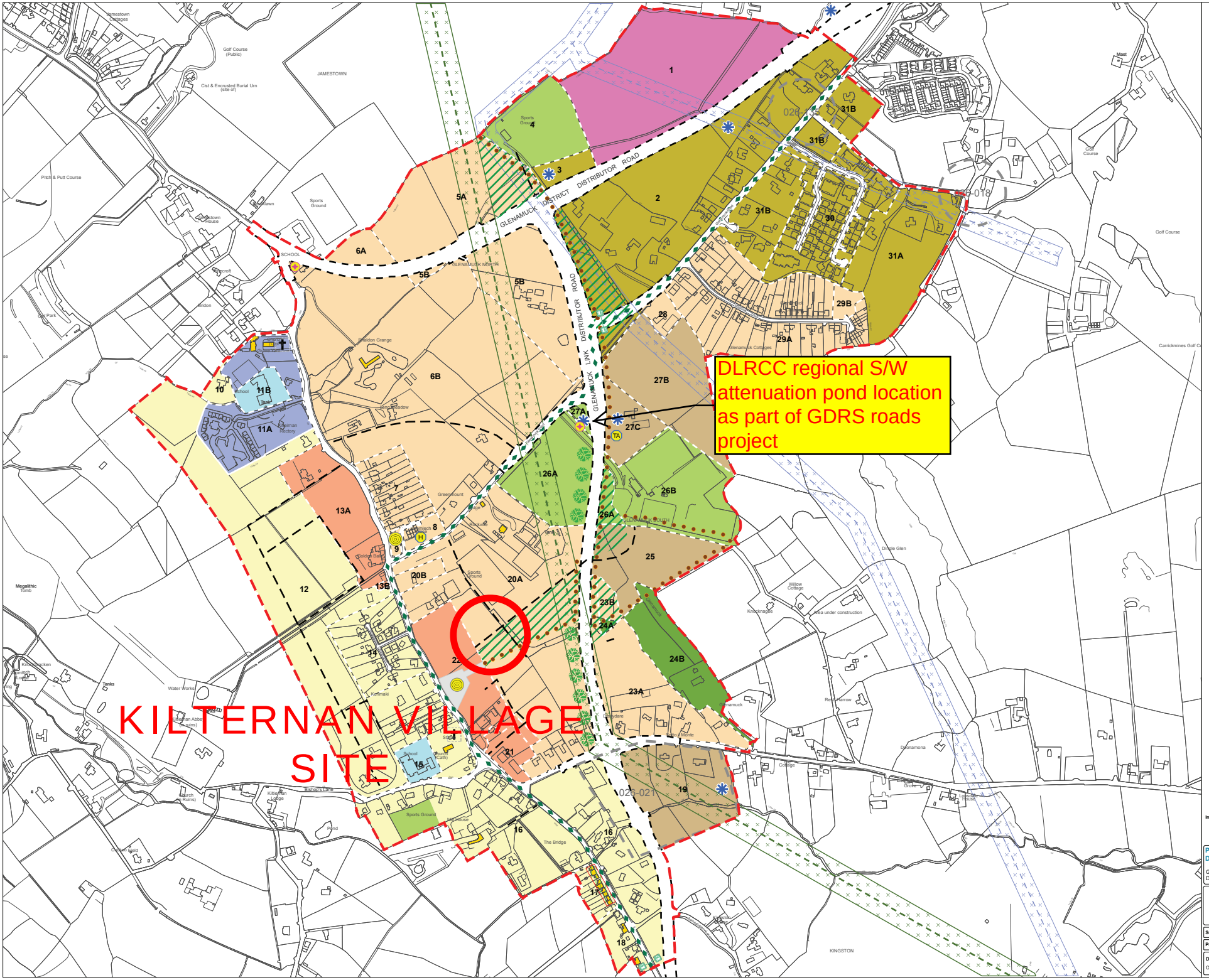
Project: KILTERNAN VILLAGE LRD

Architect: MCORM Architects

Stage: LRD Stage 3

Drawing Title: OVERLAND EXCEEDANCE ROUTING

Date	Drawn By	Scales	Dwg.No.	Rev.
Oct'23	RM	1:2000 @A3	2104C/315	


DLRCC regional S/W attenuation pond location as part of GDRS roads project
KILTERNAN VILLAGE SITE
GLENAMUCK DISTRICT DISTRIBUTOR ROAD
GLENAMUCK DISTRICT DISTRIBUTOR ROAD LINK
GLENAMUCK NORTH
JAMESTOWN
KINGSTON
LEGEND
Boundary of Local Area Plan
Medium/Higher Density Residential
Medium Density Residential
Lower Density Residential
Neighbourhood Centre
Employment Use
Agriculture
High Amenity
Open Space/Recreational Amenity
Parish/Community Centre Node
Existing Primary School
Indicative Greenway Link
Architectural Conservation Area
Protected Structures
Record of Monuments and Places
County Council Housing Programme Site
Traveller Accommodation
Surface Water Attenuation Pond
Gateway Feature
Artistic Feature
Walkway/Cycleway
Civic Space
Church
ESB 220KV Overhead Line
Restriction Corridor 220KV
ESB 110KV Overhead Line
Restriction Corridor 110KV
Primary Bus Corridor
Indicative Proposed Access Road
Proposed Bus Gate
Trees (Avenue Planting)
Dashed White Lines Indicate Land Parcel Boundary
25A Land Parcel Number
NOTE: The lines of road proposals and surface water attenuation ponds on this map are diagrammatic only and are subject to change during the detailed design stage.
0 45 90 180 270
Metres
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Planning and Enterprise Department
G.Hayden
Director of Planning
dlr
Adopted Kiltiernan / Glenamuck Local Area Plan 2013
Senior Planner: D.Irvine
Chief Technician: M. Hevehan
Prepared By: C. Fulcher
Drawn By: M.Hennessy
Date: October 2013
Scale: 1:2500
Drawing No: PL - 13 - 402

Mapping Notes

1. The lines of the Road Proposals shown are diagrammatic only and may be subject to change.
2. Wave Overtopping layer is relevant to the following maps only: Map No's. 2, 3, 4, 7, 10 & 14 unless noted otherwise.
3. These flood maps contain Land Use Zonings & Flooding information only. Please refer to the Land Use Zoning maps for more detailed land use objectives.

