Balfour Beatty

SSEN ASTI FRAMEWORK CAMBUSHINNIE 400KV

Drainage Impact Assessment

CMBS4-LT520-BB-DRAI-XX-RPT-W-0002
NOVEMBER 2024

CONFIDENTIAL

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APPENDICES

1. INTRODUCTION

1.1. APPOINTMENT AND BRIEF

1.1.1. WSP has been commissioned by Balfour Beatty to undertake this Drainage Impact Assessment (DIA) to accompany the planning application for Cambushinnie 400kV Substation (hereafter referred to as the 'proposed development') located to the west of Braco, Scotland (hereafter referred to as the 'site'). This report relates solely to the above site and addresses the on-plot surface water drainage and the access road surface water drainage.

1.1.2. This report is intended for the sole benefit of the parties named above and shall not be capable of assignment without prior agreement. WSP shall not be liable for any use of the report for any reasons other than that for which the report was originally prepared and provided.

1.1.3. Although this report was prepared using the degree of skill and care ordinarily exercised by engineers practicing under similar circumstances, please note that WSP cannot take responsibility for errors in the information provided by third parties.

1.1.4. It should be noted that the areas stated in this document are indicative only, based on the received SSEN general arrangement and should in no way be considered as binding maxima or minima.

1.1.5. This report is to be read in conjunction with all preliminaries, general conditions and all contract drawings.

1.1.6. This report does not address the temporary situation or Construction CAR licence, if required, during the construction phase of any part of the proposed development which may have implications on the drainage network.

1.2. OBJECTIVE OF STUDY & METHODOLOGY

1.2.1. Drainage is a material consideration in the determination of planning applications. This Drainage Strategy Report establishes an acceptable method of disposal for both foul water and surface water for the proposed development.

1.2.2. A site visit was undertaken in November 2023 by representatives of the WSP team undertaking this DIA to assess the general topography of the area.

1.2.3. When considering Drainage Strategies and assessments the scope of the report should follow the guidance as outline in the "Water Assessment and Drainage Assessment Guide" (WADAG) produced by the Sustainable Urban Drainage Scottish Working Party (SUDSWP)[1]. This guidance is intended to help guide those involved with the installation of water and drainage infrastructure through the necessary stages in obtaining the relevant permissions, whilst complying with current standards and policies.

1.2.4. For the purposes of this DIA, the following key areas outlined in the Water Assessment and Drainage Assessment Guide have been considered:

- Surface water and SuDS general considerations
- SuDS – hydraulic design considerations
- Treatment and disposal of wastewater

1.2.5. The drainage specification is based on the following standards:

- The Scottish Government, National Planning Framework 4, February 2023.
- CIRIA C753 SuDS Manual
- CIRIA C648 Control of Water Pollution from Linear Construction Projects
- SSEN specification SP-NET-CIV-502: Drainage Specification and SP-NET-CIV-503: Pavement & Roadways Specification
- SEPA, Climate Change Allowances for Flood Risk Assessment in Land Use Planning, version 4.
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended.
- Perth & Kinross Council, Flood Risk and Flood Risk Assessments, March 2021.

1.2.6. Perth & Kinross Council's (P&KC) requirements as per their Flood Risk and Flood Risk Assessments guidance are as follows:

- Information on any existing on site drainage.
- Confirmation of the hardstanding area of the proposed site.
- Soil classification for the site.
- Porosity tests for proposed infiltration devices, undertaken in line with the requirements of BRE Digest 365 or similar.
- Summary of proposed SuDS.
- Correspondence with Scottish Water confirming availability for servicing the development. Note this is not applicable to this site as the drainage outfalls are not proposed to connect to the Scottish Water network.
- Drainage calculations for the 1, 30, 100 and 200 year periods.
- Calculations demonstrating the attenuation required to maintain the greenfield runoff rate.
- The volume of treatment required.
- Drawing showing the proposed surface water and foul drainage proposals.
- Maintenance schedules for the proposed SuDS and responsibility for maintenance.
- SuDS risk assessment
- No surcharging in the 1 in 30 year storm event.
- Surcharging may occur in the 1 in 100 year storm event, with no flooding to properties or gardens.
- Flooding within the 1 in 200 storm event inclusive of climate change should not encroach within 300mm of the lowest garden level or 600mm of property FFL.
- Overland flows routes to be considered with access and egress to be maintained at all times.
- Discharge rate to be restricted to the pre-development greenfield run-off for the equivalent return period. With the 1 in 100 year event discharge rate to be around 5.0 l/s/ha and the 1 in 200 year event to be around 5.5 l/s/ha.

[1] Sustainable Urban Drainage Scottish Working Party, Water Assessment and Drainage Assessment Guide, 2016.

2. EXISTING SITE

2.1. SITE LOCATION

2.1.1. The application site is located to the south of Braco West Substation, Dunblane, FK15 9LP (National Grid Reference X: 279424, Y: 709009). The site location is shown in Figure 1 below.

Figure 1 - Site Location Plan

2.1.2. The site and surrounding area are currently used for tree plantation of varying ages. There is a single-track providing access to the site along its western boundary.

2.2. SITE DESCRIPTION

2.2.1. As part of this application Scottish and Southern Electricity Networks (SSEN) are proposing to install a new Substation and associated infrastructure including the necessary upgrade works to the Non Public Road (NPR) located to the east of the Braco West Sub substation.

2.3. SITE TOPOGRAPHY

2.3.1. The platform area is located on the side of the slope with levels at approximately 250m AOD in the north east corner falling to approximately 230m AOD in the south western corner. The gradient of the slope at this location is approximately 1 in 12.

2.3.2. The basin is located further south of the platform to the west of the existing access track at a level of approximately 210m AOD.

2.3.3. The NPR road is has a large elevation difference across the 3.6km. Where it terminates at the Braco West Substation is at 248m AOD, where the proposed works end close to Braco, the levels are in the region of 128.5m AOD.

2.4. EXISTING SEWERS/ DRAINAGE/ INFRASTRUCTURE

2.4.1. As the site is greenfield in nature, there is not expected to be any formal drainage infrastructure such as manholes and pipes installed within the substation area. However, there are existing culverts in place for the existing ditch network that are located to adjacent to the NPR.

2.4.2. Due to the nature of the site location there is no public or private foul drainage infrastructure located within the working area or within close proximity to the site.

2.4.3. This area of land is currently used for tree plantation and is located close to the top of Cambushinnie Hill and Feddal Hill. Currently this year, according to SEPA rainfall data, year 2024 to date has a total of 1,194mm at the nearest rainfall station located in Braco (Dunduff)[2], The rainfall amount combined with the existing ground conditions of wet peaty soils would result in high amounts of runoff if it was not correctly managed. In the area of the proposed platform there are numerous existing ditches, these are located adjacent to tracks or cutting through plantation areas for example.

2.4.4. These network of ditches are used to manage the flows over water down the through the topography at a manageable flow rate otherwise it could result in flooding at lower elevations if not properly managed in the upper catchment.

2.5. EXISTING WATERCOURSE / DITCHES

2.5.1. The site platform is proposed to be located on top of an existing access track and an associated drainage ditch/ watercourse. This drainage ditch/ watercourse, located to the west of the platform, is understood to flow in a south-eastern direction and is culverted, to the north-west of the platform, below the existing access road. This drainage ditch/ watercourse then continues to route along the eastern boundary of the existing access road. During WSP's site visit on 28th November 2023, it was noted that this drainage ditch/ watercourse was flowing and became undefined to the south of the proposed platform, where the existing access road veers in a southern direction. This drainage ditch/ watercourse will require to be diverted to accommodate the proposed platform. Further investigation is required to determine the source of the water and the outfall of this drainage ditch/ watercourse. Consultation with SEPA is required to confirm acceptability of diverting this drainage ditch/ watercourse.

2.5.2. There is an existing water feature on the site to the west of the existing access road. This is understood to be fed by an existing field drain. The proposed platform location requires this water feature to be relocated. Further investigation is required to confirm the status of the water feature, alongside consultation with SEPA to confirm acceptability of diverting this water feature and associated drains.

2.6. EXISTING CATCHMENTS

2.6.1. The area of land where the platform is to be located is located within the catchment of The Crocket Burn. In that overall catchment are small sub-catchments for each of the tributaries. As part of this assessment WSP have concentrated on 3 of those catchments. An example of the pre and post development catchments can be found in **Appendix A** of this report.

2.6.2. The catchment analysis has solely been completed using a combination of ariel imagery and 5m LIDAR data.

2.6.3. The introduction of the platform will not have any negative impacts on the existing catchments, all of the existing catchments are to remain as they are in size, therefore the same volume of water will reach the downstream network, however it will make it there slower due to the attenuation system proposed as part of the drainage design.

2.7. FLOOD RISK ASSESSMENT

2.7.1. A Flood Risk Assessment for the site has been completed by Jacobs referenced “Cambushinnie 400kV Substation: Flood Risk Assessment”.

[2] Scottish Rainfall Data - provided by Scottish Environment Protection Agency (SEPA)

3. WATER REGULATORY PROCESS

3.1. WATER FRAMEWORK DIRECTIVE AND WATER ENVIRONMENT & WATER SERVICES (SCOTLAND) ACT 2003

3.1.1. The Water Environment and Water Services (Scotland) Act 2003 (WEWS) transposes the Water Framework Directive into national law and provides a framework to assess, protect and enhance the water environment in Scotland. The water environment includes wetlands, rivers, lochs, transitional waters (estuaries), coastal waters and groundwater. The Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended, (CAR) mean that from 1st April 2006 it is an offence to undertake the following activities without a CAR authorisation:

- Discharges to all wetlands, surface waters and groundwaters;
- Disposal to land (replacing the Groundwater Regulations 1998);
- Abstractions from all wetlands, surface waters and groundwaters;
- Impoundments (dams and weirs) of rivers, lochs, wetlands, and transitional waters;
- Engineering works in inland waters and wetlands.

3.1.2. A CAR authorisation is intended to control impacts on the water environment. It does not cover wider impacts that may be associated with a development such as visual impact or damage to terrestrial ecosystems. Under CAR, three types of authorisation allow for proportionate and risk-based regulation:

- General Binding Rules (GBRs)
- Registration
- Licence

3.1.3. GBRs represent the lowest level of control and include the discharges of surface water runoff. GBR activities taking place in accordance with the rules do not require an application for authorisation from SEPA, and therefore, there are no associated charges. The GBR activities specified by schedule 3 of CAR include:

- The operation of any weir that does not result in a level difference of more than 1m between upstream and downstream water surfaces, cannot be operated to control the upstream water level and was constructed before 1st April 2006.
- The abstraction of less than $10m^3$ of water per day.
- The construction or extension of any well, borehole or other works by which water may be abstracted, or the installation or modification of any machinery where additional water may be abstracted where such works are-
  - Not intended for the purpose of abstraction; or
  - Intended for the abstraction of less than $10m^3$ in any one day; or
  - Intended for the abstraction of less than $150m^3$ in any period of one year
  - Intended to dewater one or more excavations at a construction site for roads, buildings, pipelines, or other built developments or undertaking maintenance of these developments.
- The abstraction from a borehole (less than $150m^3$ in any period of one year) for the purpose of sampling or testing
- The dredging of a river, burn or ditch that-

- Has an average width less than 1m at the stretch to be worked, measured at the bottom of the channel
- Has been artificially straightened or canalised along the length to be worked

- The construction of minor or temporary bridges (with a channel width of less than 5 metres)
- The laying of a pipeline or cable by boring beneath the banks and bed of a river, burn or ditch
- Works to control the erosion of a bank of a river, burn or ditch by revetment
- Operating any vehicle, plant, or equipment for the purposes of the activities outlined within this section of the report
- Discharge of water runoff from a surface water drainage system to the water environment from construction sites, buildings, road, yards, or any other built developments
- Discharge into a surface water drainage system
- Removal of sediment or any other matter that may have been deposited on the bed of a river, burn or ditch in the area of impounded water upstream of a weir.
- The removal of sediment or other matter from:
  - The bed of a river, burn or ditch within 10 metres upstream of entry to a closed culvert
  - The bed of a river, burn or ditch within 10 metres downstream of a closed culvert
  - Inside a closed culvert
- The placement of one or more boulders in a river or burn
- The temporary abstraction of groundwater at a construction site or for maintenance purposes by means of pumping groundwater from excavations or wells or boreholes
- Direct discharge of pollutants into groundwater as a result of construction or maintenance works which come into contact with groundwater
- Abstraction and subsequent return of groundwater for the purposes of extracting geothermal energy from the abstracted water
- Discharge of water run-off via a surface water drainage system to the water environment as a result of rural land activities
- Construction and maintenance of water bound roads and tracks
- Application of pesticide
- Operation of sheep dipping facilities.

3.1.4. Registrations allow for the recording of small-scale activities, which individually pose a small environmental risk but, cumulatively, can result in environmental harm. Operators must apply to SEPA to register these activities, for which there is an application fee.

3.1.5. Licences allow for site-specific conditions to be set to protect the water environment. They will be able to cover linked activities on a number of sites over a wide area, as well as multiple activities on a single site. Application fees apply to all licences. SEPA has divided licence activities into simple licence and complex licence activities dependent on the risk and scale.

3.2. POLLUTION CONTROL

3.2.1. WEWS requires any activity that is liable to cause pollution to be authorised. SEPA will use these powers to control point source discharges of pollution.

3.2.2. CAR Authorisation GBR 10 refers to the discharge of water runoff from a surface water drainage system to the water environment from construction sites, buildings, roads, yards or any other built developments and states under part (d):

3.2.3. The discharge shall not contain any water runoff from any built developments, the construction of which is completed after 1st April 2007, or from construction sites operated after 1st April 2007, unless

(i) *During construction those developments or construction sites are drained by a SUD system or equivalent equipped to avoid pollution of the water environment;*

(ii) *Following construction those developments are drained by a SUD system equipped to avoid pollution of the water environment;*

(iii) *the runoff is from a development that is a single dwelling and its curtilage; or*

(iv) *the discharge is to coastal water*

3.2.4. The levels of authorisation applicable for point source controlled activities relating to the drainage for the proposed development should be covered under the GBR. Note this report does not address the temporary situation or Construction CAR Licence during the construction phase.

3.2.5. In order to establish the amount of treatment required for the nature of the development the Simple Index Approach (SIA) should be utilised. This is investigated further within this report.

4. OUTLINE SURFACE WATER DRAINAGE STRATEGY – NON-PUBLIC ROAD

4.1. PROPOSED DEVELOPMENT

4.1.1. The NPR is a approximately 3.6km length of unpaved compacted aggregate access track that begins near Braco to the east and ends at the existing Braco West substation.

4.1.2. As part of the required works this section of access track is to be widened to suit the required vehicle tracking required for the development.

4.2. SURFACE WATER DRAINAGE

4.2.1. The NPR is an unpaved aggregate section of access track that is currently used by the Forestry Commission to obtain access to the upper sections of the tree plantations, and for SSEN to gain access to the Braco West Sub Station that is located direction east of the proposed substation.

4.2.2. The minimum width for the NPR improvements is 6.5m, however there are sections that are designed wider to suit the tracking requirements of the abnormal load carriers.

4.2.3. Along the length of the NPR are existing ditches that convey the existing flows from the access track and the surrounding land where the topography allows. It is proposed to use as many of these existing ditches where it is feasible. For further details and exact positioning of the existing ditches refer to WSP drawings CMBS4-LT520-BB-ROAD-ZZ-D-C-0005 to 0011 located in **Appendix** of this report.

4.2.4. The first 80m of NPR will drain into an existing ditch located on the southern side.

4.2.5. Between chainages 80m and 300m, a new section of ‘ditch’ is to be installed replacing the existing. The widening could not be installed on the north side of the NPR due to a separate planning application (22/02231/FLM) to install 49.99MW of battery energy storage that is located directly north of this section of NPR. This section of ditch is 0.5m deep, with a 0.5m base width and 1 in 2 gradient side slopes, and any necessary earthworks at 1 in 3 gradient.

4.2.6. After chainage 300m, through to chainage 1950m, an existing ditch on the eastern / southern side of the NPR is proposed to be used. As part of the works this whole section of ditch is to be cleaned and removed of all vegetation to ensure it is capable to run at full capacity if required.

4.2.7. Following on from chainage 1950m, a new ditch is to be installed on the southern / easter side of the NPR. This ditch is to replace the existing that had to be diverted due to the required widening works. This length of proposed ditch runs to approximately chainage 2220m, where it crosses under the NPR and flows into another proposed ditch that runs for approximately 120m before connecting into an existing ditch on the east side of the NPR.

4.2.8. That existing stretch of ditch runs until chainage 2600m where it connects into a proposed ditch that is required due to the widening on the corner. This section is short in nature before it is culverted into a watercourse on the southern side of the NPR.

4.2.9. A new ditch is proposed at chainage 2680m that flows for approximately 100m before discharging into a larger watercourse. After this a new ditch is proposed that flows on the western side of the NPR until chainage 3000m where it is culverted under into an existing ditch on the eastern side of the NPR.

4.2.10. Until chainage 3220m the NPR is drained via an existing ditch located on the eastern side before this discharges into a larger watercourse flowing in a west-east direction. This watercourse is culverted perpendicular to the NPR.

4.2.11. The last section from chainage 3220m to 3500m is drained via a proposed ditch located on the eastern side of the NPR. A watercourse from the east connects into said ditch before drainage into an un-surveyed area due to the dense woodland.

4.2.12. The remaining section of the NPR remains untouched as far as widening works go; therefore we are not proposing to install any proposed features for this section of track, it is drainage via the existing regime.

4.2.13. For all the proposed ditches that are to be installed along the length of the NPR, none of them are to have any flow restrictions in place as it isn't feasible to install any attenuation features along the route due to the steep topography, with a section even reaching a gradient of 10% (1 in 10) for a long stretch.

4.2.14. The proposed ditch is to be constructed with varying sizes of gabion stone along the base to try slowing the flow of water down in the steeper sections. It is noted that the existing ditches do not have any flow controls and are most likely to consist of smaller rocks in the base.

5. OUTLINE SURFACE WATER DRAINAGE STRATEGY – PLATFORM AND ASSOCIATED ACCESS ROADS

5.1. PROPOSED DEVELOPMENT

5.1.1. The proposed development comprises of the substation platform, inclusive of the associated buildings, access roads and hardstanding areas and an attenuation basin located to the south near the existing access track.

5.2. SURFACE WATER DRAINAGE

5.2.1. The platform drainage design allows for flow through the free draining platform material to the collector drains. The collector drains surround the perimeter of the platform to assist in dispersal of the attenuated rainfall. The collector drains will connect to downstream pipework work that will connect to the access road drainage before being attenuated and ultimately discharge to a tributary of the Crocket Burn located to the east of the existing southern access track.

5.2.2. The base of the platform construction make-up below the level of the collector drain outfalls will be dust blending to prevent infiltration to ground. The platform edges will be lined with an impermeable liner.

5.2.3. The platform roads (apart from oily water areas) will drain by crossfall to adjacent filter trenches that will connect to the collector drains on the platform perimeter. The roofs will drain via gravity fall pipes which will also connect to the collector drain.

5.2.4. The transformer skidway's, the diesel generators and the generator refilling area will be superelevated with raised kerbs. The oil will be directed to channel drains at the low points, which will connect into the oily water drainage system. Each oily water area will have a shut off valve to allow the area to be isolated from the main system. The oily water drains all flow to a common manhole before being discharged into a SPEL "PURACEPTOR" separator. The outlet from the separator will connect into the sites surface water drainage system. The exact position of this is to be confirmed at the detailed design stage.

5.2.5. The proposed access roads have been split into three sections for the purposes of this DIA. Exact locations of these can be found on drawing CMBS4-LT520-BB-DRAI-ZZ-PLN-C-0001 located in **Appendix C** of this report.

- Access Road Section 1 – Chainage 900m to chainage 1220m on northern access road.
- Access Road Section 2 – Chainage 790m to chainage 900m on northern access road.
- Access Road Section 3 – Chainage 0m to chainage 790m on northern access road and the remaining section of western and southern access road.

5.2.6. Access road section 1, to the north-east of the proposed platform and north of the existing platform, will drain to roadside filter trenches and a swale prior to discharging to a tributary of the Bullie Burn. Following a topographical survey completed by WSP and received by the designer on 29th October, the depth and position of this tributary has been confirmed. The outfall route will be confirmed and detailed during the next design stage.

5.2.7. Access road section 2, to the north-east of the proposed platform and north-west of the existing platform, will also drain to roadside filter trenches and a swale prior to discharging to a tributary of the Bullie Burn. Following a topographical survey completed by WSP and received by the designer on 29th October, the depth and position of this tributary has been confirmed. The outfall route will be confirmed and detailed during the next design stage.

5.2.8. Access road section 3, starting from the north-east of the proposed platform and connecting to the existing access road to the south of the proposed platform, will drain to roadside filter trenches prior to discharging to a detention basin and discharging into the existing ditch that is located on the eastern side of the access road.

5.2.9. As part of the development an area of approximately 5.7Ha is to be moved between tributaries of the Crocket Burn. This area is located between the new and diverted access road and the platform itself. This small change in catchment is small in scale compared to the overall catchment, and ultimately it discharges into the same watercourse. Further assessment is to be completed to determine what works is achievable to minimise this catchment transfer. An indicative route of a ditch can be found on drawing CMBS4-LT520-BB-DRAI-ZZ-PLN-C-0001.

5.2.10. As part of the works numerous ditches are to be cut off, and therefore require diverting. WSP have shown these as indicative routes on drawing CMBS4-LT520-BB-DRAI-ZZ-PLN-C-0001. The western most diverted ditch that runs around the access track and stops within a densely wooded area, therefore survey information in this area is limited. To prevent scour of the existing ground additional walkover is required to confirm what drainage features are located in this western area of woodland.

5.2.11. Some indicative solutions to prevent scour of the existing ground during high flow events is to connect into an existing ditch within the woodland or allow the ditch to peter out to ground level and allow the water to flow naturally overground and soakaway into the mossy, peaty type soil that is present, and ultimately ending up into an existing ditch / land drain.

5.3. FLOWS

5.3.1. The runoff rates for the platform and access roads surface water drainage outfalls have been calculated in line with P&KC's requirements and are presented in **Tables 5-1** below.

5.3.2. The hardstanding area for the platform is inclusive of the internal access tracks, foundations, buildings and 20% of the gravel extents. The internal MEWP routes are assumed to be gravel and as such have been considered at 20% hardstanding as per the gravel extents. Due to the nature of the proposed development, future expansion has not been considered as part of the drainage calculations.

5.3.3. The hardstanding area for the access roads is inclusive of the access roads. Access road section 3 also includes an area of greenfield that is contained between the access road and an area of greenfield contained between the platform and the access road. This greenfield area has been considered to be partially permeable with a 50% permeability coefficient.

Table 5-1 – Run-off Rates for Platform and Access Roads

Site Area	Return Period (Year)	Hardstanding Area (ha)	Discharge Rate Calculated Using IH124 Method (l/s)	Discharge Rate for 1 in 100 year at 5 l/s/ha (l/s)	Discharge Rate for 1 in 200 year at 5.5 l/s/ha (l/s)
Access Road Section 1	2	0.214	1.0	-	-
	30		2.2	-	-
	100		2.9	1.1	-
	200		3.2	-	1.2
Access Road Section 2	2	0.076	0.4	-	-
	30		0.8	-	-
	100		1.0	0.4	-
	200		1.2	-	0.4
Access Road Section 3 & Platform	2	7.042	34.5	-	-
	30		71.8	-	-
	100		94.3	35.2	-
	200		106.8	-	38.7

5.3.4. A discharge rate of 34.5 l/s has been applied and used in the hydraulic model.

5.3.5. As the discharge rates from access roads section 1 and section 2, will result in a flow control with an orifice less than 75mm, the surface water drainage will be discharged unrestricted in line with Sewers for Scotland v4.0, to prevent blockage.

5.4. OUTFALL LOCATION

5.4.1. The attenuation basin is located to the south of the proposed platform adjacent to the position where the diverted access track ties in with the existing. It is proposed to tie the outfall from the attenuation basin into the existing ditch on the eastern side of the access track.

5.4.2. Currently it is unknown where this ditch outfalls, but additional walkover survey is proposed to confirm which tributary of the Crocket Burn located further south it connects into.

6. SUDS STRATEGY – PLATFORM & ACCESS ROADS

6.1. SITE TOPOGRAPHY

6.1.1. The platform is proposed to be set at a level of 241.0m AOD, which may receive adjustment at detailed design stage. The surrounding levels will be developed in consideration of the proposed platform level and where possible will follow the existing site form.

6.1.2. The access roads where possible will be developed in consideration of the surrounding levels.

6.2. TREATMENT/WATER QUALITY

6.2.1. Treatment is a SEPA requirement in accordance with Regulatory Method (WAT-RM-08)[3] for the regulation of urban drainage. Treatment is required to prevent pollution entering the water environment due to the surface water discharge or ground water pollution.

6.2.2. SuDS should be designed in accordance with CIRIA C753 and SuDS for Roads.

6.2.3. To ensure that suitable SuDS features have been selected for the proposed development, achieving the required level of treatment before discharge, the Simple Index Approach has been utilised in **Section 6.5** of this report.

6.3. SURFACE WATER MANAGEMENT TRAIN

6.3.1. The surface water management train combines a series of SuDS to ultimately control the flow rate and volume of runoff, while reducing the concentration of contamination being discharged into the receiving watercourse.

6.3.2. The surface water management train for the proposed development will use the following SuDS features to treat the surface water runoff:

- Filter Trenches
- Detention Basin
- Swale

[3] Scottish Environment Protection Agency, Regulatory Method (WAT-RM-08) Sustainable Urban Drainage Systems (SuDS or SUD Systems), 2019.

6.3.3. Filter trenches are shallow trenches filled with stone, which provide additional storage attenuation for surface water runoff and reduce pollutant levels by filtering out fine sediments, metals, hydrocarbons and other pollutants. After passing through the filter trench the surface water runoff will enter a perforated pipe or soak into the ground.

6.3.4. Although they are normally dry, detention basins can provide a means of storage for restricting runoff to accommodate a controlled discharge. The water quality can be increased through the introduction of vegetation to remove pollutants and through detention by separation of buoyant materials.

6.3.5. Swales are shallow channels which can be used to treat and attenuate runoff. These channels are vegetated along the sides and flat bottomed to help reduce the flow rate of the surface water runoff and to reduce the transfer of sediment to the downstream SuDS facilities. The swale also presents an opportunity for evapotranspiration, infiltration, and increased biodiversity opportunity.

6.4. SOURCE CONTROL

6.4.1. Source control provides the most effective way of managing contamination within surface water runoff due to the decrease in contaminants entering the SuDS management train. In return SuDS features performances further down the management train will be improved due to a reduction in sediment entering the surface water drainage system, where sediment can reduce capacity and even block SuDS features.

6.4.2. With lower contributing catchment areas which ultimately results in a reduction in flows, the risk of failure to prevent contamination entering the receiving watercourse is also decreased.

6.4.3. During dry spells pollutants can accumulate on hardstanding's until they are washed away during the early stages of rainfall. Increasing the contamination within the surface water runoff, this accumulation of pollutants should be removed as close to the source as possible.

6.4.4. The filter trenches and interceptor will reduce downstream pollutants.

6.5. WATER QUALITY TREATMENT

6.5.1. CIRIA C753 The SuDS Manual[4] outlines guidance on designing SuDS to achieve the appropriate level of water quality and design standards.

6.5.2. To assess the risk posed to the water quality at the discharge point the Simple Index Approach Tool has been used. The Simple Index Approach Tool ensures that the proposed SuDS will provide the required level of treatment for the relevant pollution source. This tool has been produced on SEPA's behalf and is formed in line with the guidance provided in The SuDS Manual.

6.5.3. The Simple Index Approach Tool accounts for where two or more SuDS features are used to exceed the pollution hazard indices and applies the following formula;

Total SuDS mitigation index = mitigation index 1 + 0.5 (mitigation index 2)

[4] CIRIA, CIRIA C753 The SuDS Manual, 2015.

6.5.4. **Table 6-1** displays the outputs from the Simple Index Approach Tool for the site.

Table 6-1 – SuDS Mitigation Indices to meet Pollution Hazard Indices

Land Use		TSS	Metals	Hydrocarbons
Commercial/Industrial Roofing: Inert Materials	Pollution Hazard Indices	0.30	0.20	0.05
	Mitigation Indices – Detention Basin	0.50	0.50	0.60
	Acceptability	✓	✓	✓
Low Traffic Roads (e.g. residential roads and general access roads < 300 traffic movements/day)	Pollution Hazard Indices	0.50	0.40	0.40
	Mitigation Indices – Filter Trench & Detention Basin (Platform Internal Roads & Access Road Section 3)	0.65	0.65	0.70
	Mitigation Indices – Filter Trench & Swale (Access Roads Section 1 & 2)	0.65	0.70	0.70
	Acceptability	✓	✓	✓
Sites where chemicals and fuel (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured	Pollution Hazard Indices	0.80	0.80	0.90
	Mitigation Indices – SPEL ESR Puraceptor & Detention Basin	>0.95	0.85	>0.95
	Acceptability	✓	✓	✓

6.5.5. Treatment of the oily water has been considered on the understanding that a SPEL ESR Puraceptor can be implemented. If this is not feasible then additional SuDS measures will be required.

6.5.6. The pollution hazard indices for the site can be satisfied through the use of a SPEL ESR Puraceptor, filter trenches, a detention basin and swales.

6.5.7. The treatment volume, Vt, has been calculated using an empirical formula which assesses the relationship between the rainfall depth, soil index and the fraction of the impervious area as specified in The SuDS Manual.

6.5.8. **Table 6-2** below states the parameters that have been used in the calculation and the value of treatment volume required for the site.

Table 6-2 – Required Treatment Volume for the Platform and Access Roads

Site Area	Developable Site Area (ha)	Impermeable Area (ha)	D (mm)	SOIL
Access Road Section 1	0.214	0.214	16.2	0.370
Access Road Section 2	0.076	0.076		
Section 3 & Platform	9.217	7.042		

6.6. ATTENUATION

6.6.1. In accordance with the SSEN Specification and regulatory requirements of the local authority and SEPA, quick storage estimates for the platform surface water drainage have been calculated using the FEH Rainfall method and are presented in Table 5-3 below, with the runoff rate restricted to the 1 in 2 year storm event.

6.6.2. Climate change has been applied at 39% in line with SEPA's "Climate Change Allowances for Flood Risk Assessment in Land Use Planning"[5].

6.6.3. The attenuation figures stated in **Table 6-3** below are for taken from quick storage estimates and are based upon the required end of system attenuation in the basin. No attenuation will be modelled as part of this assessment within the platform area. However, due to the nature of the platform construction comprising of Type 3 aggregate and 6F2, both of which comprise of an open grading resulting in a high permeability and attenuation possibility.

6.6.4. Any minor flooding therefore shown within the model at this at can be expected to be stored and slowed down within the upper layers of the aggregate construction.

Table 6-3 – Attenuation Estimations for Platform and Access Roads

Site Area	Return Period (Year)	Discharge Rate (l/s)	Climate Change (%)	Hardstanding Area (ha)	Required Storage (m^3)
Access Road Section 1	2	1.0	39	0.214	149
	30				267
	200				393

[5] Scottish Environment Protection Agency, Climate Change Allowances for Flood Risk Assessment in Land Use Planning, August 2024.

Access Road Section 2	2	0.4	39	0.076	49
	30				89
	200				132
Access Road Section 3 & Platform	2	34.5	39	7.042	4773
	30				8528
	200				12676

6.6.5. Attenuation for the access roads sections 1 and 2 surface water runoff will be provided via roadside filter trenches with a swale at the outfall to provide a second level of treatment. As discussed above, the surface water runoff will be discharged unrestricted for access roads sections 1 and 2.

6.6.6. Attenuation for the platform and access road section 3 will be provided via road side filter trenches and detention basin.

6.6.7. A high level hydraulic model of the onsite drainage system has been completed and run for all storms up to and including the 1 in 200 year + 39% climate change allowance. With a maximum restricted discharge rate of 34.5 l/s, an attenuation volume of 7,382m^3 is required. This is less than the quick storage estimate, however those estimate do not take into account the hydraulic design principles from the Causeway Flow model.

6.7. DESIGN FOR EXCEEDANCE

6.7.1. During extreme rainfall events capacities of sewers, watercourses and other drainage systems will on occasion be exceeded. This occurs when the rate of surface water runoff is greater than the drainage inlet capacity.

6.7.2. Any exceedance flow which cannot be stored below ground will result in excess water creating overland flows. These overland flows should be routed along carriageways, footways, and open spaces to prevent flooding to properties.

6.7.3. Storage up to and including the 1 in 30 year storm event, will be attenuated within the surface water drainage network, with the 1 in 200 year storm event plus climate change being contained within the site in line GCC's requirements.

6.7.4. Exceedance flows will be contained on site through a detailed levels design, outline exceedance flows have been added to the drainage strategy drawing, located in **Appendix B** of this report.

6.8. RISK ASSESSMENT

6.8.1. A SuDS health and safety risk assessment has been completed in line with Chapter 36 of CIRIA C753, The SuDS Manual. This has indicated that the proposed SuDS feature pose a low risk for construction and maintenance of the filter drains, subject to confirmation from the detailed design of the drainage. There is a low risk for the maintenance of the detention basin as a 3.5m access track is proposed, therefore all necessary maintenance can be completed without the need to enter the basin itself.

6.8.2. Drainage depths will be required to be confirmed at the detailed design stage.

6.9. APPROVALS AND ADOPTION

6.9.1. The proposed surface water drainage and SuDS on the site will be privately owned and maintained. Should any CAR requirements be needed, these will be handled during the next design phase, to ensure that correct and detailed information can be included as part of the applications, and to determine if these are truly required.

6.10. CONSTRUCTION

6.10.1. During the construction of SuDS features within the development, it is important that the risk of pollution from the site be kept to a minimum. Method statements for the control of pollution should be provided by the developers, and/or their contractors outlining their pollution prevention measures prior to development commencing on site.

6.10.2. Hazardous and environmentally damaging chemicals and other materials should be managed and stored to ensure that they do not enter the existing drainage systems or cause local soil contamination. Guidance on the handling and storage of materials on site is available from SEPA. Materials which fall into this category include:

- Petrochemicals (e.g., fuel, lubricants)
- Building materials (e.g., cement)
- General (e.g., excavation arising, mud, litter, site waste materials)

6.10.3. Note this is not a comprehensive list.

6.10.4. Care should be taken to ensure that any excavation works, and control of groundwater which may be necessary to facilitate the works, does not result in mobilisation of silts leading to contamination of any watercourses.

6.10.5. The works should be managed and sequenced to ensure that the risk of contaminated runoff or groundwater from the site entering the drainage systems is kept to a minimum. On site facilities for containment and controlled release of runoff and groundwater to the existing drainage system should be implemented. These facilities should be designed to trap debris and allow settlement and collection of silt.

6.10.6. SEPA stipulates that the surface water discharge on construction sites do not require authorisation as long the surface water is discharged in line with the general binding rules outlined in the Water Environment (Controlled Activities) Regulations 2011(as amened) and none of the following points apply;

- The site area is greater than 4 hectares

- The site contains a road or track length greater than 5km
- The site includes an area of more than 1 hectare or any length of more than 500 metres on ground with a slope in excess of 25 degrees.

6.10.7. More guidance on this regulation can be found at; www.sepa.org.uk.

6.11. MAINTENANCE

6.11.1. Maintenance Schedules for the proposed SuDS are provided below in **Table 7-4, Table 7-5** and **Table 7-6.**

Table 7-4 – Maintenance Requirements for Filter Trenches

Maintenance Requirements for Filter Trenches	
Operation	**Frequency Required**
Removal of litter	Monthly (or as required)
Inspect filter drain trench, inlet and outlet pipework and control systems	Monthly
Inspect pre-treatment systems, inlets and perforated pipework	Six Monthly
Remove sediment from pre-treatment devices	Six monthly, or as required
Remove or control tree roots where they are near the sides of the trench	As required
Where high pollution loads exist, surface geotextile should be replaced, and overlying filter medium should be replaced or washed	Five yearly, or as required
Clear perforated pipe work of blockages	As required

Table 7-5 – Maintenance Requirements for Detention Basins

Maintenance Requirements for Detention Basins	
Operation	**Frequency Required**
Remove Litter	Monthly
Grass cutting following inspection and reseeding areas of poor growth	As required
Inspect inlets, outlets, overflows, banksides, structures, pipework etc for damage or blockages	Monthly
Inlet and outlet cleaning	As required
Tidy all dead growth before the start of growing season	Annually

Removal of sediment following inspection	As required (Typically 25 years)

Table 7-6 – Maintenance Requirements for Swales

Maintenance Requirements for Swales	
Operation	**Frequency Required**
Inspections to identify mowing requirements	Monthly
Litter removal	Monthly
Scarifying and spiking following inspection	As required
Repair damaged vegetation following inspections	As Required
Inspect inlets, outlets and overflows, clearing blockages when required	Monthly
Inspect inlets and surfaces for silt, and remove where required	Half yearly
Safely remove oils of petrol residues	As required

7. FOUL WATER DRAINAGE STRATEGY

7.1. EXISTING FOUL DRAINAGE INFRASTRUCTURE

7.1.1. As discussed in Section 2.4 of this report, there are no known existing foul drainage infrastructure located on the site.

7.2. PROPOSED FOUL DRAINAGE

7.2.1. The proposed foul drainage for the platform substation buildings will discharge via a gravity drainage system into a suitably placed package treatment plant / cess pool or tank. Details of this will be confirmed during the detailed design stage.

7.2.2. Should a package treatment plant be the chosen option, the positioning will be vital to ensure that a sample chamber can be positioned before this enters the onsite surface water drainage system. Due to the small nature of the flows expected from such a system these will not be modelled in as part of the hydraulic model.

7.3. APPROVALS AND ADOPTION

7.3.1. The foul water drainage for the site will be privately owned and maintained. If any licenses are required from SEPA, these will be determined at the next stage once the design has been finalised to ensure all correct information is submitted as part of that assessment.

8. CONCLUSION

8.1.1. The NPR will flow into the existing drainage ditches or the proposed drainage ditches at an unrestricted rate as per the existing drainage regime.

8.1.2. The NPR will not be attenuated and will discharge freely into the existing ditches throughout the site. Due to the steep nature of the topography along the NPR, it was deemed unacceptable and unsafe to install attenuation basin or try to install other forms of attenuation features.

8.1.3. Section 1 and 2 of the platform access roads will discharge unrestricted into a culvert passing under the access road and into a swale before entering an existing tributary of the Bullie Burn located to the north and east of the access road.

8.1.4. Section 3 of the access road and the platform will be restricted to 34.5 l/s.

8.1.5. Section 3 of the access road and the platform is attenuated through an end of system detention basin.

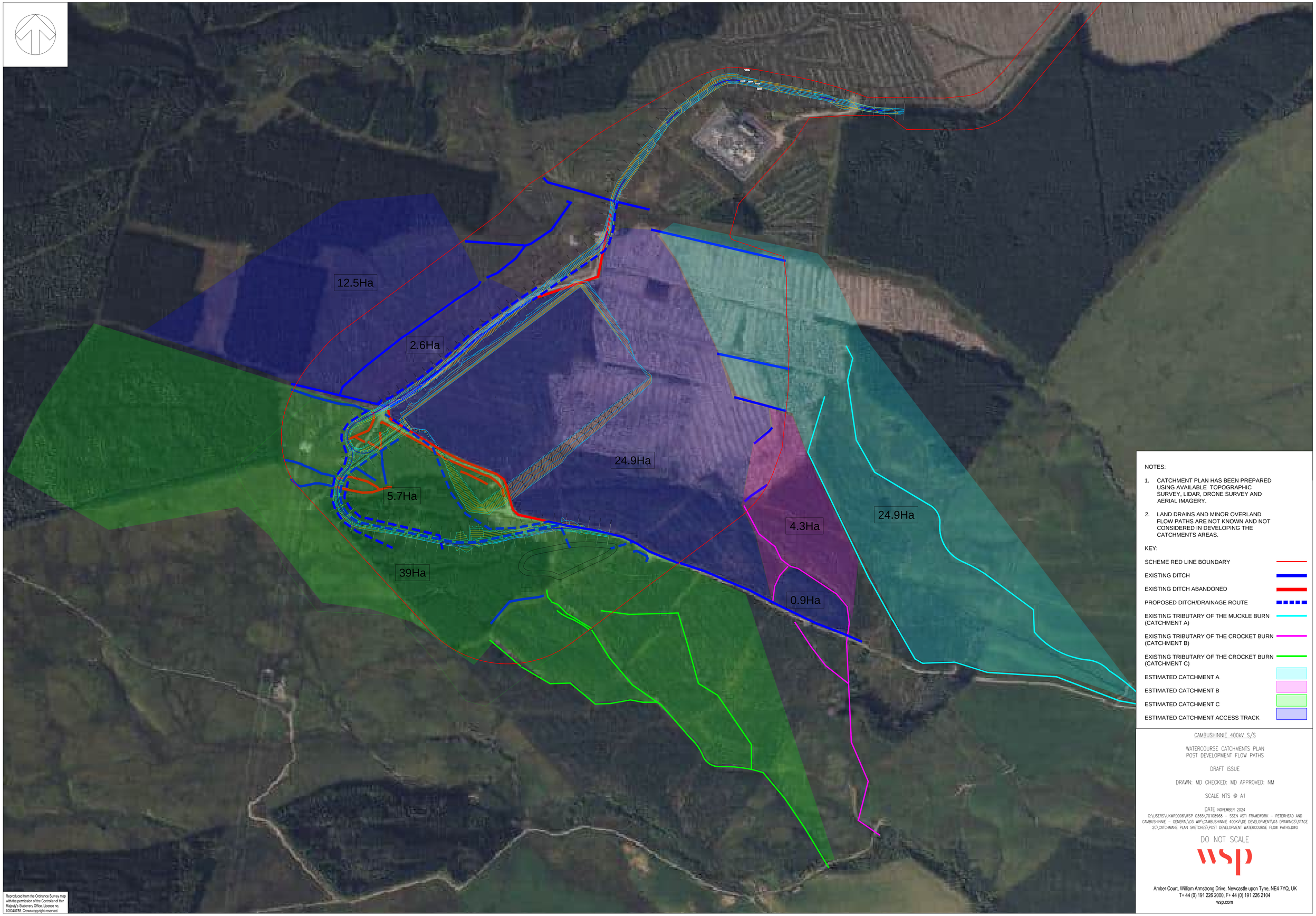
8.1.6. Based upon the Causeway Flow Hydraulic model, a total of 7,382m^3 of attenuation is required for the 1 in 200 year storm event with an allowance of 39% climate change.