Flood Zone Map

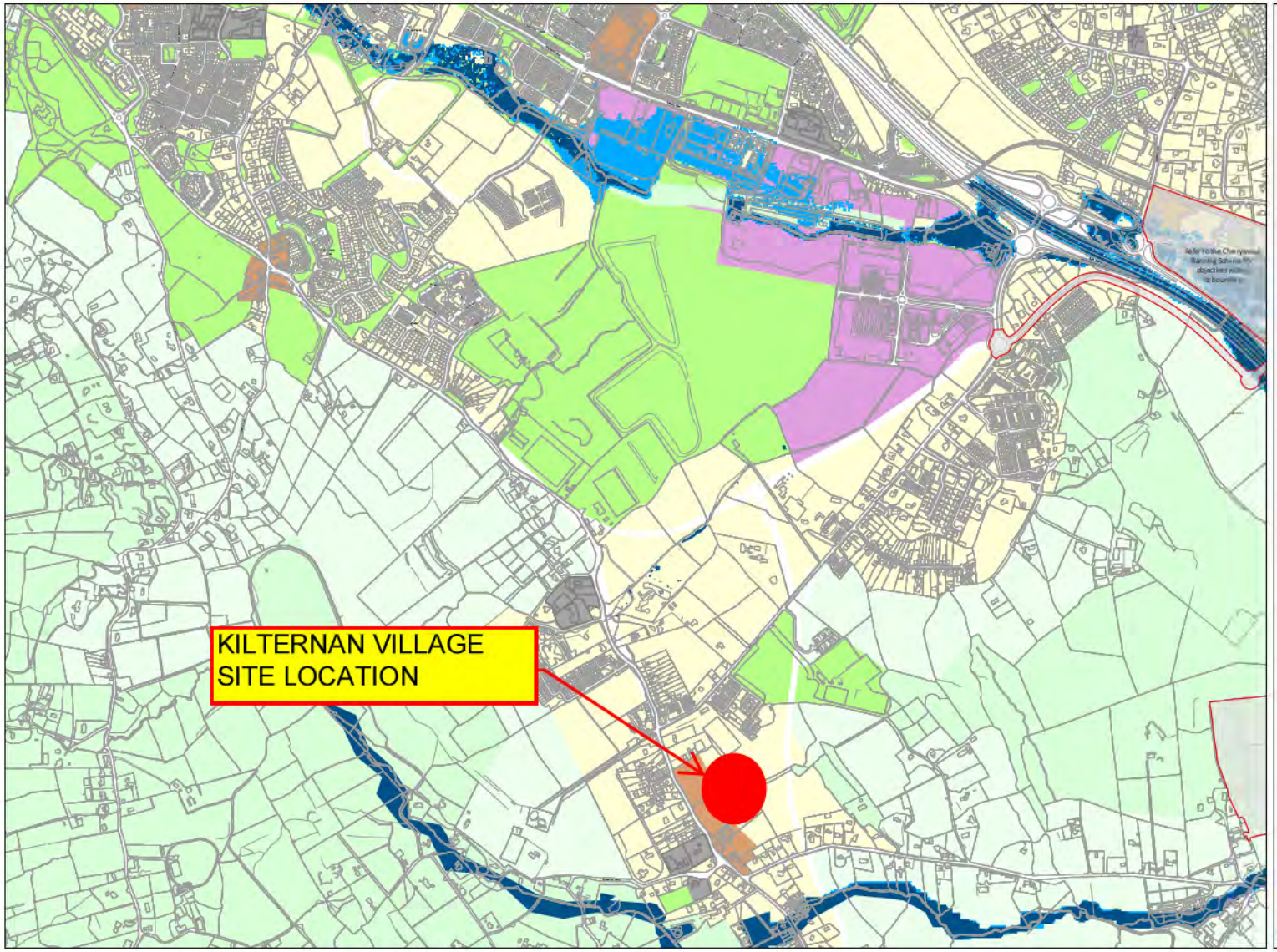
COMHAIRLE CHONTAE DHÚN LAOGHAIRE-RÁTH AN DÚIN

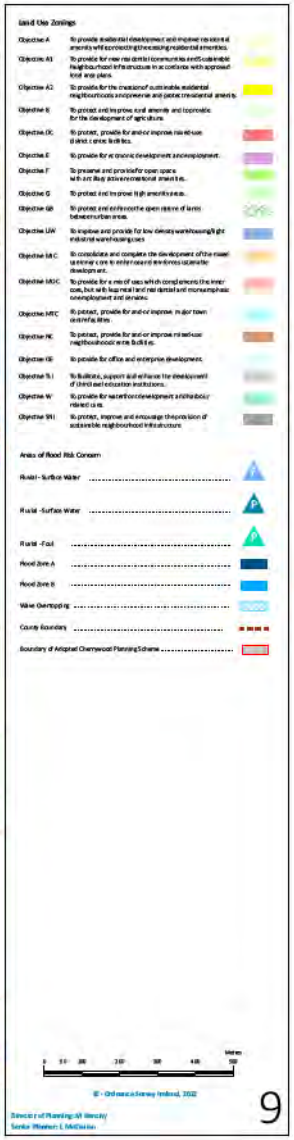
DÚN LAOGHAIRE-RATHDOWN COUNTY COUNCIL

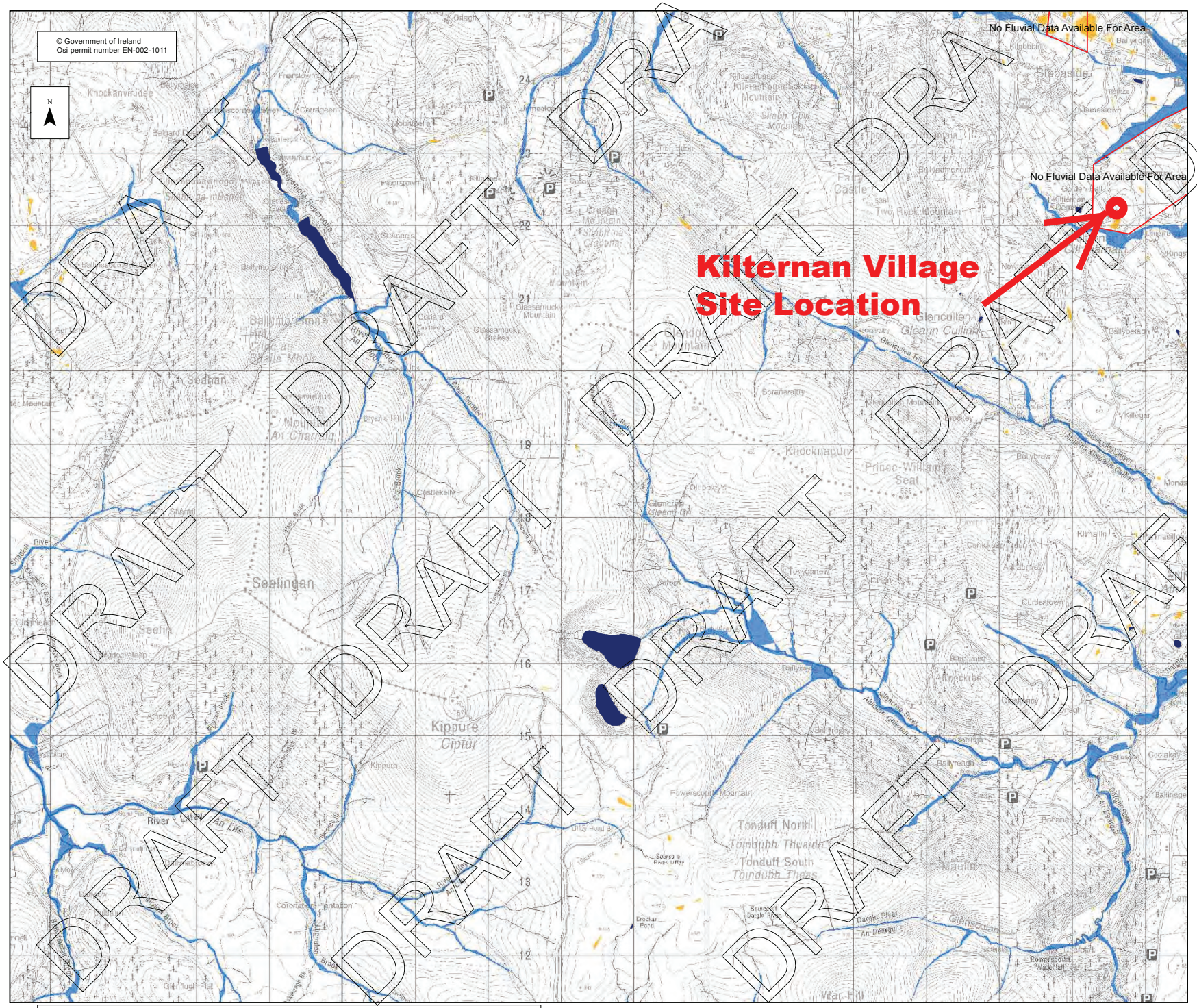
COUNTY DEVELOPMENT PLAN 2022-2028

Adopted March 2022

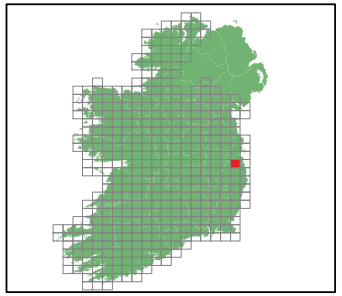
INDEX







Location Plan :