8.1.7. As part of this scheme, and the requirements set by SEPA and Perth and Kinross Council that the SuDS approach is compliant with the CIRIA SuDS Manual Simple Index Approach. As discussed in Section 7.5 of this report, the proposed access road and platform have been deemed acceptable with the use of filter drains for the access road and gravel areas of the platform, followed by a second level of treatment in the detention basin, however the oily areas of the site are to drain to separate system that will be treated through a SPEL ESR Puraceptor before discharging back into the site drainage system.

8.1.8. It can be deemed that the drainage impact on the wider network is acceptable and deemed not to pose any pollution or flood risk to the existing environment.

Appendix A

EXISTING CATCHMENT



NOTES:

1. CATCHMENT PLAN HAS BEEN PREPARED USING AVAILABLE TOPOGRAPHIC SURVEY, LIDAR, DRONE SURVEY AND AERIAL IMAGERY.
2. LAND DRAINS AND MINOR OVERLAND FLOW PATHS ARE NOT KNOWN AND NOT CONSIDERED IN DEVELOPING THE CATCHMENTS AREAS.

KEY:

- SCHEME RED LINE BOUNDARY
- EXISTING DITCH
- EXISTING DITCH ABANDONED
- PROPOSED DITCH/DRAINAGE ROUTE
- EXISTING TRIBUTARY OF THE MUCKLE BURN (CATCHMENT A)
- EXISTING TRIBUTARY OF THE CROCKET BURN (CATCHMENT B)
- EXISTING TRIBUTARY OF THE CROCKET BURN (CATCHMENT C)
- ESTIMATED CATCHMENT A
- ESTIMATED CATCHMENT B
- ESTIMATED CATCHMENT C
- ESTIMATED CATCHMENT ACCESS TRACK

CAMBUSHINNIE 400kV S/S

WATERCOURSE CATCHMENTS PLAN
POST DEVELOPMENT FLOW PATHS

DRAFT ISSUE

DRAWN: MD CHECKED: MD APPROVED: NM

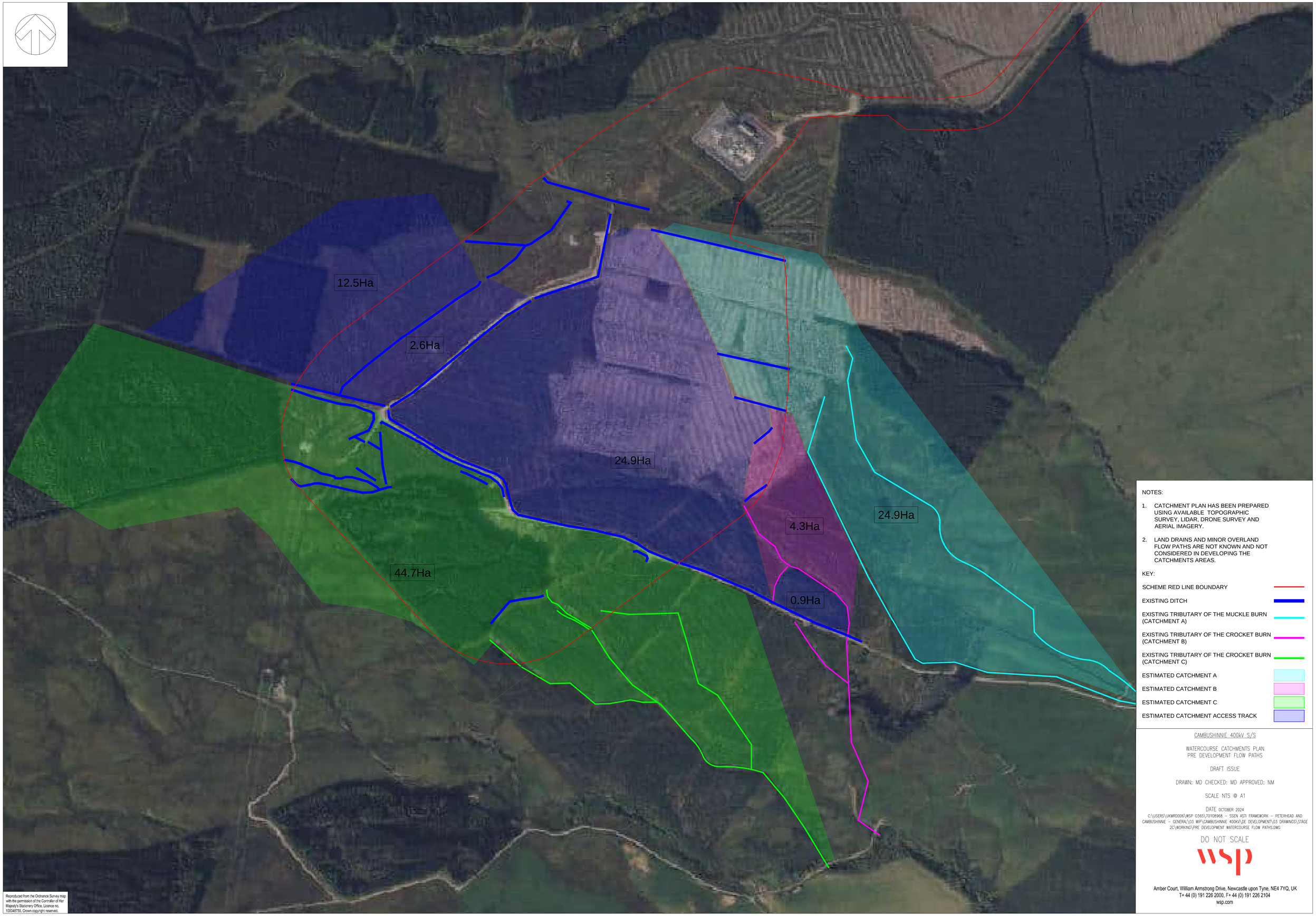
SCALE NTS @ A1

DATE NOVEMBER 2024

C:\USERS\UKMRD006\WSP 0365\70108968 - SSEN ASTI FRAMEWORK - PETERHEAD AND CAMBUSHINNIE - GENERAL\03 WIP\CAMBUSHINNIE 400KV\DE DEVELOPMENT\03 DRAWINGS\STAGE 2C\CATCHMANE PLAN SKETCHES\POST DEVELOPMENT WATERCOURSE FLOW PATHS.DWG

DO NOT SCALE

Amber Court, William Armstrong Drive, Newcastle upon Tyne, NE4 7YQ, UK
T+ 44 (0) 191 226 2000, F+ 44 (0) 191 226 2104
wsp.com



NOTES:

1. CATCHMENT PLAN HAS BEEN PREPARED USING AVAILABLE TOPOGRAPHIC SURVEY, LIDAR, DRONE SURVEY AND AERIAL IMAGERY.
2. LAND DRAINS AND MINOR OVERLAND FLOW PATHS ARE NOT KNOWN AND NOT CONSIDERED IN DEVELOPING THE CATCHMENTS AREAS.

KEY:

- SCHEME RED LINE BOUNDARY
- EXISTING DITCH
- EXISTING TRIBUTARY OF THE MUCKLE BURN (CATCHMENT A)
- EXISTING TRIBUTARY OF THE CROCKET BURN (CATCHMENT B)
- EXISTING TRIBUTARY OF THE CROCKET BURN (CATCHMENT C)
- ESTIMATED CATCHMENT A
- ESTIMATED CATCHMENT B
- ESTIMATED CATCHMENT C
- ESTIMATED CATCHMENT ACCESS TRACK

CAMBUSHINNIE 400kV S/S

WATERCOURSE CATCHMENTS PLAN
PRE DEVELOPMENT FLOW PATHS

DRAFT ISSUE

DRAWN: MD CHECKED: MD APPROVED: NM

SCALE NTS @ A1

DATE OCTOBER 2024

C:\USERS\UKMRD006\WSP 0365\70108968 – SSEN ASTI FRAMEWORK – PETERHEAD AND CAMBUSHINNIE – GENERAL\03 WIP\CAMBUSHINNIE 400KV\DE DEVELOPMENT\03 DRAWINGS\STAGE 2C\WORKING\PRE DEVELOPMENT WATERCOURSE FLOW PATHS.DWG

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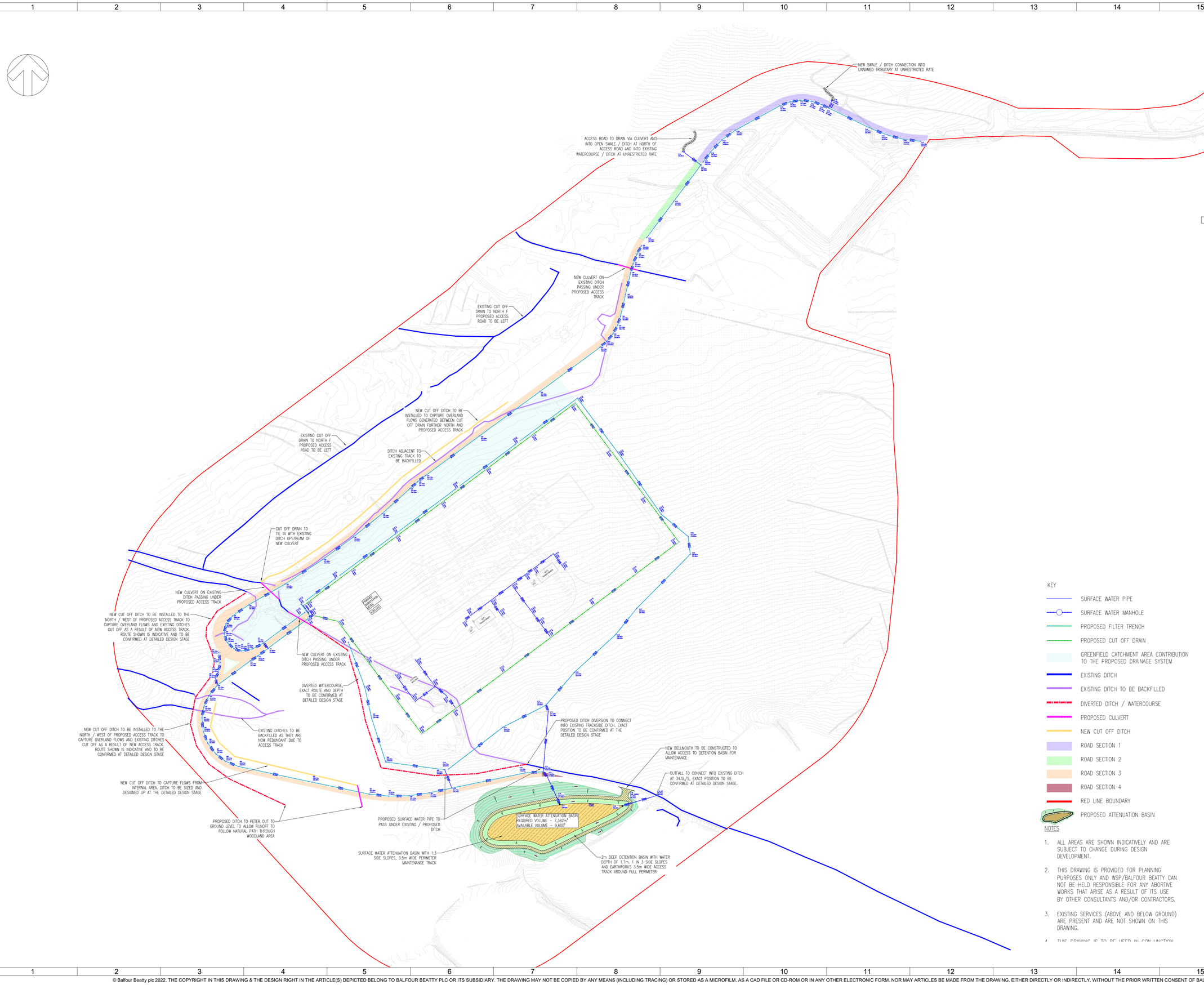
Appendix B

NON-PUBLIC ROAD DRAINAGE STRATEGY

Appendix C

SUBSTATION & PLATFORM ACCESS ROAD DRAINAGE STRATEGY



Designer's Site Specific Risk Assessment

This assessment is for non-standard or unusual Hazards and it is expected that Hazards associated with standard installations and designs are well understood by a competent Contractor.

By: | Date:

- [-] No works associated with this drawing

HAZARDS/ ACTIVITY - Assessed as Low (L) / Medium (M) / High (H)

[-]	Falls From Height	[-]	Drowning/Fall onto Rebar
[-]	Hazardous Material	[-]	Contaminated Land
[-]	Excavation/Service Strike	[-]	Poor Ground conditions
[-]	HAVS	[-]	Site Fabrication/drilling
[-]	Confined Workplace	[-]	Manual Handling
[-]	Access/Egress	[-]	Stored Energy
[-]	Weight Limit	[-]	Congested site
[-]	Residual Electricity	[-]	Existing equipment in close proximity

Interfaces: [-] Public [-] Operatives [-] Vehicle/Plant

WHO COULD BE HARMED?

- [-] Construction operatives
- [-] Dismantling crew
- [-] Future maintenance crew
- [-] Public

CONTROL MEASURES

- [-] Existing work instruction
- [-] Method detailed on drawing
- [-] Method detailed on separate document

TEMPORARY WORKS

- [-] No temporary works required
- [-] Temporary works required and documented separately
- [-] Drawing contains temporary works:

[ ] DC0	-	Standard solution	
[ ] DC1	-	Simple design	Complete temporary works design check certificate: ENG-SF-0101C
[ ] DC2	-	More complex design	
[ ] DC3	-	Complex/Innovative	
[ ] DC4	-	Abnormal Highly innovative	

Level 1 Control

[-] OK to proceed, no significant design hazards and risks, standard control measures apply.

Level 2 Control

[-] OK to proceed as detailed in existing work instruction or procedure detailed on drawing or separate document.

Level 3 Control

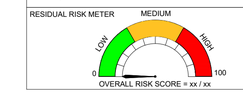
[-] OK to proceed providing specific design hazards and risks have been recognised, acknowledged and understood by the operation team. Site operatives may require additional instruction/training

CDM REGULATIONS RESIDUAL RISKS

Design based hazards are actively eliminated where possible. Where hazards cannot be eliminated, this symbol along with an attached note will identify the hazard and indicate that any action is required by the person supervising the works to manage the design hazard during construction.

Other than those noted, we are not aware of any further residual design risks apart from those that a competent contractor would ordinarily consider.

RESIDUAL RISK METER



OVERALL RISK SCORE = xx / xx

DRAWN	AS	REMARKS:			
CHKD	MD	UPDATED TO OPTION 3.3 EARTHWORKS OPTION			
DESIGN	AS	STATUS	S5	DATE	04/11/2024
APPD	MD	FOR INFORMATION		REV	P06
DRAWN	AS	REMARKS:			
CHKD	MD	2C ISSUE			
DESIGN	AS	STATUS	S5	DATE	04/11/2024
APPD	MD	FOR INFORMATION		REV	P05
DRAWN	KT	REMARKS:			
CHKD	MD	ECE FINAL			
DESIGN	KT	STATUS	S5	DATE	26/07/24
APPD	PW	FOR INFORMATION		REV	P04
DRAWN	KT	REMARKS:			
CHKD	MD	2C ISSUE			
DESIGN	KT	STATUS	S5	DATE	09/05/24
APPD	NM	FOR ACCEPTANCE		REV	P03
DRAWN	KT	REMARKS:			
CHKD	MD	2B ISSUE			
DESIGN	KT	STATUS	S5	DATE	22/03/24
APPD	NM	FOR ACCEPTANCE		REV	P02
DRAWN	KT	REMARKS:			
CHKD	MD	FIRST ISSUE			
DESIGN	KT	STATUS	S5	DATE	19/01/24
APPD	NM	FOR REVIEW		REV	P01

Scottish & Southern Electricity Networks

Balfour Beatty

PROJECT NAME: ASTI-ECE

LOCATION: CAMBUSHINNIE 400kV S/S | SITE: CMBS

TITLE:

CAMBUSHINNIE 400kV S/S PROPOSED PLATFORM OFF SITE DRAINAGE LAYOUT

SIZE	SCALE	FORMAT	SHEET No.
A1	1:2000	ACAD	01 OF 01

DRAWING No. CMBS4-LT520-BB-DRAI-ZZ-PLN-C-0001

Appendix D

DRAINAGE CALCULATIONS

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Main Site

Pipe Sizes Circular Manhole Sizes Adoptable

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	14.100	Add Flow / Climate Change (%)	0
Ratio R	0.250	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.900
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	1000

Designed with Level Soffits

Time Area Diagram for Main Site

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.829	8-12	1.932	16-20	0.573	24-28	0.092
4-8	1.870	12-16	1.598	20-24	0.109	28-32	0.038

Total Area Contributing (ha) = 7.042

Total Pipe Volume (m^3) = 895.120

Network Design Table for Main Site

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
1.000	68.355	0.195	350.5	0.140	15.00	0.0	0.600	o	600	Pipe/Conduit	
1.001	69.435	0.198	350.7	0.100	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.002	69.435	0.198	350.7	0.090	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.003	65.335	0.187	349.4	0.100	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.004	64.250	0.184	349.2	0.100	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	62.250	0.178	349.7	0.225	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)
1.000	24.36	15.88	238.550	0.140	0.0	0.0	0.0	1.29	366.1	9.2
1.001	23.68	16.77	238.355	0.240	0.0	0.0	0.0	1.29	366.0	15.4
1.002	23.06	17.67	238.157	0.330	0.0	0.0	0.0	1.29	366.0	20.6
1.003	22.50	18.51	237.959	0.430	0.0	0.0	0.0	1.30	366.7	26.2
1.004	21.99	19.33	237.772	0.530	0.0	0.0	0.0	1.30	366.8	31.6
1.005	21.53	20.13	237.588	0.755	0.0	0.0	0.0	1.30	366.6	44.0

Network Design Table for Main Site

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
2.000	23.526	0.063	373.4	0.007	15.00	0.0	0.600	o	600	Pipe/Conduit	
2.001	31.580	0.094	336.0	0.007	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.002	6.175	0.018	343.1	0.033	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.003	24.780	0.071	349.0	0.010	0.00	0.0	0.600	o	600	Pipe/Conduit	
3.000	6.075	0.017	357.4	0.003	15.00	0.0	0.600	o	600	Pipe/Conduit	
3.001	31.566	0.105	300.6	0.031	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	23.536	0.067	351.3	0.005	15.00	0.0	0.600	o	600	Pipe/Conduit	
3.002	31.479	0.090	349.8	0.012	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.004	44.431	0.127	349.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.005	15.445	0.044	351.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.006	18.955	0.054	351.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.006	72.150	0.206	350.2	0.140	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.007	70.150	0.200	350.8	0.235	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	39.822	0.265	150.3	0.000	15.00	0.0	0.600	o	300	Pipe/Conduit	
5.001	30.071	0.200	150.4	0.059	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)
2.000	24.81	15.31	237.881	0.007	0.0	0.0	0.0	1.25	354.6	0.5
2.001	24.49	15.71	237.818	0.014	0.0	0.0	0.0	1.32	374.1	0.9
2.002	24.43	15.79	237.724	0.047	0.0	0.0	0.0	1.31	370.1	3.1
2.003	24.18	16.11	237.706	0.057	0.0	0.0	0.0	1.30	366.9	3.7
3.000	25.00	15.08	237.847	0.003	0.0	0.0	0.0	1.28	362.6	0.2
3.001	24.69	15.45	237.830	0.034	0.0	0.0	0.0	1.40	395.6	2.3
4.000	24.82	15.30	237.792	0.005	0.0	0.0	0.0	1.29	365.7	0.3
3.002	24.37	15.86	237.725	0.051	0.0	0.0	0.0	1.30	366.5	3.4
2.004	23.75	16.68	237.635	0.108	0.0	0.0	0.0	1.30	366.5	6.9
2.005	23.61	16.88	237.508	0.108	0.0	0.0	0.0	1.29	365.9	6.9
2.006	23.43	17.12	237.464	0.108	0.0	0.0	0.0	1.29	365.9	6.9
1.006	21.01	21.06	237.410	1.003	0.0	0.0	0.0	1.30	366.3	57.1
1.007	20.54	21.96	237.204	1.238	0.0	0.0	0.0	1.29	366.0	68.9
5.000	24.64	15.52	239.275	0.000	0.0	0.0	0.0	1.28	90.5	0.0
5.001	24.33	15.91	239.010	0.059	0.0	0.0	0.0	1.28	90.5	3.9

Network Design Table for Main Site

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
6.000	39.812	0.465	85.6	0.000	15.00	0.0	0.600	o	300	Pipe/Conduit	
5.002	17.462	0.116	150.5	0.059	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.003	19.000	1.390	13.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	51.214	0.146	350.8	0.190	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.009	56.174	0.160	351.1	0.148	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.010	56.155	0.160	351.0	0.090	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.011	56.148	0.160	350.9	0.145	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.012	31.400	0.090	348.9	0.082	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.000	67.555	0.193	350.0	0.043	15.00	0.0	0.600	o	600	Pipe/Conduit	
7.001	67.555	0.193	350.0	0.051	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.002	67.558	0.193	350.0	0.174	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.003	67.557	0.193	350.0	0.173	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.004	67.555	0.193	350.0	0.176	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.005	67.556	0.835	80.9	0.168	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.006	15.652	0.462	33.9	0.045	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.013	3.092	0.094	32.9	0.008	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)
6.000	24.75	15.39	239.275	0.000	0.0	0.0	0.0	1.70	120.2	0.0
5.002	24.16	16.14	238.810	0.118	0.0	0.0	0.0	1.28	90.4	7.7
5.003	24.10	16.21	238.694	0.118	0.0	0.0	0.0	4.27	302.2	7.7
1.008	20.22	22.62	237.004	1.546	0.0	0.0	0.0	1.29	366.0	84.7
1.009	19.88	23.35	236.858	1.694	0.0	0.0	0.0	1.29	365.8	91.2
1.010	19.55	24.07	236.698	1.784	0.0	0.0	0.0	1.29	365.9	94.5
1.011	19.23	24.79	236.538	1.929	0.0	0.0	0.0	1.29	365.9	100.5
1.012	19.06	25.20	236.378	2.011	0.0	0.0	0.0	1.30	367.0	103.8
7.000	24.36	15.87	238.550	0.043	0.0	0.0	0.0	1.30	366.4	2.8
7.001	23.71	16.74	238.357	0.094	0.0	0.0	0.0	1.30	366.4	6.0
7.002	23.10	17.61	238.164	0.268	0.0	0.0	0.0	1.30	366.4	16.8
7.003	22.52	18.48	237.971	0.441	0.0	0.0	0.0	1.30	366.4	26.9
7.004	21.99	19.34	237.778	0.617	0.0	0.0	0.0	1.30	366.4	36.7
7.005	21.74	19.76	237.585	0.785	0.0	0.0	0.0	2.71	765.9	46.2
7.006	21.70	19.82	236.750	0.830	0.0	0.0	0.0	4.19	1185.7	48.8
1.013	19.06	25.21	236.288	2.849	0.0	0.0	0.0	4.26	1203.4	147.1

Network Design Table for Main Site

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
8.000	92.819	0.259	358.4	0.166	15.00	0.0	0.600	o	450	Pipe/Conduit	
8.001	90.000	0.257	350.2	0.160	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.002	90.000	0.257	350.2	0.149	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.003	90.000	0.257	350.2	0.134	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.004	51.037	2.595	19.7	0.078	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.005	18.749	0.031	604.8	0.039	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.014	63.954	0.325	196.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
9.000	11.400	0.143	79.7	0.010	15.00	0.0	0.600	o	225	Pipe/Conduit	
9.001	12.426	0.190	65.4	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.002	11.516	0.239	48.2	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.003	26.687	0.534	50.0	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.004	26.689	0.533	50.1	0.017	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.005	11.373	0.210	54.2	0.017	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.006	11.372	0.182	62.5	0.007	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.007	11.372	0.151	75.3	0.007	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.008	11.372	0.119	95.6	0.007	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.009	90.002	0.409	220.1	0.007	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.010	90.000	0.409	220.0	0.059	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.011	80.301	0.365	220.0	0.059	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.012	12.130	0.055	220.5	0.052	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)
8.000	23.92	16.45	239.850	0.166	0.0	0.0	0.0	1.07	169.9	10.8
8.001	22.94	17.84	239.591	0.326	0.0	0.0	0.0	1.08	171.9	20.3
8.002	22.06	19.22	239.334	0.475	0.0	0.0	0.0	1.08	171.9	28.4
8.003	21.26	20.61	239.077	0.609	0.0	0.0	0.0	1.08	171.9	35.1
8.004	21.16	20.80	238.820	0.687	0.0	0.0	0.0	4.60	731.7	39.4
8.005	20.95	21.18	236.225	0.726	0.0	0.0	0.0	0.82	130.3	41.2
1.014	18.81	25.82	236.194	3.575	0.0	0.0	0.0	1.73	489.8	182.1
9.000	24.96	15.13	252.028	0.010	0.0	0.0	0.0	1.47	58.3	0.7
9.001	24.85	15.26	251.885	0.018	0.0	0.0	0.0	1.62	64.4	1.2
9.002	24.77	15.36	251.695	0.027	0.0	0.0	0.0	1.89	75.1	1.8
9.003	24.58	15.60	251.456	0.035	0.0	0.0	0.0	1.85	73.7	2.3
9.004	24.39	15.84	250.922	0.052	0.0	0.0	0.0	1.85	73.7	3.4
9.005	24.30	15.95	250.389	0.069	0.0	0.0	0.0	1.78	70.8	4.5
9.006	24.22	16.06	250.179	0.076	0.0	0.0	0.0	1.66	65.9	5.0
9.007	24.12	16.19	249.997	0.083	0.0	0.0	0.0	1.51	60.0	5.4
9.008	24.01	16.33	249.846	0.090	0.0	0.0	0.0	1.34	53.2	5.9
9.009	23.00	17.75	249.652	0.097	0.0	0.0	0.0	1.06	74.6	6.0
9.010	22.09	19.17	249.243	0.156	0.0	0.0	0.0	1.06	74.6	9.3
9.011	21.35	20.44	248.834	0.215	0.0	0.0	0.0	1.06	74.6	12.4
9.012	21.25	20.63	248.469	0.267	0.0	0.0	0.0	1.05	74.5	15.4

Network Design Table for Main Site

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
9.013	12.130	0.055	220.5	0.009	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.014	45.027	0.205	219.6	0.008	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.015	45.001	0.205	219.5	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.016	44.999	0.205	219.5	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.017	54.127	0.246	220.0	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.018	50.972	0.232	219.7	0.035	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.019	23.012	0.105	219.2	0.033	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.020	12.340	0.689	17.9	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.021	12.340	1.279	9.6	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.022	11.135	1.250	8.9	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.023	11.407	1.233	9.3	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.024	8.350	0.821	10.2	0.019	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.025	14.147	0.854	16.6	0.016	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.026	14.999	1.867	8.0	0.011	0.00	0.0	0.600	o	300	Pipe/Conduit	
10.000	61.578	0.523	117.7	0.092	15.00	0.0	0.600	o	450	Pipe/Conduit	
9.027	8.300	3.000	2.8	0.075	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.015	15.456	0.044	351.3	0.042	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.016	10.028	0.029	345.8	0.015	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.017	49.798	0.142	350.7	0.000	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)
9.013	21.14	20.82	248.414	0.276	0.0	0.0	0.0	1.05	74.5	15.8
9.014	20.77	21.53	248.359	0.284	0.0	0.0	0.0	1.06	74.7	16.0
9.015	20.41	22.24	248.154	0.313	0.0	0.0	0.0	1.06	74.7	17.3
9.016	20.06	22.95	247.949	0.342	0.0	0.0	0.0	1.06	74.7	18.6
9.017	19.67	23.80	247.744	0.372	0.0	0.0	0.0	1.06	74.6	19.8
9.018	19.31	24.61	247.498	0.407	0.0	0.0	0.0	1.06	74.7	21.3
9.019	19.16	24.97	247.266	0.440	0.0	0.0	0.0	1.06	74.8	22.8
9.020	19.14	25.02	247.161	0.458	0.0	0.0	0.0	3.73	263.8	23.7
9.021	19.12	25.06	246.472	0.476	0.0	0.0	0.0	5.09	359.8	24.6
9.022	19.11	25.10	245.193	0.494	0.0	0.0	0.0	5.30	374.5	25.6
9.023	19.09	25.14	243.943	0.512	0.0	0.0	0.0	5.20	367.5	26.5
9.024	19.08	25.16	242.710	0.531	0.0	0.0	0.0	4.96	350.4	27.4
9.025	19.05	25.23	241.889	0.547	0.0	0.0	0.0	3.88	274.4	28.2
9.026	19.03	25.27	241.035	0.558	0.0	0.0	0.0	5.58	394.4	28.8
10.000	24.62	15.55	239.542	0.092	0.0	0.0	0.0	1.87	297.8	6.1
9.027	19.03	25.28	239.019	0.725	0.0	0.0	0.0	12.29	1954.4	37.4
1.015	18.73	26.02	235.869	4.342	0.0	0.0	0.0	1.29	365.7	220.2
1.016	18.68	26.15	235.825	4.357	0.0	0.0	0.0	1.30	368.6	220.4
1.017	18.43	26.79	235.796	4.357	0.0	0.0	0.0	1.29	366.0	220.4

Network Design Table for Main Site

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
11.000	12.411	1.088	11.4	0.000	15.00	0.0	0.600	o	150	Pipe/Conduit	
11.001	11.958	1.049	11.4	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
11.002	7.498	0.657	11.4	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
11.003	9.145	0.802	11.4	0.007	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.018	16.028	0.040	400.7	0.026	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.019	14.817	0.037	400.5	0.007	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.020	13.229	0.033	400.9	0.008	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.021	16.285	0.041	397.2	0.007	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.022	15.511	0.039	397.7	0.009	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.023	16.068	0.312	51.5	0.008	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.024	14.401	1.221	11.8	0.009	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.025	17.049	1.444	11.8	0.008	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.026	90.000	7.202	12.5	0.008	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.027	70.221	5.628	12.5	0.044	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.028	23.267	1.790	13.0	0.035	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.029	25.077	2.267	11.1	0.012	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.030	24.405	0.207	117.9	0.010	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.031	27.407	0.078	351.4	0.015	0.00	0.0	0.600	o	600	Pipe/Conduit	
12.000	56.748	4.404	12.9	0.000	15.00	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)
11.000	25.01	15.07	243.815	0.000	0.0	0.0	0.0	3.00	53.0	0.0
11.001	24.96	15.14	242.727	0.006	0.0	0.0	0.0	3.00	53.0	0.4
11.002	24.92	15.18	241.678	0.012	0.0	0.0	0.0	3.00	53.0	0.8
11.003	24.88	15.23	241.021	0.019	0.0	0.0	0.0	3.00	53.0	1.3
1.018	18.35	27.01	235.654	4.402	0.0	0.0	0.0	1.21	342.2	220.4
1.019	18.27	27.22	235.614	4.409	0.0	0.0	0.0	1.21	342.3	220.4
1.020	18.21	27.40	235.577	4.417	0.0	0.0	0.0	1.21	342.1	220.4
1.021	18.13	27.62	235.544	4.424	0.0	0.0	0.0	1.22	343.7	220.4
1.022	18.05	27.84	235.503	4.433	0.0	0.0	0.0	1.21	343.5	220.4
1.023	18.02	27.91	235.464	4.441	0.0	0.0	0.0	3.40	961.0	220.4
1.024	18.01	27.95	235.152	4.450	0.0	0.0	0.0	7.12	2012.1	220.4
1.025	18.00	27.99	233.931	4.458	0.0	0.0	0.0	7.11	2011.0	220.4
1.026	17.92	28.20	232.487	4.466	0.0	0.0	0.0	6.91	1954.6	220.4
1.027	17.86	28.37	225.285	4.510	0.0	0.0	0.0	6.92	1956.2	220.4
1.028	17.84	28.43	219.657	4.545	0.0	0.0	0.0	6.78	1916.5	220.4
1.029	17.82	28.49	217.867	4.557	0.0	0.0	0.0	7.35	2077.8	220.4
1.030	17.76	28.67	215.600	4.567	0.0	0.0	0.0	2.24	633.9	220.4
1.031	17.64	29.02	215.393	4.582	0.0	0.0	0.0	1.29	365.7	220.4
12.000	24.89	15.21	238.494	0.000	0.0	0.0	0.0	4.40	311.2	0.0

Network Design Table for Main Site

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
12.001	38.901	5.652	6.9	0.044	0.00	0.0	0.600	o	300	Pipe/Conduit	
12.002	55.144	2.535	21.8	0.089	0.00	0.0	0.600	o	300	Pipe/Conduit	
12.003	71.519	1.507	47.5	0.244	0.00	0.0	0.600	o	300	Pipe/Conduit	
12.004	23.535	8.782	2.7	0.204	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.032	89.771	0.299	300.2	0.014	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.033	21.871	0.073	299.6	0.045	0.00	0.0	0.600	o	600	Pipe/Conduit	
13.000	80.688	0.264	305.6	0.000	15.00	0.0	0.600	o	450	Pipe/Conduit	
13.001	91.594	0.300	305.3	0.136	0.00	0.0	0.600	o	450	Pipe/Conduit	
13.002	41.559	3.406	12.2	0.099	0.00	0.0	0.600	o	450	Pipe/Conduit	
13.003	21.481	2.500	8.6	0.017	0.00	0.0	0.600	o	450	Pipe/Conduit	
13.004	91.819	4.200	21.9	0.010	0.00	0.0	0.600	o	450	Pipe/Conduit	
13.005	39.858	2.250	17.7	0.240	0.00	0.0	0.600	o	450	Pipe/Conduit	
13.006	67.650	1.500	45.1	0.141	0.00	0.0	0.600	o	450	Pipe/Conduit	
13.007	52.121	4.830	10.8	0.372	0.00	0.0	0.600	o	450	Pipe/Conduit	
14.000	82.178	0.329	250.0	0.333	15.00	0.0	0.600	o	300	Pipe/Conduit	
14.001	58.083	1.858	31.3	0.275	0.00	0.0	0.600	o	300	Pipe/Conduit	
13.008	7.143	0.821	8.7	0.180	0.00	0.0	0.600	o	450	Pipe/Conduit	
13.009	73.598	4.717	15.6	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)
12.001	24.80	15.32	234.090	0.044	0.0	0.0	0.0	6.03	426.2	3.0
12.002	24.58	15.59	228.438	0.133	0.0	0.0	0.0	3.39	239.3	8.9
12.003	24.17	16.11	225.903	0.377	0.0	0.0	0.0	2.29	161.7	24.7
12.004	24.14	16.16	224.396	0.581	0.0	0.0	0.0	9.67	683.6	38.0
1.032	17.32	30.00	215.314	5.177	0.0	0.0	0.0	1.40	395.9	242.9
1.033	17.32	30.00	215.015	5.222	0.0	0.0	0.0	1.40	396.3	245.0
13.000	24.14	16.16	239.850	0.000	0.0	0.0	0.0	1.16	184.1	0.0
13.001	23.18	17.48	239.586	0.136	0.0	0.0	0.0	1.16	184.2	8.5
13.002	23.10	17.60	239.286	0.235	0.0	0.0	0.0	5.84	929.5	14.7
13.003	23.07	17.65	235.880	0.252	0.0	0.0	0.0	6.97	1108.1	15.7
13.004	22.83	18.00	233.380	0.262	0.0	0.0	0.0	4.36	693.9	16.2
13.005	22.74	18.14	229.180	0.502	0.0	0.0	0.0	4.85	771.1	30.9
13.006	22.50	18.51	226.930	0.643	0.0	0.0	0.0	3.03	482.5	39.2
13.007	22.41	18.65	225.430	1.015	0.0	0.0	0.0	6.22	988.6	61.6
14.000	23.97	16.38	222.937	0.333	0.0	0.0	0.0	0.99	70.0	21.6
14.001	23.72	16.73	222.608	0.608	0.0	0.0	0.0	2.82	199.5	39.1
13.008	22.40	18.67	220.600	1.803	0.0	0.0	0.0	6.92	1101.2	109.4
13.009	22.25	18.90	219.779	1.803	0.0	0.0	0.0	5.17	821.8	109.4

Network Design Table for Main Site

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
1.034	8.280	0.028	295.7	0.017	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.035	28.335	3.729	7.6	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.036	7.115	1.755	4.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.037	75.884	0.200	379.4	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.038	10.132	0.058	174.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.039	33.000	1.132	29.2	0.000	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)
1.034	17.32	30.00	214.912	7.042	0.0	0.0	0.0	1.41	398.9	330.4
1.035	17.32	30.00	214.884	7.042	0.0	0.0	0.0	8.87	2507.7	330.4
1.036	17.32	30.00	211.155	7.042	0.0	0.0	0.0	12.15	3434.5	330.4
1.037	17.32	30.00	209.400	7.042	0.0	0.0	0.0	1.24	351.8	330.4
1.038	17.32	30.00	209.200	7.042	0.0	0.0	0.0	1.84	520.1	330.4
1.039	17.32	30.00	209.142	7.042	0.0	0.0	0.0	3.37	371.9	330.4

Area Summary for Main Site

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.140	0.140	0.140
1.001	-	-	100	0.100	0.100	0.100
1.002	-	-	100	0.090	0.090	0.090
1.003	-	-	100	0.100	0.100	0.100
1.004	-	-	100	0.100	0.100	0.100
1.005	-	-	100	0.225	0.225	0.225
2.000	-	-	100	0.007	0.007	0.007
2.001	-	-	100	0.007	0.007	0.007
2.002	-	-	100	0.033	0.033	0.033
2.003	-	-	100	0.010	0.010	0.010
3.000	-	-	100	0.003	0.003	0.003
3.001	-	-	100	0.031	0.031	0.031
4.000	-	-	100	0.005	0.005	0.005
3.002	-	-	100	0.012	0.012	0.012
2.004	-	-	100	0.000	0.000	0.000
2.005	-	-	100	0.000	0.000	0.000
2.006	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.140	0.140	0.140
1.007	-	-	100	0.235	0.235	0.235
5.000	-	-	100	0.000	0.000	0.000
5.001	-	-	100	0.059	0.059	0.059
6.000	-	-	100	0.000	0.000	0.000
5.002	-	-	100	0.059	0.059	0.059
5.003	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.190	0.190	0.190
1.009	-	-	100	0.148	0.148	0.148
1.010	-	-	100	0.090	0.090	0.090
1.011	-	-	100	0.145	0.145	0.145
1.012	-	-	100	0.082	0.082	0.082
7.000	-	-	100	0.043	0.043	0.043
7.001	-	-	100	0.051	0.051	0.051
7.002	-	-	100	0.174	0.174	0.174
7.003	-	-	100	0.173	0.173	0.173
7.004	-	-	100	0.176	0.176	0.176
7.005	-	-	100	0.168	0.168	0.168
7.006	-	-	100	0.045	0.045	0.045
1.013	-	-	100	0.008	0.008	0.008
8.000	-	-	100	0.166	0.166	0.166
8.001	-	-	100	0.160	0.160	0.160
8.002	-	-	100	0.149	0.149	0.149
8.003	-	-	100	0.134	0.134	0.134
8.004	-	-	100	0.078	0.078	0.078
8.005	-	-	100	0.039	0.039	0.039
1.014	-	-	100	0.000	0.000	0.000
9.000	-	-	100	0.010	0.010	0.010
9.001	-	-	100	0.008	0.008	0.008
9.002	-	-	100	0.009	0.009	0.009
9.003	-	-	100	0.008	0.008	0.008
9.004	-	-	100	0.017	0.017	0.017
9.005	-	-	100	0.017	0.017	0.017
9.006	-	-	100	0.007	0.007	0.007