Legend:

Flood Extents

- Fluvial - Indicative 1% AEP (100-yr) Event
- Fluvial - Extreme Event
- Coastal - Indicative 0.5% AEP (200-yr) Event
- Coastal - Extreme Event
- Pluvial - Indicative 1% AEP (100-yr) Event
- Pluvial - Extreme Event
- Groundwater Flood Extents
- Lakes / Turloughs

PFRA Outcomes

- Probable Area for Further Assesment
- Possible Area for Further Assesment

Important User Note:

The flood extents shown on these maps are based on broad-scale simple analysis and may not be accurate for a specific location. Information on the purpose, development and limitations of these maps is available in the relevant reports (see www.cfram.ie). Users should seek professional advice if they intend to rely on the maps in any way.

If you believe that the maps are inaccurate in some way please forward full details by contacting the OPW (refer to PFRA Information leaflets or 'Have Your Say' on www.cfram.ie).

Office of Public Works
Jonathon Swift Street
Trim
Co Meath
Ireland

Project :
PRELIMINARY FLOOD RISK ASSESMENT (PFRA)

Map :
PFRA Indicative extents and outcomes
- Draft for Consultation

Figure By : PJW Date : July2011

Checked By : MA Date : July 2011

Figure No. : 2019 / MAP / 221 / A

Revision 0

Drawing Scale : 1:50,000 Plot Scale : 1:1 @ A3

OPW *National Flood Hazard Mapping*

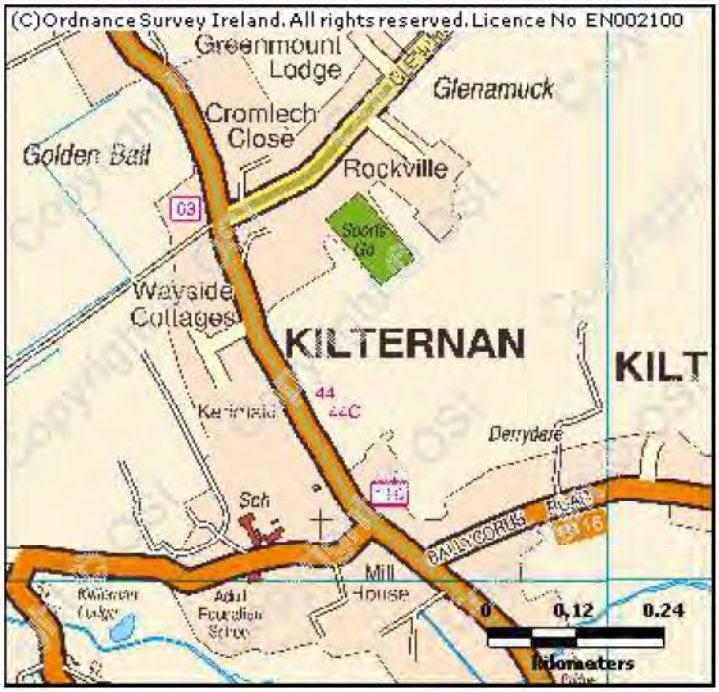
Summary Local Area Report

This Flood Report summarises all flood events within 2.5 kilometres of the map centre.

The map centre is in:

County: Dublin

NGR: O 206 223



Map Scale 1:10,112

Map Legend	
	Flood Points
	Multiple / Recurring Flood Points
	Areas Flooded
	Hydrometric Stations
	Rivers
	Lakes
	River Catchment Areas
	Land Commission *
	Drainage Districts *
	Benefiting Lands *

* Important: These maps do not indicate flood hazard or flood extent. Thier purpose and scope is explained in the Glossary.