Area Summary for Main Site

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
9.007	-	-	100	0.007	0.007	0.007
9.008	-	-	100	0.007	0.007	0.007
9.009	-	-	100	0.007	0.007	0.007
9.010	-	-	100	0.059	0.059	0.059
9.011	-	-	100	0.059	0.059	0.059
9.012	-	-	100	0.052	0.052	0.052
9.013	-	-	100	0.009	0.009	0.009
9.014	-	-	100	0.008	0.008	0.008
9.015	-	-	100	0.029	0.029	0.029
9.016	-	-	100	0.029	0.029	0.029
9.017	-	-	100	0.030	0.030	0.030
9.018	-	-	100	0.035	0.035	0.035
9.019	-	-	100	0.033	0.033	0.033
9.020	-	-	100	0.018	0.018	0.018
9.021	-	-	100	0.018	0.018	0.018
9.022	-	-	100	0.018	0.018	0.018
9.023	-	-	100	0.018	0.018	0.018
9.024	-	-	100	0.019	0.019	0.019
9.025	-	-	100	0.016	0.016	0.016
9.026	-	-	100	0.011	0.011	0.011
10.000	-	-	100	0.092	0.092	0.092
9.027	-	-	100	0.075	0.075	0.075
1.015	-	-	100	0.042	0.042	0.042
1.016	-	-	100	0.015	0.015	0.015
1.017	-	-	100	0.000	0.000	0.000
11.000	-	-	100	0.000	0.000	0.000
11.001	-	-	100	0.006	0.006	0.006
11.002	-	-	100	0.006	0.006	0.006
11.003	-	-	100	0.007	0.007	0.007
1.018	-	-	100	0.026	0.026	0.026
1.019	-	-	100	0.007	0.007	0.007
1.020	-	-	100	0.008	0.008	0.008
1.021	-	-	100	0.007	0.007	0.007
1.022	-	-	100	0.009	0.009	0.009
1.023	-	-	100	0.008	0.008	0.008
1.024	-	-	100	0.009	0.009	0.009
1.025	-	-	100	0.008	0.008	0.008
1.026	-	-	100	0.008	0.008	0.008
1.027	-	-	100	0.044	0.044	0.044
1.028	-	-	100	0.035	0.035	0.035
1.029	-	-	100	0.012	0.012	0.012
1.030	-	-	100	0.010	0.010	0.010
1.031	-	-	100	0.015	0.015	0.015
12.000	-	-	100	0.000	0.000	0.000
12.001	-	-	100	0.044	0.044	0.044
12.002	-	-	100	0.089	0.089	0.089
12.003	-	-	100	0.244	0.244	0.244
12.004	-	-	100	0.204	0.204	0.204
1.032	-	-	100	0.014	0.014	0.014
1.033	-	-	100	0.045	0.045	0.045
13.000	-	-	100	0.000	0.000	0.000

Area Summary for Main Site

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
13.001	-	-	100	0.136	0.136	0.136
13.002	-	-	100	0.099	0.099	0.099
13.003	-	-	100	0.017	0.017	0.017
13.004	-	-	100	0.010	0.010	0.010
13.005	-	-	100	0.240	0.240	0.240
13.006	-	-	100	0.141	0.141	0.141
13.007	-	-	100	0.372	0.372	0.372
14.000	-	-	100	0.333	0.333	0.333
14.001	-	-	100	0.275	0.275	0.275
13.008	-	-	100	0.180	0.180	0.180
13.009	-	-	100	0.000	0.000	0.000
1.034	-	-	100	0.017	0.017	0.017
1.035	-	-	100	0.000	0.000	0.000
1.036	-	-	100	0.000	0.000	0.000
1.037	-	-	100	0.000	0.000	0.000
1.038	-	-	100	0.000	0.000	0.000
1.039	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				7.042	7.042	7.042

Surcharged Outfall Details for Main Site

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.039	119_OUT	209.310	208.010	0.000	1500	0

Datum (m) 208.010 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1440	0.000	5760	0.000	10080	0.000	14400	0.000	18720	0.000
2880	0.000	7200	0.000	11520	0.000	15840	0.000	20160	0.000
4320	0.000	8640	0.000	12960	0.000	17280	0.000		

Simulation Criteria for Main Site

Volumetric Runoff Coeff	0.750	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 Online Controls 2 Number of Storage Structures 1

Simulation Criteria for Main Site

Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	14.100	Storm Duration (mins)	30
Ratio R	0.250		

Online Controls for Main Site

Orifice Manhole: 117, DS/PN: 1.037, Volume (m³): 13.0

Diameter (m) 0.600 Discharge Coefficient 0.600 Invert Level (m) 209.400

Hydro-Brake® Optimum Manhole: 119, DS/PN: 1.039, Volume (m³): 9.8

Unit Reference	MD-SHE-0237-3450-2000-3450
Design Head (m)	2.000
Design Flow (l/s)	34.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	237
Invert Level (m)	209.142
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	34.4
Flush-Flo™	0.593	34.3
Kick-Flo®	1.283	27.8
Mean Flow over Head Range	-	29.8

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)
0.100	7.8	1.200	29.9	3.000	41.8	7.000	63.0
0.200	24.0	1.400	29.0	3.500	45.0	7.500	65.1
0.300	31.8	1.600	30.9	4.000	48.0	8.000	67.2
0.400	33.4	1.800	32.7	4.500	50.8	8.500	69.2
0.500	34.1	2.000	34.4	5.000	53.5	9.000	71.2
0.600	34.3	2.200	36.0	5.500	56.0	9.500	73.1
0.800	33.8	2.400	37.5	6.000	58.4		
1.000	32.6	2.600	39.0	6.500	60.8		

Storage Structures for Main Site

Cellular Storage Manhole: 118, DS/PN: 1.038

Invert Level (m) 209.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	4713.0	0.0	2.000	6964.0	0.0

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

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 Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Winter	2	+39%	200/30 Winter				238.627
1.001	2	30 Winter	2	+39%	200/30 Summer				238.463
1.002	3	30 Winter	2	+39%	100/30 Winter				238.287
1.003	4	30 Winter	2	+39%	100/30 Summer				238.107
1.004	5	30 Winter	2	+39%	100/15 Winter				237.937
1.005	6	30 Winter	2	+39%	30/30 Winter				237.787
2.000	7	30 Winter	2	+39%	100/30 Winter				237.889
2.001	8	15 Winter	2	+39%	100/30 Winter				237.839
2.002	9	15 Winter	2	+39%	100/30 Summer				237.794
2.003	10	15 Winter	2	+39%	100/30 Summer				237.776
3.000	11	15 Winter	2	+39%	100/30 Winter				237.876
3.001	12	15 Winter	2	+39%	100/30 Winter				237.875
4.000	13	30 Winter	2	+39%	100/30 Winter				237.802
3.002	14	15 Winter	2	+39%	100/30 Summer				237.790
2.004	15	15 Winter	2	+39%	100/15 Winter				237.723
2.005	16	30 Winter	2	+39%	30/30 Winter				237.649
2.006	17	30 Winter	2	+39%	30/30 Winter				237.641
1.006	18	30 Winter	2	+39%	30/30 Summer				237.638

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.523	0.000	0.04		13.8	OK	
1.001	2	-0.492	0.000	0.07		24.7	OK	
1.002	3	-0.470	0.000	0.11		34.8	OK	
1.003	4	-0.452	0.000	0.14		45.6	OK	
1.004	5	-0.435	0.000	0.17		55.3	OK	
1.005	6	-0.401	0.000	0.24		78.3	OK	
2.000	7	-0.592	0.000	0.00		0.7	OK	
2.001	8	-0.579	0.000	0.00		1.5	OK	
2.002	9	-0.530	0.000	0.03		6.2	OK	
2.003	10	-0.530	0.000	0.03		7.5	OK	
3.000	11	-0.571	0.000	0.00		0.4	OK	
3.001	12	-0.555	0.000	0.01		4.7	OK	
4.000	13	-0.590	0.000	0.00		0.5	OK	
3.002	14	-0.535	0.000	0.02		6.6	OK	
2.004	15	-0.512	0.000	0.04		13.5	OK	
2.005	16	-0.459	0.000	0.05		12.1	OK	
2.006	17	-0.423	0.000	0.05		12.5	OK	
1.006	18	-0.372	0.000	0.30		101.3	OK	

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File Option 3.3 SW Drainage.mdx | Checked by
XP Solutions | Network 2019.1

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.007	19	30 Winter	2	+39%	30/15 Summer				237.455
5.000	20	120 Winter	2	+39%					239.275
5.001	21	15 Winter	2	+39%	200/30 Winter				239.075
6.000	22	120 Winter	2	+39%					239.275
5.002	23	15 Winter	2	+39%	200/30 Summer				238.906
5.003	24	15 Winter	2	+39%	200/15 Winter				238.744
1.008	25	30 Winter	2	+39%	30/15 Summer				237.289
1.009	26	30 Winter	2	+39%	30/15 Summer				237.157
1.010	27	30 Winter	2	+39%	30/15 Summer				237.063
1.011	28	30 Winter	2	+39%	30/15 Summer				237.007
1.012	29	30 Winter	2	+39%	30/15 Summer				236.934
7.000	30	30 Winter	2	+39%	200/30 Winter				238.585
7.001	31	15 Winter	2	+39%	200/30 Summer				238.427
7.002	32	15 Winter	2	+39%	100/30 Winter				238.293
7.003	33	15 Winter	2	+39%	100/30 Winter				238.135
7.004	34	15 Winter	2	+39%	100/15 Winter				237.971
7.005	35	15 Winter	2	+39%	30/30 Winter				237.730
7.006	36	15 Winter	2	+39%	30/15 Summer				236.900
1.013	37	30 Winter	2	+39%	30/15 Summer				236.852
8.000	38	30 Winter	2	+39%					239.945
8.001	39	30 Winter	2	+39%					239.731
8.002	40	30 Winter	2	+39%	200/30 Winter				239.505
8.003	41	30 Winter	2	+39%	200/30 Winter				239.271
8.004	42	30 Winter	2	+39%	200/30 Winter				238.916
8.005	43	30 Winter	2	+39%	2/15 Winter				236.805
1.014	44	30 Winter	2	+39%	30/15 Summer				236.780
9.000	45	30 Winter	2	+39%					252.048
9.001	46	30 Winter	2	+39%					251.912
9.002	47	15 Winter	2	+39%					251.727
9.003	48	15 Winter	2	+39%					251.493
9.004	49	15 Winter	2	+39%					250.970
9.005	50	15 Winter	2	+39%					250.448
9.006	51	15 Winter	2	+39%					250.244
9.007	52	15 Winter	2	+39%					250.069
9.008	53	15 Winter	2	+39%					249.926
9.009	54	15 Winter	2	+39%					249.739
9.010	55	15 Winter	2	+39%					249.349
9.011	56	15 Winter	2	+39%	200/15 Summer				248.957
9.012	57	30 Winter	2	+39%	100/15 Summer				248.619
9.013	58	30 Winter	2	+39%	100/15 Summer				248.566
9.014	59	30 Winter	2	+39%	100/15 Winter				248.500
9.015	60	30 Winter	2	+39%	100/15 Winter				248.302
9.016	61	30 Winter	2	+39%	100/15 Winter				248.102
9.017	62	30 Winter	2	+39%	100/15 Winter				247.901
9.018	63	30 Winter	2	+39%	100/15 Winter				247.660
9.019	64	30 Winter	2	+39%	30/30 Winter				247.439
9.020	65	30 Winter	2	+39%					247.253
9.021	66	30 Winter	2	+39%					246.550

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.007	19	-0.349	0.000	0.36		120.2	OK	
5.000	20	-0.300	0.000	0.00		0.0	OK	
5.001	21	-0.235	0.000	0.10		8.6	OK	
6.000	22	-0.300	0.000	0.00		0.0	OK	
5.002	23	-0.204	0.000	0.22		17.2	OK	
5.003	24	-0.250	0.000	0.07		17.2	OK	
1.008	25	-0.315	0.000	0.46		146.5	OK	
1.009	26	-0.301	0.000	0.48		157.4	OK	
1.010	27	-0.235	0.000	0.49		157.6	OK	
1.011	28	-0.131	0.000	0.49		159.0	OK	
1.012	29	-0.044	0.000	0.61		182.8	OK	
7.000	30	-0.565	0.000	0.01		4.2	OK	
7.001	31	-0.530	0.000	0.03		10.1	OK	
7.002	32	-0.471	0.000	0.10		33.0	OK	
7.003	33	-0.436	0.000	0.16		54.2	OK	
7.004	34	-0.407	0.000	0.22		73.3	OK	
7.005	35	-0.455	0.000	0.13		91.3	OK	
7.006	36	-0.450	0.000	0.14		96.0	OK	
1.013	37	-0.036	0.000	0.65		226.1	OK	
8.000	38	-0.355	0.000	0.10		16.2	OK	
8.001	39	-0.310	0.000	0.20		33.2	OK	
8.002	40	-0.279	0.000	0.30		49.0	OK	
8.003	41	-0.256	0.000	0.38		61.5	OK	
8.004	42	-0.354	0.000	0.10		68.6	OK	
8.005	43	0.130	0.000	0.86		70.6	SURCHARGED	
1.014	44	-0.014	0.000	0.63		275.9	OK	
9.000	45	-0.205	0.000	0.02		1.0	OK	
9.001	46	-0.198	0.000	0.03		1.9	OK	
9.002	47	-0.193	0.000	0.05		3.2	OK	
9.003	48	-0.188	0.000	0.06		4.4	OK	
9.004	49	-0.177	0.000	0.10		6.8	OK	
9.005	50	-0.166	0.000	0.15		9.3	OK	
9.006	51	-0.160	0.000	0.18		10.3	OK	
9.007	52	-0.153	0.000	0.22		11.3	OK	
9.008	53	-0.145	0.000	0.27		12.2	OK	
9.009	54	-0.213	0.000	0.17		12.3	OK	
9.010	55	-0.194	0.000	0.26		18.6	OK	
9.011	56	-0.177	0.000	0.34		24.2	OK	
9.012	57	-0.150	0.000	0.49		29.9	OK	
9.013	58	-0.148	0.000	0.51		30.8	OK	
9.014	59	-0.159	0.000	0.45		31.4	OK	
9.015	60	-0.152	0.000	0.48		33.8	OK	
9.016	61	-0.147	0.000	0.51		35.9	OK	
9.017	62	-0.143	0.000	0.53		37.8	OK	
9.018	63	-0.138	0.000	0.56		39.7	OK	
9.019	64	-0.127	0.000	0.63		41.5	OK	
9.020	65	-0.208	0.000	0.20		42.4	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.021	66	-0.222	0.000	0.15		43.4	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
9.022	67	30 Winter	2	+39%					245.273
9.023	68	30 Winter	2	+39%					244.024
9.024	69	30 Winter	2	+39%					242.802
9.025	70	30 Winter	2	+39%					241.982
9.026	71	30 Winter	2	+39%					241.111
10.000	72	30 Winter	2	+39%					239.594
9.027	73	30 Winter	2	+39%					239.094
1.015	74	30 Winter	2	+39%	2/15 Summer				236.642
1.016	75	30 Winter	2	+39%	2/15 Summer				236.580
1.017	76	30 Winter	2	+39%	2/15 Summer				236.520
11.000	77	120 Winter	2	+39%					243.815
11.001	78	15 Winter	2	+39%					242.740
11.002	79	15 Winter	2	+39%					241.697
11.003	80	15 Winter	2	+39%					241.045
1.018	81	30 Winter	2	+39%	2/15 Summer				236.377
1.019	82	30 Winter	2	+39%	2/15 Summer				236.306
1.020	83	30 Winter	2	+39%	2/15 Summer				236.239
1.021	84	30 Winter	2	+39%	2/15 Summer				236.175
1.022	85	30 Winter	2	+39%	2/30 Winter				236.110
1.023	86	30 Winter	2	+39%	200/30 Winter				235.793
1.024	87	30 Winter	2	+39%					235.374
1.025	88	30 Winter	2	+39%					234.143
1.026	89	30 Winter	2	+39%					232.658
1.027	90	30 Winter	2	+39%					225.459
1.028	91	30 Winter	2	+39%					219.858
1.029	92	30 Winter	2	+39%	100/60 Winter				218.056
1.030	93	60 Winter	2	+39%	2/30 Winter				216.307
1.031	94	60 Winter	2	+39%	2/30 Summer				216.152
12.000	95	120 Winter	2	+39%					238.494
12.001	96	15 Winter	2	+39%					234.114
12.002	97	15 Winter	2	+39%					228.498
12.003	98	15 Winter	2	+39%	100/15 Summer				226.027
12.004	99	15 Winter	2	+39%					224.471
1.032	100	60 Winter	2	+39%	2/30 Winter				216.053
1.033	101	60 Winter	2	+39%	2/30 Summer				215.773
13.000	102	120 Winter	2	+39%					239.850
13.001	103	15 Winter	2	+39%					239.687
13.002	104	15 Winter	2	+39%					239.343
13.003	105	15 Winter	2	+39%					235.937
13.004	106	15 Winter	2	+39%					233.448
13.005	107	15 Winter	2	+39%					229.276
13.006	108	15 Winter	2	+39%					227.067
13.007	109	15 Winter	2	+39%					225.550
14.000	110	30 Winter	2	+39%	100/30 Summer				223.083
14.001	111	30 Winter	2	+39%	200/15 Summer				222.728
13.008	112	15 Winter	2	+39%	100/15 Summer				220.812
13.009	113	15 Winter	2	+39%	200/15 Summer				219.947
1.034	114	60 Winter	2	+39%	2/30 Summer				215.656

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.022	67	-0.220	0.000	0.16		44.5	OK	
9.023	68	-0.219	0.000	0.16		45.5	OK	
9.024	69	-0.208	0.000	0.21		46.7	OK	
9.025	70	-0.207	0.000	0.21		47.8	OK	
9.026	71	-0.224	0.000	0.15		48.6	OK	
10.000	72	-0.398	0.000	0.03		9.1	OK	
9.027	73	-0.375	0.000	0.07		63.9	OK	
1.015	74	0.173	0.000	1.34		326.4	SURCHARGED	
1.016	75	0.155	0.000	1.50		324.8	SURCHARGED	
1.017	76	0.124	0.000	1.01		324.1	SURCHARGED	
11.000	77	-0.150	0.000	0.00		0.0	OK	
11.001	78	-0.137	0.000	0.02		0.9	OK	
11.002	79	-0.131	0.000	0.04		1.8	OK	
11.003	80	-0.126	0.000	0.06		2.8	OK	
1.018	81	0.123	0.000	1.48		324.9	SURCHARGED	
1.019	82	0.092	0.000	1.56		325.5	SURCHARGED	
1.020	83	0.062	0.000	1.61		325.5	SURCHARGED	
1.021	84	0.031	0.000	1.45		325.4	SURCHARGED	
1.022	85	0.007	0.000	1.51		325.9	SURCHARGED	
1.023	86	-0.271	0.000	0.58		326.0	OK	
1.024	87	-0.378	0.000	0.29		325.9	OK	
1.025	88	-0.388	0.000	0.27		326.5	OK	
1.026	89	-0.429	0.000	0.18		326.9	OK	
1.027	90	-0.426	0.000	0.19		328.6	OK	
1.028	91	-0.399	0.000	0.25		329.8	OK	
1.029	92	-0.411	0.000	0.22		330.1	OK	
1.030	93	0.107	0.000	0.72		329.9	SURCHARGED	
1.031	94	0.159	0.000	1.13		330.7	SURCHARGED	
12.000	95	-0.300	0.000	0.00		0.0	OK	
12.001	96	-0.276	0.000	0.02		6.5	OK	
12.002	97	-0.240	0.000	0.09		19.5	OK	
12.003	98	-0.176	0.000	0.35		55.0	OK	
12.004	99	-0.225	0.000	0.14		84.5	OK	
1.032	100	0.139	0.000	0.96		353.2	SURCHARGED	
1.033	101	0.158	0.000	1.17		356.3	SURCHARGED	
13.000	102	-0.450	0.000	0.00		0.0	OK	
13.001	103	-0.349	0.000	0.11		18.8	OK	
13.002	104	-0.393	0.000	0.04		32.4	OK	
13.003	105	-0.393	0.000	0.04		34.7	OK	
13.004	106	-0.382	0.000	0.05		36.0	OK	
13.005	107	-0.354	0.000	0.10		70.0	OK	
13.006	108	-0.313	0.000	0.20		89.7	OK	
13.007	109	-0.330	0.000	0.16		143.1	OK	
14.000	110	-0.154	0.000	0.47		32.6	OK	
14.001	111	-0.180	0.000	0.33		62.9	OK	
13.008	112	-0.238	0.000	0.45		228.3	OK	
13.009	113	-0.282	0.000	0.30		227.4	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.034	114	0.144	0.000	1.91		450.9	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.035	115	60 Winter	2	+39%	200/30 Summer				215.079
1.036	116	60 Winter	2	+39%	30/15 Winter				211.396
1.037	117	60 Winter	2	+39%	2/30 Summer				210.427
1.038	118	1440 Winter	2	+39%	30/360 Winter				209.625
1.039	119	1440 Winter	2	+39%	2/360 Winter				209.609

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.035	115	-0.405	0.000	0.23		450.7	OK	
1.036	116	-0.359	0.000	0.34		450.3	OK	
1.037	117	0.427	0.000	1.39		447.0	SURCHARGED	
1.038	118	-0.175	0.000	0.11		34.8	OK	
1.039	119	0.092	0.000	0.10		31.9	SURCHARGED	