7 Results

1. Shanganagh Carrickmines Nov 2002
County: Dublin
Start Date: 26/Nov/2002
Flood Quality Code: 3
Additional Information: Reports (1) More Mapped Information

2. Shanganagh Carrickmines Dec 1997
County: Dublin
Start Date: 18/Dec/1997
Flood Quality Code: 3
Additional Information: Reports (1) More Mapped Information

3. Shanganagh Carrickmines May 1993
County: Dublin
Start Date: 26/May/1993
Flood Quality Code: 1
Additional Information: Photos (3) Reports (4) More Mapped Information

4. Shanganagh Carrickmines Nov 1982
County: Dublin
Start Date: 06/Nov/1982
Flood Quality Code: 3
Additional Information: Reports (3) More Mapped Information

5. Kilternan Glencullen Road Nov 1982
County: Dublin
Start Date: 05/Nov/1982
Flood Quality Code: 3

Report Produced: 29-May-2018 17:19

Additional Information: Reports (1) More Mapped Information

6. Glenamuck Stream Glenamuck Road Recurring

Start Date:

County: Dublin

Flood Quality Code:4

Additional Information: Reports (2) More Mapped Information

7. Enniskerry Road Recurring

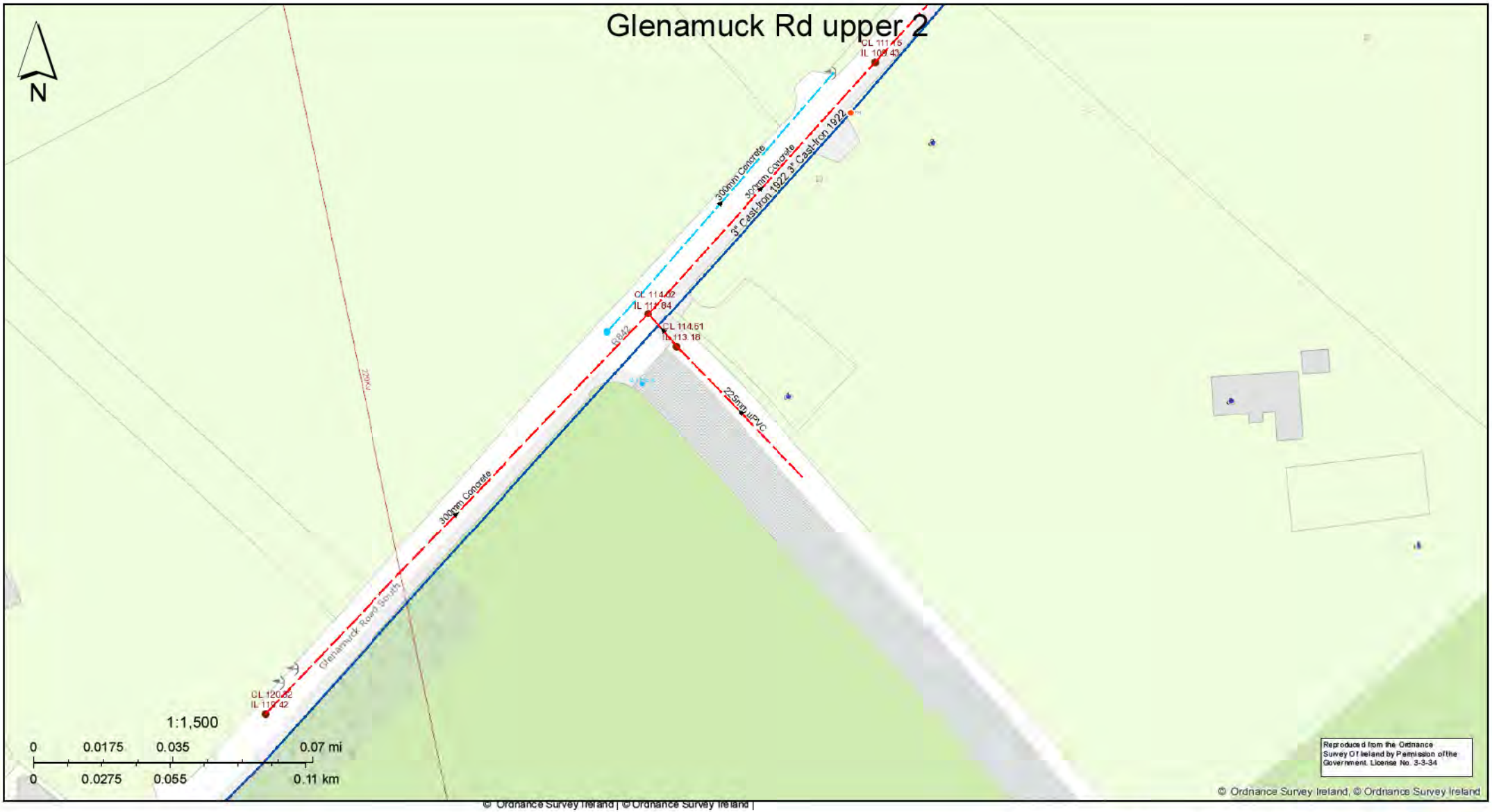
Start Date:

County: Dublin

Flood Quality Code:4

Additional Information: Reports (2) More Mapped Information

Glenamuck Rd upper 2



July 11, 2017

Legend

Stormwater Gravity Mains (Irish Water Owned)
- Surface

Stormwater Gravity Mains (Non-Irish Water Owned)
- Surface

Storm Manholes
- Cascade
- Catchpit
- Hatchbox
- Lamphole
- Standard
- Other; Unknown

Storm Inlets
- Gully
- Standard
- Other; Unknown

Storm Fittings
- Vent/Col
- Other; Unknown

Storm Discharge Points
- Outfall
- Overflow
- Soakaway
- Other; Unknown

Storm Culverts

Storm Clean Outs

Sewer Gravity Mains (Irish Water owned)
- Combined
- Foul
- Overflow
- Unknown

Sewer Gravity Mains (Non-Irish Water owned)
- Combined
- Foul
- Overflow
- Unknown

Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland. It should not be relied upon in the event of excavations or other works being carried out in the vicinity of the network. The onus is on the parties carrying out the works to ensure the exact location of the network is identified prior to mechanical works being carried out. Service pipes are not generally shown but their presence should be anticipated. © Irish Water

UISCE ÉIREANN : IRISH WATER

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Glenamuck Rd upper

July 11, 2017

Legend

Stormwater Gravity Mains (Irish Water Owned)
- Surface

Stormwater Gravity Mains (Non-Irish Water Owned)
- Surface

Storm Manholes
- Cascade
- Catchpit
- Hatchbox
- Lamphole
- Standard
- Other; Unknown

Storm Inlets
- Gully
- Standard
- Other; Unknown

Storm Fittings
- Vent/Col
- Other; Unknown

Storm Discharge Points
- Outfall
- Overflow
- Soakaway
- Other; Unknown

Storm Culverts

Storm Clean Outs

Sewer Gravity Mains (Irish Water owned)
- Combined
- Foul
- Overflow
- Unknown

Sewer Gravity Mains (Non-Irish Water owned)
- Combined
- Foul
- Overflow
- Unknown

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Kilternan Village

5/29/2018 9:45:34 AM

Legend

Stormwater Gravity Mains (Irish Water Owned)
- Surface

Stormwater Gravity Mains (Non-Irish Water Owned)
- Surface

Storm Manholes
- Cascade
- Catchpit
- Hatchbox
- Lamphole
- Standard
- Other; Unknown

Storm Inlets
- Gully
- Standard
- Other; Unknown

Storm Fittings
- Vent/Col
- Other; Unknown

Storm Discharge Points
- Outfall
- Overflow
- Soakaway
- Other; Unknown
- Storm Culverts
- Storm Clean Outs

Sewer Gravity Mains (Irish Water owned)
- Combined
- Foul
- Overflow
- Unknown

Sewer Gravity Mains (Non-Irish Water owned)
- Combined
- Foul
- Overflow
- Unknown

Sewer Pressurized Mains (Irish Water owned)
- Combined
- Foul
- Overflow
- Unknown

Sewer Pressurized Mains (Non-Irish Water owned)
- Combined
- Foul
- Overflow
- Unknown

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