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

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 Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Winter	30	+39%	200/30 Winter				238.657
1.001	2	15 Winter	30	+39%	200/30 Summer				238.509
1.002	3	30 Winter	30	+39%	100/30 Winter				238.357
1.003	4	30 Winter	30	+39%	100/30 Summer				238.328
1.004	5	30 Winter	30	+39%	100/15 Winter				238.273
1.005	6	30 Winter	30	+39%	30/30 Winter				238.195
2.000	7	30 Winter	30	+39%	100/30 Winter				238.091
2.001	8	30 Winter	30	+39%	100/30 Winter				238.091
2.002	9	30 Winter	30	+39%	100/30 Summer				238.091
2.003	10	30 Winter	30	+39%	100/30 Summer				238.091
3.000	11	30 Winter	30	+39%	100/30 Winter				238.091
3.001	12	30 Winter	30	+39%	100/30 Winter				238.091
4.000	13	30 Winter	30	+39%	100/30 Winter				238.091
3.002	14	30 Winter	30	+39%	100/30 Summer				238.091
2.004	15	30 Winter	30	+39%	100/15 Winter				238.091
2.005	16	30 Winter	30	+39%	30/30 Winter				238.114
2.006	17	30 Winter	30	+39%	30/30 Winter				238.136
1.006	18	30 Winter	30	+39%	30/30 Summer				238.161

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.493	0.000	0.07		25.5	OK	
1.001	2	-0.446	0.000	0.14		46.5	OK	
1.002	3	-0.400	0.000	0.20		65.7	OK	
1.003	4	-0.231	0.000	0.26		86.1	OK	
1.004	5	-0.099	0.000	0.31		100.7	OK	
1.005	6	0.007	0.000	0.43		142.1	SURCHARGED	
2.000	7	-0.390	0.000	0.00		1.2	OK	
2.001	8	-0.327	0.000	0.03		8.6	OK	
2.002	9	-0.233	0.000	0.14		27.9	OK	
2.003	10	-0.215	0.000	0.09		27.4	OK	
3.000	11	-0.356	0.000	0.00		1.1	OK	
3.001	12	-0.339	0.000	0.03		8.8	OK	
4.000	13	-0.301	0.000	0.00		1.2	OK	
3.002	14	-0.234	0.000	0.10		30.9	OK	
2.004	15	-0.144	0.000	0.26		82.6	OK	
2.005	16	0.006	0.000	0.36		86.8	SURCHARGED	
2.006	17	0.072	0.000	0.32		86.4	SURCHARGED	
1.006	18	0.151	0.000	0.60		199.4	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.007	19	30 Winter	30	+39%	30/15 Summer				238.163
5.000	20	120 Winter	30	+39%					239.275
5.001	21	15 Winter	30	+39%	200/30 Winter				239.110
6.000	22	120 Winter	30	+39%					239.275
5.002	23	15 Winter	30	+39%	200/30 Summer				238.963
5.003	24	15 Winter	30	+39%	200/15 Winter				238.772
1.008	25	30 Winter	30	+39%	30/15 Summer				238.160
1.009	26	30 Winter	30	+39%	30/15 Summer				238.147
1.010	27	30 Winter	30	+39%	30/15 Summer				238.125
1.011	28	30 Winter	30	+39%	30/15 Summer				238.095
1.012	29	30 Winter	30	+39%	30/15 Summer				238.056
7.000	30	30 Winter	30	+39%	200/30 Winter				238.611
7.001	31	15 Winter	30	+39%	200/30 Summer				238.466
7.002	32	15 Winter	30	+39%	100/30 Winter				238.361
7.003	33	30 Winter	30	+39%	100/30 Winter				238.316
7.004	34	30 Winter	30	+39%	100/15 Winter				238.277
7.005	35	30 Winter	30	+39%	30/30 Winter				238.211
7.006	36	30 Winter	30	+39%	30/15 Summer				238.104
1.013	37	30 Winter	30	+39%	30/15 Summer				238.019
8.000	38	30 Winter	30	+39%					239.980
8.001	39	15 Winter	30	+39%					239.797
8.002	40	15 Winter	30	+39%	200/30 Winter				239.594
8.003	41	15 Winter	30	+39%	200/30 Winter				239.367
8.004	42	30 Winter	30	+39%	200/30 Winter				238.954
8.005	43	30 Winter	30	+39%	2/15 Winter				238.049
1.014	44	30 Winter	30	+39%	30/15 Summer				238.002
9.000	45	30 Winter	30	+39%					252.055
9.001	46	15 Winter	30	+39%					251.925
9.002	47	15 Winter	30	+39%					251.745
9.003	48	15 Winter	30	+39%					251.512
9.004	49	15 Winter	30	+39%					250.994
9.005	50	15 Winter	30	+39%					250.481
9.006	51	15 Winter	30	+39%					250.281
9.007	52	15 Winter	30	+39%					250.111
9.008	53	15 Winter	30	+39%					249.975
9.009	54	15 Winter	30	+39%					249.787
9.010	55	15 Winter	30	+39%					249.411
9.011	56	15 Winter	30	+39%	200/15 Summer				249.027
9.012	57	15 Winter	30	+39%	100/15 Summer				248.708
9.013	58	15 Winter	30	+39%	100/15 Summer				248.655
9.014	59	15 Winter	30	+39%	100/15 Winter				248.578
9.015	60	30 Winter	30	+39%	100/15 Winter				248.383
9.016	61	30 Winter	30	+39%	100/15 Winter				248.197
9.017	62	30 Winter	30	+39%	100/15 Winter				248.022
9.018	63	30 Winter	30	+39%	100/15 Winter				247.797
9.019	64	30 Winter	30	+39%	30/30 Winter				247.569
9.020	65	30 Winter	30	+39%					247.283
9.021	66	30 Winter	30	+39%					246.576

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.007	19	0.359	0.000	0.65		216.0	SURCHARGED	
5.000	20	-0.300	0.000	0.00		0.0	OK	
5.001	21	-0.200	0.000	0.24		19.9	OK	
6.000	22	-0.300	0.000	0.00		0.0	OK	
5.002	23	-0.147	0.000	0.50		38.8	OK	
5.003	24	-0.222	0.000	0.15		38.9	OK	
1.008	25	0.556	0.000	0.77		246.8	SURCHARGED	
1.009	26	0.689	0.000	0.82		265.3	SURCHARGED	
1.010	27	0.827	0.000	0.87		282.0	SURCHARGED	
1.011	28	0.957	0.000	0.89		290.5	SURCHARGED	
1.012	29	1.078	0.000	0.97		291.3	SURCHARGED	
7.000	30	-0.539	0.000	0.02		7.8	OK	
7.001	31	-0.491	0.000	0.06		20.6	OK	
7.002	32	-0.403	0.000	0.22		72.2	OK	
7.003	33	-0.255	0.000	0.31		104.0	OK	
7.004	34	-0.101	0.000	0.43		142.1	OK	
7.005	35	0.026	0.000	0.25		174.0	SURCHARGED	
7.006	36	0.754	0.000	0.25		171.8	SURCHARGED	
1.013	37	1.131	0.000	0.84		293.0	SURCHARGED	
8.000	38	-0.320	0.000	0.18		30.0	OK	
8.001	39	-0.244	0.000	0.39		63.7	OK	
8.002	40	-0.190	0.000	0.58		94.7	OK	
8.003	41	-0.160	0.000	0.70		114.1	OK	
8.004	42	-0.316	0.000	0.19		127.9	OK	
8.005	43	1.374	0.000	1.54		126.2	SURCHARGED	
1.014	44	1.208	0.000	0.80		353.7	SURCHARGED	
9.000	45	-0.198	0.000	0.03		1.8	OK	
9.001	46	-0.185	0.000	0.07		4.0	OK	
9.002	47	-0.175	0.000	0.11		7.0	OK	
9.003	48	-0.169	0.000	0.14		9.6	OK	
9.004	49	-0.153	0.000	0.22		15.3	OK	
9.005	50	-0.133	0.000	0.35		21.0	OK	
9.006	51	-0.123	0.000	0.41		23.1	OK	
9.007	52	-0.111	0.000	0.49		25.2	OK	
9.008	53	-0.096	0.000	0.61		27.7	OK	
9.009	54	-0.165	0.000	0.38		27.2	OK	
9.010	55	-0.132	0.000	0.54		39.1	OK	
9.011	56	-0.107	0.000	0.69		49.8	OK	
9.012	57	-0.061	0.000	0.97		58.8	OK	
9.013	58	-0.059	0.000	1.00		60.3	OK	
9.014	59	-0.081	0.000	0.87		60.8	OK	
9.015	60	-0.071	0.000	0.93		64.9	OK	
9.016	61	-0.052	0.000	0.97		67.6	OK	
9.017	62	-0.022	0.000	0.96		67.9	OK	
9.018	63	-0.001	0.000	0.99		69.7	OK	
9.019	64	0.003	0.000	1.08		71.7	SURCHARGED	
9.020	65	-0.178	0.000	0.35		72.8	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.021	66	-0.196	0.000	0.26		74.1	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
9.022	67	30 Winter	30	+39%					245.299
9.023	68	30 Winter	30	+39%					244.052
9.024	69	30 Winter	30	+39%					242.835
9.025	70	30 Winter	30	+39%					242.016
9.026	71	30 Winter	30	+39%					241.140
10.000	72	30 Winter	30	+39%					239.612
9.027	73	30 Winter	30	+39%					239.123
1.015	74	30 Winter	30	+39%	2/15 Summer				237.805
1.016	75	30 Winter	30	+39%	2/15 Summer				237.597
1.017	76	30 Winter	30	+39%	2/15 Summer				237.390
11.000	77	120 Winter	30	+39%					243.815
11.001	78	15 Winter	30	+39%					242.747
11.002	79	15 Summer	30	+39%					241.708
11.003	80	15 Summer	30	+39%					241.058
1.018	81	30 Winter	30	+39%	2/15 Summer				237.106
1.019	82	30 Winter	30	+39%	2/15 Summer				236.894
1.020	83	30 Winter	30	+39%	2/15 Summer				236.680
1.021	84	30 Winter	30	+39%	2/15 Summer				236.465
1.022	85	30 Winter	30	+39%	2/30 Winter				236.249
1.023	86	30 Winter	30	+39%	200/30 Winter				235.883
1.024	87	30 Winter	30	+39%					235.423
1.025	88	30 Winter	30	+39%					234.189
1.026	89	30 Winter	30	+39%					232.693
1.027	90	30 Winter	30	+39%					225.494
1.028	91	30 Winter	30	+39%					219.902
1.029	92	30 Winter	30	+39%	100/60 Winter				218.096
1.030	93	60 Winter	30	+39%	2/30 Winter				217.327
1.031	94	60 Winter	30	+39%	2/30 Summer				217.113
12.000	95	120 Winter	30	+39%					238.494
12.001	96	15 Winter	30	+39%					234.127
12.002	97	15 Winter	30	+39%					228.528
12.003	98	15 Winter	30	+39%	100/15 Summer				226.112
12.004	99	15 Winter	30	+39%					224.513
1.032	100	60 Winter	30	+39%	2/30 Winter				216.902
1.033	101	60 Winter	30	+39%	2/30 Summer				216.289
13.000	102	120 Winter	30	+39%					239.850
13.001	103	15 Winter	30	+39%					239.742
13.002	104	15 Winter	30	+39%					239.377
13.003	105	15 Winter	30	+39%					235.970
13.004	106	15 Winter	30	+39%					233.485
13.005	107	15 Winter	30	+39%					229.328
13.006	108	15 Winter	30	+39%					227.145
13.007	109	15 Winter	30	+39%					225.618
14.000	110	30 Winter	30	+39%	100/30 Summer				223.157
14.001	111	15 Winter	30	+39%	200/15 Summer				222.790
13.008	112	15 Winter	30	+39%	100/15 Summer				220.973
13.009	113	15 Winter	30	+39%	200/15 Summer				220.048
1.034	114	60 Winter	30	+39%	2/30 Summer				216.049

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.022	67	-0.194	0.000	0.27		75.9	OK	
9.023	68	-0.191	0.000	0.28		79.1	OK	
9.024	69	-0.175	0.000	0.36		82.5	OK	
9.025	70	-0.173	0.000	0.38		85.4	OK	
9.026	71	-0.195	0.000	0.26		87.4	OK	
10.000	72	-0.380	0.000	0.06		16.8	OK	
9.027	73	-0.346	0.000	0.12		117.6	OK	
1.015	74	1.336	0.000	1.92		468.2	SURCHARGED	
1.016	75	1.172	0.000	2.15		465.6	SURCHARGED	
1.017	76	0.994	0.000	1.44		461.0	SURCHARGED	
11.000	77	-0.150	0.000	0.00		0.0	OK	
11.001	78	-0.130	0.000	0.04		2.0	OK	
11.002	79	-0.120	0.000	0.09		4.1	OK	
11.003	80	-0.113	0.000	0.14		6.5	OK	
1.018	81	0.852	0.000	2.12		464.7	SURCHARGED	
1.019	82	0.680	0.000	2.23		464.3	SURCHARGED	
1.020	83	0.503	0.000	2.30		464.1	SURCHARGED	
1.021	84	0.321	0.000	2.08		464.6	SURCHARGED	
1.022	85	0.146	0.000	2.15		464.3	SURCHARGED	
1.023	86	-0.181	0.000	0.83		465.0	OK	
1.024	87	-0.329	0.000	0.42		465.9	OK	
1.025	88	-0.342	0.000	0.39		466.5	OK	
1.026	89	-0.394	0.000	0.26		466.9	OK	
1.027	90	-0.391	0.000	0.26		469.3	OK	
1.028	91	-0.355	0.000	0.35		470.9	OK	
1.029	92	-0.371	0.000	0.31		471.4	OK	
1.030	93	1.127	0.000	1.02		463.7	SURCHARGED	
1.031	94	1.120	0.000	1.59		465.8	SURCHARGED	
12.000	95	-0.300	0.000	0.00		0.0	OK	
12.001	96	-0.263	0.000	0.04		14.9	OK	
12.002	97	-0.210	0.000	0.20		45.2	OK	
12.003	98	-0.091	0.000	0.81		125.9	OK	
12.004	99	-0.183	0.000	0.32		194.2	OK	
1.032	100	0.988	0.000	1.43		522.8	SURCHARGED	
1.033	101	0.674	0.000	1.73		527.7	SURCHARGED	
13.000	102	-0.450	0.000	0.00		0.0	OK	
13.001	103	-0.294	0.000	0.24		41.7	OK	
13.002	104	-0.359	0.000	0.09		71.2	OK	
13.003	105	-0.360	0.000	0.09		76.7	OK	
13.004	106	-0.345	0.000	0.12		80.2	OK	
13.005	107	-0.302	0.000	0.23		156.1	OK	
13.006	108	-0.235	0.000	0.44		198.6	OK	
13.007	109	-0.262	0.000	0.36		322.0	OK	
14.000	110	-0.080	0.000	0.88		60.2	OK	
14.001	111	-0.118	0.000	0.65		123.6	OK	
13.008	112	-0.077	0.000	0.98		499.6	OK	
13.009	113	-0.181	0.000	0.65		500.9	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.034	114	0.537	0.000	3.27		773.0	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.035	115	60 Winter	30	+39%	200/30 Summer				215.147
1.036	116	60 Winter	30	+39%	30/15 Winter				212.337
1.037	117	60 Winter	30	+39%	2/30 Summer				211.743
1.038	118	1440 Winter	30	+39%	30/360 Winter				209.952
1.039	119	1440 Winter	30	+39%	2/360 Winter				209.952

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.035	115	-0.337	0.000	0.40		773.0	OK	
1.036	116	0.582	0.000	0.58		771.9	SURCHARGED	
1.037	117	1.743	0.000	2.39		768.0	SURCHARGED	
1.038	118	0.152	0.000	0.12		38.2	SURCHARGED	
1.039	119	0.435	0.000	0.10		34.1	SURCHARGED	

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

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 Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Winter	100	+39%	200/30 Winter				238.915
1.001	2	30 Winter	100	+39%	200/30 Summer				238.868
1.002	3	30 Winter	100	+39%	100/30 Winter				238.801
1.003	4	30 Winter	100	+39%	100/30 Summer				238.803
1.004	5	30 Winter	100	+39%	100/15 Winter				238.803
1.005	6	30 Winter	100	+39%	30/30 Winter				238.801
2.000	7	30 Winter	100	+39%	100/30 Winter				238.748
2.001	8	30 Winter	100	+39%	100/30 Winter				238.746
2.002	9	30 Winter	100	+39%	100/30 Summer				238.745
2.003	10	30 Winter	100	+39%	100/30 Summer				238.743
3.000	11	30 Winter	100	+39%	100/30 Winter				238.746
3.001	12	30 Winter	100	+39%	100/30 Winter				238.746
4.000	13	30 Winter	100	+39%	100/30 Winter				238.745
3.002	14	30 Winter	100	+39%	100/30 Summer				238.743
2.004	15	30 Winter	100	+39%	100/15 Winter				238.741
2.005	16	30 Winter	100	+39%	30/30 Winter				238.747
2.006	17	30 Winter	100	+39%	30/30 Winter				238.765
1.006	18	30 Winter	100	+39%	30/30 Summer				238.791

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.235	0.000	0.09		31.5	OK	
1.001	2	-0.087	0.000	0.18		59.2	OK	
1.002	3	0.044	0.000	0.32		107.1	SURCHARGED	
1.003	4	0.244	0.000	0.39		127.9	SURCHARGED	
1.004	5	0.431	0.000	0.41		135.7	SURCHARGED	
1.005	6	0.613	0.000	0.46		152.3	SURCHARGED	
2.000	7	0.267	0.000	0.01		3.4	SURCHARGED	
2.001	8	0.328	0.000	0.04		12.1	SURCHARGED	
2.002	9	0.421	0.000	0.13		26.9	SURCHARGED	
2.003	10	0.437	0.000	0.10		30.2	SURCHARGED	
3.000	11	0.299	0.000	0.01		3.2	SURCHARGED	
3.001	12	0.316	0.000	0.04		11.4	SURCHARGED	
4.000	13	0.353	0.000	0.01		3.2	SURCHARGED	
3.002	14	0.418	0.000	0.10		30.8	SURCHARGED	
2.004	15	0.506	0.000	0.27		84.0	SURCHARGED	
2.005	16	0.639	0.000	0.40		97.3	SURCHARGED	
2.006	17	0.701	0.000	0.37		100.1	SURCHARGED	
1.006	18	0.781	0.000	0.71		235.3	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.007	19	30 Winter	100	+39%	30/15 Summer				238.877
5.000	20	120 Winter	100	+39%					239.275
5.001	21	15 Winter	100	+39%	200/30 Winter				239.125
6.000	22	120 Winter	100	+39%					239.275
5.002	23	15 Winter	100	+39%	200/30 Summer				238.989
5.003	24	30 Winter	100	+39%	200/15 Winter				238.969
1.008	25	30 Winter	100	+39%	30/15 Summer				238.951
1.009	26	30 Winter	100	+39%	30/15 Summer				238.965
1.010	27	30 Winter	100	+39%	30/15 Summer				238.956
1.011	28	30 Winter	100	+39%	30/15 Summer				238.931
1.012	29	30 Winter	100	+39%	30/15 Summer				238.889
7.000	30	30 Winter	100	+39%	200/30 Winter				238.808
7.001	31	30 Winter	100	+39%	200/30 Summer				238.803
7.002	32	30 Winter	100	+39%	100/30 Winter				238.812
7.003	33	30 Winter	100	+39%	100/30 Winter				238.836
7.004	34	30 Winter	100	+39%	100/15 Winter				238.856
7.005	35	30 Winter	100	+39%	30/30 Winter				238.860
7.006	36	30 Winter	100	+39%	30/15 Summer				238.852
1.013	37	30 Winter	100	+39%	30/15 Summer				238.846
8.000	38	30 Winter	100	+39%					239.999
8.001	39	15 Winter	100	+39%					239.829
8.002	40	15 Winter	100	+39%	200/30 Winter				239.642
8.003	41	30 Winter	100	+39%	200/30 Winter				239.422
8.004	42	30 Winter	100	+39%	200/30 Winter				239.028
8.005	43	30 Winter	100	+39%	2/15 Winter				238.889
1.014	44	30 Winter	100	+39%	30/15 Summer				238.824
9.000	45	30 Winter	100	+39%					252.058
9.001	46	15 Winter	100	+39%					251.931
9.002	47	15 Winter	100	+39%					251.752
9.003	48	15 Winter	100	+39%					251.521
9.004	49	15 Winter	100	+39%					251.005
9.005	50	15 Winter	100	+39%					250.496
9.006	51	15 Winter	100	+39%					250.298
9.007	52	15 Winter	100	+39%					250.131
9.008	53	15 Winter	100	+39%					250.000
9.009	54	15 Winter	100	+39%					249.809
9.010	55	15 Winter	100	+39%					249.442
9.011	56	15 Winter	100	+39%	200/15 Summer				249.095
9.012	57	30 Winter	100	+39%	100/15 Summer				248.881
9.013	58	30 Winter	100	+39%	100/15 Summer				248.801
9.014	59	30 Winter	100	+39%	100/15 Winter				248.719
9.015	60	30 Winter	100	+39%	100/15 Winter				248.548
9.016	61	30 Winter	100	+39%	100/15 Winter				248.358
9.017	62	30 Winter	100	+39%	100/15 Winter				248.147
9.018	63	30 Winter	100	+39%	100/15 Winter				247.876
9.019	64	30 Winter	100	+39%	30/30 Winter				247.600
9.020	65	30 Winter	100	+39%					247.292
9.021	66	30 Winter	100	+39%					246.585

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.007	19	1.073	0.000	0.77		254.3	SURCHARGED	
5.000	20	-0.300	0.000	0.00		0.0	OK	
5.001	21	-0.185	0.000	0.31		25.6	OK	
6.000	22	-0.300	0.000	0.00		0.0	OK	
5.002	23	-0.121	0.000	0.65		50.0	OK	
5.003	24	-0.025	0.000	0.16		41.5	OK	
1.008	25	1.347	0.000	0.84		271.4	SURCHARGED	
1.009	26	1.507	0.000	0.85		275.3	SURCHARGED	
1.010	27	1.658	0.000	0.87		281.8	SURCHARGED	
1.011	28	1.793	0.000	0.88		285.6	SURCHARGED	
1.012	29	1.911	0.000	0.96		289.8	SURCHARGED	
7.000	30	-0.342	0.000	0.03		9.9	OK	
7.001	31	-0.154	0.000	0.08		25.3	OK	
7.002	32	0.048	0.000	0.25		84.1	SURCHARGED	
7.003	33	0.265	0.000	0.40		131.1	SURCHARGED	
7.004	34	0.478	0.000	0.50		165.4	SURCHARGED	
7.005	35	0.675	0.000	0.28		193.1	SURCHARGED	
7.006	36	1.502	0.000	0.27		185.9	SURCHARGED	
1.013	37	1.958	0.000	0.97		336.8	SURCHARGED	
8.000	38	-0.301	0.000	0.24		39.1	OK	
8.001	39	-0.212	0.000	0.50		81.9	OK	
8.002	40	-0.142	0.000	0.75		121.5	OK	
8.003	41	-0.105	0.000	0.92		149.2	OK	
8.004	42	-0.242	0.000	0.25		164.6	OK	
8.005	43	2.214	0.000	2.17		177.9	SURCHARGED	
1.014	44	2.030	0.000	0.96		423.5	SURCHARGED	
9.000	45	-0.195	0.000	0.04		2.4	OK	
9.001	46	-0.179	0.000	0.09		5.2	OK	
9.002	47	-0.168	0.000	0.14		9.1	OK	
9.003	48	-0.160	0.000	0.18		12.5	OK	
9.004	49	-0.142	0.000	0.29		19.9	OK	
9.005	50	-0.118	0.000	0.45		27.2	OK	
9.006	51	-0.106	0.000	0.54		29.9	OK	
9.007	52	-0.091	0.000	0.64		32.7	OK	
9.008	53	-0.071	0.000	0.80		35.9	OK	
9.009	54	-0.143	0.000	0.49		35.3	OK	
9.010	55	-0.101	0.000	0.70		50.5	OK	
9.011	56	-0.039	0.000	0.85		61.0	OK	
9.012	57	0.112	0.000	1.17		70.7	SURCHARGED	
9.013	58	0.087	0.000	1.19		71.8	SURCHARGED	
9.014	59	0.060	0.000	1.00		69.9	SURCHARGED	
9.015	60	0.094	0.000	0.99		69.1	SURCHARGED	
9.016	61	0.109	0.000	1.02		71.1	SURCHARGED	
9.017	62	0.103	0.000	1.04		73.8	SURCHARGED	
9.018	63	0.078	0.000	1.09		76.9	SURCHARGED	
9.019	64	0.034	0.000	1.21		80.1	SURCHARGED	
9.020	65	-0.169	0.000	0.40		82.7	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.021	66	-0.187	0.000	0.30		85.8	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
9.022	67	30 Winter	100	+39%					245.310
9.023	68	30 Winter	100	+39%					244.063
9.024	69	30 Winter	100	+39%					242.848
9.025	70	30 Winter	100	+39%					242.030
9.026	71	30 Summer	100	+39%					241.151
10.000	72	30 Winter	100	+39%					239.624
9.027	73	30 Summer	100	+39%					239.136
1.015	74	30 Winter	100	+39%	2/15 Summer				238.552
1.016	75	30 Winter	100	+39%	2/15 Summer				238.269
1.017	76	30 Winter	100	+39%	2/15 Summer				237.979
11.000	77	120 Winter	100	+39%					243.815
11.001	78	15 Winter	100	+39%					242.750
11.002	79	15 Summer	100	+39%					241.712
11.003	80	15 Summer	100	+39%					241.064
1.018	81	30 Winter	100	+39%	2/15 Summer				237.565
1.019	82	30 Winter	100	+39%	2/15 Summer				237.264
1.020	83	30 Winter	100	+39%	2/15 Summer				236.962
1.021	84	30 Winter	100	+39%	2/15 Summer				236.654
1.022	85	30 Winter	100	+39%	2/30 Winter				236.344
1.023	86	30 Winter	100	+39%	200/30 Winter				235.942
1.024	87	30 Winter	100	+39%					235.454
1.025	88	30 Winter	100	+39%					234.218
1.026	89	30 Winter	100	+39%					232.715
1.027	90	30 Winter	100	+39%					225.517
1.028	91	30 Winter	100	+39%					219.928
1.029	92	60 Winter	100	+39%	100/60 Winter				218.687
1.030	93	60 Winter	100	+39%	2/30 Winter				218.170
1.031	94	60 Winter	100	+39%	2/30 Summer				217.876
12.000	95	120 Winter	100	+39%					238.494
12.001	96	15 Winter	100	+39%					234.132
12.002	97	15 Winter	100	+39%					228.541
12.003	98	15 Winter	100	+39%	100/15 Summer				226.292
12.004	99	15 Winter	100	+39%					224.529
1.032	100	60 Winter	100	+39%	2/30 Winter				217.587
1.033	101	60 Winter	100	+39%	2/30 Summer				216.740
13.000	102	120 Winter	100	+39%					239.850
13.001	103	15 Winter	100	+39%					239.767
13.002	104	15 Winter	100	+39%					239.387
13.003	105	15 Winter	100	+39%					235.981
13.004	106	15 Winter	100	+39%					233.500
13.005	107	15 Winter	100	+39%					229.350
13.006	108	15 Winter	100	+39%					227.181
13.007	109	15 Winter	100	+39%					225.648
14.000	110	30 Winter	100	+39%	100/30 Summer				223.328
14.001	111	15 Winter	100	+39%	200/15 Summer				222.836
13.008	112	15 Winter	100	+39%	100/15 Summer				221.559
13.009	113	15 Winter	100	+39%	200/15 Summer				220.097
1.034	114	30 Summer	100	+39%	2/30 Summer				216.463

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.022	67	-0.183	0.000	0.32		89.5	OK	
9.023	68	-0.180	0.000	0.34		93.6	OK	
9.024	69	-0.162	0.000	0.43		97.9	OK	
9.025	70	-0.159	0.000	0.45		101.6	OK	
9.026	71	-0.184	0.000	0.32		104.5	OK	
10.000	72	-0.368	0.000	0.08		21.9	OK	
9.027	73	-0.333	0.000	0.15		147.1	OK	
1.015	74	2.083	0.000	2.31		563.0	SURCHARGED	
1.016	75	1.844	0.000	2.59		559.5	SURCHARGED	
1.017	76	1.583	0.000	1.73		554.0	SURCHARGED	
11.000	77	-0.150	0.000	0.00		0.0	OK	
11.001	78	-0.127	0.000	0.05		2.6	OK	
11.002	79	-0.116	0.000	0.12		5.3	OK	
11.003	80	-0.107	0.000	0.18		8.4	OK	
1.018	81	1.311	0.000	2.54		555.9	SURCHARGED	
1.019	82	1.050	0.000	2.68		557.0	SURCHARGED	
1.020	83	0.785	0.000	2.76		556.1	SURCHARGED	
1.021	84	0.510	0.000	2.48		555.8	SURCHARGED	
1.022	85	0.241	0.000	2.58		556.8	SURCHARGED	
1.023	86	-0.122	0.000	0.99		556.9	OK	
1.024	87	-0.298	0.000	0.50		556.5	OK	
1.025	88	-0.313	0.000	0.46		557.7	OK	
1.026	89	-0.372	0.000	0.31		559.1	OK	
1.027	90	-0.368	0.000	0.32		562.9	OK	
1.028	91	-0.329	0.000	0.42		565.6	OK	
1.029	92	0.220	0.000	0.36		543.3	SURCHARGED	
1.030	93	1.970	0.000	1.20		547.1	SURCHARGED	
1.031	94	1.883	0.000	1.88		550.5	SURCHARGED	
12.000	95	-0.300	0.000	0.00		0.0	OK	
12.001	96	-0.258	0.000	0.05		19.3	OK	
12.002	97	-0.197	0.000	0.26		58.4	OK	
12.003	98	0.089	0.000	1.02		158.2	SURCHARGED	
12.004	99	-0.167	0.000	0.40		243.8	OK	
1.032	100	1.673	0.000	1.71		625.3	SURCHARGED	
1.033	101	1.125	0.000	2.07		631.5	SURCHARGED	
13.000	102	-0.450	0.000	0.00		0.0	OK	
13.001	103	-0.269	0.000	0.31		53.9	OK	
13.002	104	-0.349	0.000	0.11		92.1	OK	
13.003	105	-0.349	0.000	0.11		99.1	OK	
13.004	106	-0.330	0.000	0.16		103.6	OK	
13.005	107	-0.280	0.000	0.30		202.1	OK	
13.006	108	-0.199	0.000	0.57		257.1	OK	
13.007	109	-0.232	0.000	0.46		416.3	OK	
14.000	110	0.091	0.000	1.14		78.0	SURCHARGED	
14.001	111	-0.072	0.000	0.84		158.4	OK	
13.008	112	0.509	0.000	1.27		646.8	SURCHARGED	
13.009	113	-0.132	0.000	0.84		647.3	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.034	114	0.951	0.000	4.20		994.3	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.035	115	30 Summer	100	+39%	200/30 Summer				215.192
1.036	116	30 Summer	100	+39%	30/15 Winter				213.984
1.037	117	30 Summer	100	+39%	2/30 Summer				213.026
1.038	118	1440 Winter	100	+39%	30/360 Winter				210.173
1.039	119	1440 Winter	100	+39%	2/360 Winter				210.172

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.035	115	-0.292	0.000	0.52		997.9	OK	
1.036	116	2.229	0.000	0.74		982.6	SURCHARGED	
1.037	117	3.026	0.000	3.03		973.1	SURCHARGED	
1.038	118	0.373	0.000	0.13		43.8	SURCHARGED	
1.039	119	0.655	0.000	0.10		34.1	SURCHARGED	

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Main Site

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 Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	60 Winter	200	+39%	200/30 Winter				239.459
1.001	2	60 Winter	200	+39%	200/30 Summer				239.451
1.002	3	60 Winter	200	+39%	100/30 Winter				239.440
1.003	4	60 Winter	200	+39%	100/30 Summer				239.425
1.004	5	60 Winter	200	+39%	100/15 Winter				239.407
1.005	6	60 Winter	200	+39%	30/30 Winter				239.385
2.000	7	60 Winter	200	+39%	100/30 Winter				239.363
2.001	8	60 Winter	200	+39%	100/30 Winter				239.363
2.002	9	60 Winter	200	+39%	100/30 Summer				239.363
2.003	10	60 Winter	200	+39%	100/30 Summer				239.362
3.000	11	60 Winter	200	+39%	100/30 Winter				239.363
3.001	12	60 Winter	200	+39%	100/30 Winter				239.363
4.000	13	60 Winter	200	+39%	100/30 Winter				239.362
3.002	14	60 Winter	200	+39%	100/30 Summer				239.362
2.004	15	60 Winter	200	+39%	100/15 Winter				239.361
2.005	16	60 Winter	200	+39%	30/30 Winter				239.359
2.006	17	60 Winter	200	+39%	30/30 Winter				239.357
1.006	18	60 Winter	200	+39%	30/30 Summer				239.355

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Main Site

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.309	0.000	0.09		32.4	SURCHARGED	
1.001	2	0.496	0.000	0.16		52.4	SURCHARGED	
1.002	3	0.683	0.000	0.33		107.9	SURCHARGED	
1.003	4	0.866	0.000	0.39		130.1	SURCHARGED	
1.004	5	1.035	0.000	0.44		143.8	SURCHARGED	
1.005	6	1.197	0.000	0.48		156.5	SURCHARGED	
2.000	7	0.882	0.000	0.01		2.5	SURCHARGED	
2.001	8	0.945	0.000	0.06		18.8	SURCHARGED	
2.002	9	1.039	0.000	0.21		43.9	SURCHARGED	
2.003	10	1.056	0.000	0.17		49.4	SURCHARGED	
3.000	11	0.916	0.000	0.01		2.2	SURCHARGED	
3.001	12	0.933	0.000	0.03		9.0	SURCHARGED	
4.000	13	0.970	0.000	0.01		2.4	SURCHARGED	
3.002	14	1.037	0.000	0.14		41.9	SURCHARGED	
2.004	15	1.126	0.000	0.36		113.4	SURCHARGED	
2.005	16	1.251	0.000	0.45		109.3	SURCHARGED	
2.006	17	1.293	0.000	0.40		108.1	SURCHARGED	
1.006	18	1.345	0.000	0.71		236.6	SURCHARGED	

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200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Main Site

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.007	19	60 Winter	200	+39%	30/15 Summer				239.318
5.000	20	30 Winter	200	+39%					239.352
5.001	21	30 Winter	200	+39%	200/30 Winter				239.360
6.000	22	30 Winter	200	+39%					239.340
5.002	23	30 Winter	200	+39%	200/30 Summer				239.345
5.003	24	30 Winter	200	+39%	200/15 Winter				239.326
1.008	25	30 Winter	200	+39%	30/15 Summer				239.327
1.009	26	30 Winter	200	+39%	30/15 Summer				239.327
1.010	27	30 Winter	200	+39%	30/15 Summer				239.309
1.011	28	30 Winter	200	+39%	30/15 Summer				239.281
1.012	29	30 Winter	200	+39%	30/15 Summer				239.230
7.000	30	60 Winter	200	+39%	200/30 Winter				239.535
7.001	31	60 Winter	200	+39%	200/30 Summer				239.532
7.002	32	60 Winter	200	+39%	100/30 Winter				239.528
7.003	33	60 Winter	200	+39%	100/30 Winter				239.519
7.004	34	60 Winter	200	+39%	100/15 Winter				239.504
7.005	35	60 Winter	200	+39%	30/30 Winter				239.483
7.006	36	30 Winter	200	+39%	30/15 Summer				239.340
1.013	37	30 Winter	200	+39%	30/15 Summer				239.173
8.000	38	30 Winter	200	+39%					240.011
8.001	39	30 Winter	200	+39%					239.871
8.002	40	30 Winter	200	+39%	200/30 Winter				239.820
8.003	41	30 Winter	200	+39%	200/30 Winter				239.779
8.004	42	30 Winter	200	+39%	200/30 Winter				239.712
8.005	43	30 Winter	200	+39%	2/15 Winter				239.176
1.014	44	30 Winter	200	+39%	30/15 Summer				239.137
9.000	45	30 Winter	200	+39%					252.061
9.001	46	15 Winter	200	+39%					251.935
9.002	47	15 Winter	200	+39%					251.756
9.003	48	15 Winter	200	+39%					251.526
9.004	49	15 Winter	200	+39%					251.012
9.005	50	15 Winter	200	+39%					250.506
9.006	51	15 Winter	200	+39%					250.309
9.007	52	15 Winter	200	+39%					250.145
9.008	53	15 Winter	200	+39%					250.018
9.009	54	15 Winter	200	+39%					249.825
9.010	55	15 Winter	200	+39%					249.464
9.011	56	30 Winter	200	+39%	200/15 Summer				249.301
9.012	57	30 Winter	200	+39%	100/15 Summer				249.095
9.013	58	30 Winter	200	+39%	100/15 Summer				249.016
9.014	59	30 Winter	200	+39%	100/15 Winter				248.935
9.015	60	30 Winter	200	+39%	100/15 Winter				248.748
9.016	61	30 Winter	200	+39%	100/15 Winter				248.535
9.017	62	30 Winter	200	+39%	100/15 Winter				248.295
9.018	63	30 Winter	200	+39%	100/15 Winter				247.974
9.019	64	30 Winter	200	+39%	30/30 Winter				247.635
9.020	65	30 Winter	200	+39%					247.300
9.021	66	30 Winter	200	+39%					246.591

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Main Site

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.007	19	1.514	0.000	0.72		240.0	SURCHARGED	
5.000	20	-0.223	0.000	0.00		0.4	OK	
5.001	21	0.050	0.000	0.29		24.2	SURCHARGED	
6.000	22	-0.235	0.000	0.00		0.3	OK	
5.002	23	0.235	0.000	0.62		48.3	SURCHARGED	
5.003	24	0.332	0.000	0.18		48.3	SURCHARGED	
1.008	25	1.723	0.000	0.81		261.2	SURCHARGED	
1.009	26	1.869	0.000	0.81		263.3	SURCHARGED	
1.010	27	2.011	0.000	0.84		274.0	SURCHARGED	
1.011	28	2.143	0.000	0.86		280.0	SURCHARGED	
1.012	29	2.252	0.000	0.96		288.8	SURCHARGED	
7.000	30	0.385	0.000	0.03		9.4	SURCHARGED	
7.001	31	0.575	0.000	0.13		43.9	SURCHARGED	
7.002	32	0.764	0.000	0.34		111.6	SURCHARGED	
7.003	33	0.948	0.000	0.38		126.1	SURCHARGED	
7.004	34	1.126	0.000	0.45		147.4	SURCHARGED	
7.005	35	1.298	0.000	0.31		216.6	SURCHARGED	
7.006	36	1.990	0.000	0.34		228.8	SURCHARGED	
1.013	37	2.285	0.000	1.01		350.3	SURCHARGED	
8.000	38	-0.289	0.000	0.28		45.6	OK	
8.001	39	-0.170	0.000	0.58		94.0	OK	
8.002	40	0.036	0.000	0.83		135.7	SURCHARGED	
8.003	41	0.252	0.000	0.98		159.3	SURCHARGED	
8.004	42	0.442	0.000	0.33		217.1	SURCHARGED	
8.005	43	2.501	0.000	2.66		218.0	SURCHARGED	
1.014	44	2.343	0.000	1.00		441.3	SURCHARGED	
9.000	45	-0.192	0.000	0.05		2.8	OK	
9.001	46	-0.175	0.000	0.11		6.0	OK	
9.002	47	-0.164	0.000	0.16		10.5	OK	
9.003	48	-0.155	0.000	0.21		14.5	OK	
9.004	49	-0.135	0.000	0.34		23.1	OK	
9.005	50	-0.108	0.000	0.53		31.6	OK	
9.006	51	-0.095	0.000	0.62		34.8	OK	
9.007	52	-0.077	0.000	0.75		38.0	OK	
9.008	53	-0.053	0.000	0.92		41.7	OK	
9.009	54	-0.127	0.000	0.57		40.9	OK	
9.010	55	-0.079	0.000	0.81		58.3	OK	
9.011	56	0.167	0.000	0.86		61.8	SURCHARGED	
9.012	57	0.326	0.000	1.15		69.7	SURCHARGED	
9.013	58	0.302	0.000	1.19		72.0	SURCHARGED	
9.014	59	0.276	0.000	1.01		70.4	SURCHARGED	
9.015	60	0.294	0.000	1.02		71.3	SURCHARGED	
9.016	61	0.286	0.000	1.09		76.0	SURCHARGED	
9.017	62	0.251	0.000	1.14		80.3	SURCHARGED	
9.018	63	0.176	0.000	1.20		84.7	SURCHARGED	
9.019	64	0.069	0.000	1.34		88.7	SURCHARGED	
9.020	65	-0.161	0.000	0.44		90.7	OK	

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Main Site

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.021	66	-0.181	0.000	0.33		93.5	OK	

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200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Main Site

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
9.022	67	30 Winter	200	+39%					245.316
9.023	68	30 Winter	200	+39%					244.070
9.024	69	30 Winter	200	+39%					242.858
9.025	70	30 Winter	200	+39%					242.041
9.026	71	30 Summer	200	+39%					241.159
10.000	72	30 Winter	200	+39%					239.632
9.027	73	30 Summer	200	+39%					239.146
1.015	74	30 Winter	200	+39%	2/15 Summer				238.876
1.016	75	30 Winter	200	+39%	2/15 Summer				238.551
1.017	76	30 Winter	200	+39%	2/15 Summer				238.236
11.000	77	120 Winter	200	+39%					243.815
11.001	78	15 Winter	200	+39%					242.751
11.002	79	15 Summer	200	+39%					241.714
11.003	80	15 Summer	200	+39%					241.067
1.018	81	30 Winter	200	+39%	2/15 Summer				237.789
1.019	82	30 Winter	200	+39%	2/15 Summer				237.460
1.020	83	30 Winter	200	+39%	2/15 Summer				237.124
1.021	84	30 Winter	200	+39%	2/15 Summer				236.781
1.022	85	30 Winter	200	+39%	2/30 Winter				236.433
1.023	86	30 Winter	200	+39%	200/30 Winter				236.081
1.024	87	30 Winter	200	+39%					235.467
1.025	88	30 Winter	200	+39%					234.229
1.026	89	30 Winter	200	+39%					232.724
1.027	90	30 Winter	200	+39%					225.526
1.028	91	30 Winter	200	+39%					220.083
1.029	92	30 Winter	200	+39%	100/60 Winter				219.761
1.030	93	30 Winter	200	+39%	2/30 Winter				219.231
1.031	94	30 Winter	200	+39%	2/30 Summer				218.933
12.000	95	120 Winter	200	+39%					238.494
12.001	96	15 Winter	200	+39%					234.136
12.002	97	15 Winter	200	+39%					228.550
12.003	98	15 Winter	200	+39%	100/15 Summer				226.657
12.004	99	15 Winter	200	+39%					224.538
1.032	100	30 Winter	200	+39%	2/30 Winter				218.648
1.033	101	30 Winter	200	+39%	2/30 Summer				217.756
13.000	102	120 Winter	200	+39%					239.850
13.001	103	15 Winter	200	+39%					239.782
13.002	104	15 Winter	200	+39%					239.395
13.003	105	15 Winter	200	+39%					235.989
13.004	106	15 Winter	200	+39%					233.511
13.005	107	15 Winter	200	+39%					229.364
13.006	108	15 Winter	200	+39%					227.206
13.007	109	15 Winter	200	+39%					225.669
14.000	110	30 Winter	200	+39%	100/30 Summer				223.481
14.001	111	15 Winter	200	+39%	200/15 Summer				223.100
13.008	112	15 Winter	200	+39%	100/15 Summer				221.893
13.009	113	15 Winter	200	+39%	200/15 Summer				220.363
1.034	114	30 Winter	200	+39%	2/30 Summer				217.432

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Main Site

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.022	67	-0.177	0.000	0.35		98.3	OK	
9.023	68	-0.173	0.000	0.37		103.7	OK	
9.024	69	-0.152	0.000	0.48		109.8	OK	
9.025	70	-0.148	0.000	0.50		114.8	OK	
9.026	71	-0.176	0.000	0.35		115.9	OK	
10.000	72	-0.360	0.000	0.09		25.5	OK	
9.027	73	-0.323	0.000	0.17		167.5	OK	
1.015	74	2.407	0.000	2.49		607.2	SURCHARGED	
1.016	75	2.126	0.000	2.81		607.5	SURCHARGED	
1.017	76	1.840	0.000	1.84		589.7	SURCHARGED	
11.000	77	-0.150	0.000	0.00		0.0	OK	
11.001	78	-0.126	0.000	0.06		3.1	OK	
11.002	79	-0.114	0.000	0.13		6.1	OK	
11.003	80	-0.104	0.000	0.21		9.7	OK	
1.018	81	1.535	0.000	2.72		597.3	SURCHARGED	
1.019	82	1.246	0.000	2.84		591.5	SURCHARGED	
1.020	83	0.947	0.000	2.94		593.0	SURCHARGED	
1.021	84	0.637	0.000	2.64		591.3	SURCHARGED	
1.022	85	0.330	0.000	2.75		592.1	SURCHARGED	
1.023	86	0.017	0.000	1.06		594.7	SURCHARGED	
1.024	87	-0.285	0.000	0.54		595.8	OK	
1.025	88	-0.302	0.000	0.49		594.9	OK	
1.026	89	-0.363	0.000	0.33		594.5	OK	
1.027	90	-0.359	0.000	0.34		600.6	OK	
1.028	91	-0.174	0.000	0.46		611.1	OK	
1.029	92	1.294	0.000	0.42		631.0	SURCHARGED	
1.030	93	3.031	0.000	1.40		636.5	SURCHARGED	
1.031	94	2.940	0.000	2.18		639.5	SURCHARGED	
12.000	95	-0.300	0.000	0.00		0.0	OK	
12.001	96	-0.254	0.000	0.06		22.4	OK	
12.002	97	-0.188	0.000	0.30		67.7	OK	
12.003	98	0.454	0.000	1.13		174.9	SURCHARGED	
12.004	99	-0.158	0.000	0.44		269.5	OK	
1.032	100	2.734	0.000	1.91		700.5	SURCHARGED	
1.033	101	2.141	0.000	2.31		704.7	SURCHARGED	
13.000	102	-0.450	0.000	0.00		0.0	OK	
13.001	103	-0.254	0.000	0.36		62.5	OK	
13.002	104	-0.341	0.000	0.13		107.0	OK	
13.003	105	-0.341	0.000	0.13		115.2	OK	
13.004	106	-0.319	0.000	0.18		120.2	OK	
13.005	107	-0.266	0.000	0.34		233.8	OK	
13.006	108	-0.174	0.000	0.66		297.7	OK	
13.007	109	-0.211	0.000	0.54		482.6	OK	
14.000	110	0.244	0.000	1.32		90.8	SURCHARGED	
14.001	111	0.192	0.000	0.93		177.0	SURCHARGED	
13.008	112	0.843	0.000	1.37		699.8	SURCHARGED	
13.009	113	0.134	0.000	0.91		699.0	SURCHARGED	

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Main Site

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.034	114	1.920	0.000	4.70		1112.3	SURCHARGED	

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Main Site

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.035	115	30 Winter	200	+39%	200/30 Summer				216.214
1.036	116	30 Winter	200	+39%	30/15 Winter				215.037
1.037	117	30 Winter	200	+39%	2/30 Summer				213.835
1.038	118	1440 Winter	200	+39%	30/360 Winter				210.329
1.039	119	1440 Winter	200	+39%	2/360 Winter				210.331

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.035	115	0.730	0.000	0.57		1105.5	SURCHARGED	
1.036	116	3.282	0.000	0.83		1100.7	SURCHARGED	
1.037	117	3.835	0.000	3.40		1090.9	SURCHARGED	
1.038	118	0.529	0.000	0.15		47.7	SURCHARGED	
1.039	119	0.814	0.000	0.10		34.1	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Section 1 Access Road

Pipe Sizes Circular Manhole Sizes Adoptable

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	14.100	Add Flow / Climate Change (%)	0
Ratio R	0.250	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	1000

Designed with Level Soffits

Time Area Diagram for Section 1 Access Road

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.150	4-8	0.049	8-12	0.015

Total Area Contributing (ha) = 0.214

Total Pipe Volume (m³) = 8.638

Network Design Table for Section 1 Access Road

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
1.000	14.873	0.699	21.3	0.012	10.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	20.014	0.984	20.3	0.014	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	20.013	0.984	20.3	0.014	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	60.524	2.848	21.3	0.039	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	13.507	0.685	19.7	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	13.086	0.611	21.4	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	13.296	0.425	31.3	0.009	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)
1.000	30.33	10.09	248.575	0.012	0.0	0.0	0.0	2.85	113.3	1.0
1.001	30.18	10.20	247.876	0.026	0.0	0.0	0.0	2.91	115.9	2.1
1.002	30.02	10.32	246.892	0.040	0.0	0.0	0.0	2.91	115.9	3.3
1.003	29.56	10.67	245.908	0.079	0.0	0.0	0.0	2.85	113.4	6.3
1.004	29.46	10.75	243.060	0.088	0.0	0.0	0.0	2.96	117.7	7.0
1.005	29.37	10.82	242.375	0.097	0.0	0.0	0.0	2.84	112.9	7.7
1.006	29.25	10.92	241.764	0.106	0.0	0.0	0.0	2.35	93.3	8.4

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Network Design Table for Section 1 Access Road

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
1.007	13.296	0.220	60.4	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	8.227	0.034	242.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	20.558	0.568	36.2	0.030	10.00	0.0	0.600	o	100	Pipe/Conduit	
2.001	20.557	0.569	36.1	0.014	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.002	20.558	0.567	36.3	0.013	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.003	57.309	1.224	46.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.009	16.906	1.083	15.6	0.042	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)
1.007	29.08	11.05	241.339	0.115	0.0	0.0	0.0	1.69	67.0	9.1
1.008	28.88	11.21	241.119	0.115	0.0	0.0	0.0	0.84	33.2	9.1
2.000	30.09	10.27	244.138	0.030	0.0	0.0	0.0	1.29	10.1	2.4
2.001	29.74	10.53	243.570	0.044	0.0	0.0	0.0	1.29	10.1	3.5
2.002	29.40	10.80	243.001	0.057	0.0	0.0	0.0	1.29	10.1	4.5
2.003	28.37	11.64	242.434	0.057	0.0	0.0	0.0	1.13	8.9	4.5
1.009	28.28	11.73	241.085	0.214	0.0	0.0	0.0	3.33	132.4	16.4

Area Summary for Section 1 Access Road

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.012	0.012	0.012
1.001	-	-	100	0.014	0.014	0.014
1.002	-	-	100	0.014	0.014	0.014
1.003	-	-	100	0.039	0.039	0.039
1.004	-	-	100	0.009	0.009	0.009
1.005	-	-	100	0.009	0.009	0.009
1.006	-	-	100	0.009	0.009	0.009
1.007	-	-	100	0.009	0.009	0.009
1.008	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.030	0.030	0.030
2.001	-	-	100	0.014	0.014	0.014
2.002	-	-	100	0.013	0.013	0.013
2.003	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.042	0.042	0.042
				Total	Total	Total
				0.214	0.214	0.214

Surcharged Outfall Details for Section 1 Access Road

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	135	241.427	240.002	0.000	1200	0

Datum (m) 240.002 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1440	0.000	5760	0.000	10080	0.000	14400	0.000	18720	0.000
2880	0.000	7200	0.000	11520	0.000	15840	0.000	20160	0.000
4320	0.000	8640	0.000	12960	0.000	17280	0.000		

Simulation Criteria for Section 1 Access Road

Volumetric Runoff Coeff	0.750	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 Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	14.100	Storm Duration (mins)	30
Ratio R	0.250		

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	125	30 Winter	2	+39%					248.590
1.001	126	15 Winter	2	+39%					247.902
1.002	127	15 Winter	2	+39%					246.925
1.003	128	15 Winter	2	+39%					245.956
1.004	129	15 Winter	2	+39%					243.112
1.005	130	15 Winter	2	+39%					242.431
1.006	131	15 Winter	2	+39%					241.829
1.007	132	15 Winter	2	+39%	200/15 Summer				241.420
1.008	133	15 Winter	2	+39%	30/15 Summer				241.246
2.000	137	30 Winter	2	+39%	100/15 Summer				244.180
2.001	138	15 Winter	2	+39%	30/15 Summer				243.624
2.002	139	15 Winter	2	+39%	30/15 Summer				243.066
2.003	140	15 Winter	2	+39%	30/15 Summer				242.504
1.009	134	15 Winter	2	+39%					241.161

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	125	-0.210	0.000	0.01		1.5	OK	
1.001	126	-0.199	0.000	0.03		3.4	OK	
1.002	127	-0.192	0.000	0.05		5.4	OK	
1.003	128	-0.177	0.000	0.10		11.1	OK	
1.004	129	-0.173	0.000	0.12		12.4	OK	
1.005	130	-0.169	0.000	0.14		13.7	OK	
1.006	131	-0.160	0.000	0.19		15.0	OK	
1.007	132	-0.144	0.000	0.28		16.2	OK	
1.008	133	-0.098	0.000	0.60		16.2	OK	
2.000	137	-0.058	0.000	0.37		3.6	OK	
2.001	138	-0.046	0.000	0.55		5.4	OK	
2.002	139	-0.035	0.000	0.74		7.2	OK	
2.003	140	-0.030	0.000	0.82		7.2	OK	
1.009	134	-0.149	0.000	0.25		29.0	OK	

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	125	30 Winter	30	+39%					248.599
1.001	126	15 Winter	30	+39%					247.914
1.002	127	15 Winter	30	+39%					246.942
1.003	128	15 Winter	30	+39%					245.981
1.004	129	15 Winter	30	+39%					243.140
1.005	130	15 Winter	30	+39%					242.462
1.006	131	15 Winter	30	+39%					241.866
1.007	132	15 Winter	30	+39%	200/15 Summer				241.470
1.008	133	15 Summer	30	+39%	30/15 Summer				241.373
2.000	137	30 Winter	30	+39%	100/15 Summer				244.199
2.001	138	15 Winter	30	+39%	30/15 Summer				243.846
2.002	139	30 Winter	30	+39%	30/15 Summer				243.416
2.003	140	30 Winter	30	+39%	30/15 Summer				242.826
1.009	134	15 Summer	30	+39%					241.200

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	125	-0.201	0.000	0.03		2.7	OK	
1.001	126	-0.187	0.000	0.07		7.1	OK	
1.002	127	-0.175	0.000	0.11		11.7	OK	
1.003	128	-0.152	0.000	0.23		24.8	OK	
1.004	129	-0.145	0.000	0.27		27.7	OK	
1.005	130	-0.138	0.000	0.31		30.5	OK	
1.006	131	-0.123	0.000	0.41		33.2	OK	
1.007	132	-0.094	0.000	0.62		36.1	OK	
1.008	133	0.029	0.000	1.37		36.8	SURCHARGED	
2.000	137	-0.039	0.000	0.67		6.7	OK	
2.001	138	0.176	0.000	0.89		8.7	SURCHARGED	
2.002	139	0.315	0.000	1.06		10.3	SURCHARGED	
2.003	140	0.292	0.000	1.11		9.8	SURCHARGED	
1.009	134	-0.110	0.000	0.50		58.4	OK	

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	125	30 Winter	100	+39%					248.602
1.001	126	15 Winter	100	+39%					247.921
1.002	127	15 Winter	100	+39%					246.949
1.003	128	15 Winter	100	+39%					245.992
1.004	129	15 Winter	100	+39%					243.152
1.005	130	15 Winter	100	+39%					242.475
1.006	131	15 Winter	100	+39%					241.882
1.007	132	15 Winter	100	+39%	200/15 Summer				241.560
1.008	133	15 Summer	100	+39%	30/15 Summer				241.411
2.000	137	30 Winter	100	+39%	100/15 Summer				244.519
2.001	138	30 Winter	100	+39%	30/15 Summer				244.209
2.002	139	30 Winter	100	+39%	30/15 Summer				243.711
2.003	140	30 Winter	100	+39%	30/15 Summer				243.039
1.009	134	15 Winter	100	+39%					241.214

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	125	-0.198	0.000	0.03		3.5	OK	
1.001	126	-0.180	0.000	0.09		9.1	OK	
1.002	127	-0.168	0.000	0.15		15.2	OK	
1.003	128	-0.141	0.000	0.29		32.1	OK	
1.004	129	-0.133	0.000	0.35		35.9	OK	
1.005	130	-0.125	0.000	0.41		39.5	OK	
1.006	131	-0.107	0.000	0.53		43.0	OK	
1.007	132	-0.004	0.000	0.81		47.0	OK	
1.008	133	0.067	0.000	1.74		46.8	SURCHARGED	
2.000	137	0.281	0.000	0.74		7.3	SURCHARGED	
2.001	138	0.539	0.000	0.94		9.1	SURCHARGED	
2.002	139	0.610	0.000	1.15		11.2	SURCHARGED	
2.003	140	0.505	0.000	1.19		10.4	SURCHARGED	
1.009	134	-0.096	0.000	0.61		72.1	OK	

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Section 1 Access Road

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	125	30 Winter	200	+39%					248.603
1.001	126	15 Winter	200	+39%					247.924
1.002	127	15 Winter	200	+39%					246.954
1.003	128	15 Winter	200	+39%					245.999
1.004	129	15 Winter	200	+39%					243.160
1.005	130	15 Winter	200	+39%					242.484
1.006	131	15 Winter	200	+39%					241.894
1.007	132	15 Winter	200	+39%	200/15 Summer				241.646
1.008	133	15 Winter	200	+39%	30/15 Summer				241.447
2.000	137	30 Winter	200	+39%	100/15 Summer				244.862
2.001	138	30 Winter	200	+39%	30/15 Summer				244.499
2.002	139	30 Winter	200	+39%	30/15 Summer				243.940
2.003	140	30 Winter	200	+39%	30/15 Summer				243.210
1.009	134	15 Winter	200	+39%					241.225

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Section 1 Access Road

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	125	-0.197	0.000	0.04		4.1	OK	
1.001	126	-0.177	0.000	0.10		10.6	OK	
1.002	127	-0.163	0.000	0.17		17.7	OK	
1.003	128	-0.134	0.000	0.34		37.2	OK	
1.004	129	-0.125	0.000	0.41		41.6	OK	
1.005	130	-0.116	0.000	0.47		45.9	OK	
1.006	131	-0.095	0.000	0.62		49.9	OK	
1.007	132	0.082	0.000	0.94		54.3	SURCHARGED	
1.008	133	0.103	0.000	2.02		54.1	SURCHARGED	
2.000	137	0.624	0.000	0.80		7.9	SURCHARGED	
2.001	138	0.829	0.000	0.99		9.7	SURCHARGED	
2.002	139	0.839	0.000	1.21		11.8	SURCHARGED	
2.003	140	0.676	0.000	1.25		10.9	SURCHARGED	
1.009	134	-0.085	0.000	0.69		81.8	OK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Section 2 Access Road

Pipe Sizes Circular Manhole Sizes Adoptable

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	14.300	Add Flow / Climate Change (%)	0
Ratio R	0.250	Minimum Backdrop Height (m)	1.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	1000

Designed with Level Soffits

Time Area Diagram for Section 2 Access Road

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.043	4-8	0.019	8-12	0.011

Total Area Contributing (ha) = 0.074

Total Pipe Volume (m³) = 5.128

Network Design Table for Section 2 Access Road

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
1.000	54.502	0.888	61.4	0.039	10.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	54.502	2.445	22.3	0.035	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	19.972	2.194	9.1	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)
1.000	30.15	10.54	252.108	0.039	0.0	0.0	0.0	1.67	66.5	3.2
1.001	29.72	10.87	251.220	0.074	0.0	0.0	0.0	2.78	110.7	6.0
1.002	29.63	10.95	248.775	0.074	0.0	0.0	0.0	4.36	173.5	6.0

Area Summary for Section 2 Access Road

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.039	0.039	0.039
1.001	-	-	100	0.035	0.035	0.035
1.002	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.074	0.074	0.074

Surcharged Outfall Details for Section 2 Access Road

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.002	124	248.006	246.581	0.000	1200	0

Datum (m) 246.581 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1440	0.000	5760	0.000	10080	0.000	14400	0.000	18720	0.000
2880	0.000	7200	0.000	11520	0.000	15840	0.000	20160	0.000
4320	0.000	8640	0.000	12960	0.000	17280	0.000		

Simulation Criteria for Section 2 Access Road

Volumetric Runoff Coeff	0.750	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 Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	14.100	Storm Duration (mins)	30
Ratio R	0.250		

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	121	30 Winter	2	+39%					252.148
1.001	122	15 Winter	2	+39%					251.265
1.002	123	15 Winter	2	+39%					248.811

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	121	-0.185	0.000	0.07		4.7	OK	
1.001	122	-0.180	0.000	0.09		9.3	OK	
1.002	123	-0.189	0.000	0.06		9.3	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Section 2 Access Road

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	121	30 Winter	30	+39%					252.163
1.001	122	15 Winter	30	+39%					251.285
1.002	123	15 Winter	30	+39%					248.827

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	121	-0.170	0.000	0.13		8.7	OK	
1.001	122	-0.160	0.000	0.18		18.7	OK	
1.002	123	-0.173	0.000	0.12		18.8	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Section 2 Access Road

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	121	30 Winter	100	+39%					252.171
1.001	122	15 Winter	100	+39%					251.294
1.002	123	15 Winter	100	+39%					248.835

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	121	-0.162	0.000	0.17		11.3	OK	
1.001	122	-0.151	0.000	0.23		24.3	OK	
1.002	123	-0.165	0.000	0.15		24.3	OK	

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Section 2 Access Road

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.250
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.600	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	150.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100, 200
Climate Change (%)	39, 39, 39, 39

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	121	30 Winter	200	+39%					252.177
1.001	122	15 Winter	200	+39%					251.300
1.002	123	15 Winter	200	+39%					248.840

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	121	-0.156	0.000	0.20		13.2	OK	
1.001	122	-0.145	0.000	0.26		28.1	OK	
1.002	123	-0.160	0.000	0.18		28.1	OK	

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