Flood Risk Assessment and Surface Water Drainage Strategy

One Horton Heath

The Folds

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Executive Summary

Stantec UK ("Stantec") has been appointed by Eastleigh Borough Council (One Horton Heath Team) to prepare a Flood Risk Statement and Surface Water Drainage Strategy for a Reserved Matters Application (RMA) for the Folds residential development at the One Horton Heath site.

The Folds is situated in the north-easternmost part of the One Horton Heath site. The development area is predominantly of open agricultural land bounded by Quobleigh Woods to the north and Fir Tree Lane to the south.

The existing site area drains to the Fair Oak Stream to the north, which is a 'main river' and a tributary of the River Itchen that is located 1.5km to the west of the site, and the southern portion of the site drains to the Foxwood Stream, which is an ordinary watercourse.

Development proposals for the Folds comprise the erection of 629 dwellings with associated public open space, landscaping, and cycle and vehicular parking.

The Folds development area lies within Flood Zone 1, defined by the NPPF as land with a low probability of flooding from rivers or the sea, specifically, it has less than a 1 in 1,000 annual probability of flooding (less than 0.1%) from rivers (Fluvial Flood Risk).

Similarly, Environment Agency online mapping shows the site area is not a risk of surface water flooding, and the British Geological Survey (BGS) Groundwater Susceptibility mapping shows the Folds development area has limited potential for groundwater flooding.

The drainage proposals have been prepared in accordance with the Flood Risk Assessment (Ref: G277-DOC01 FRA, May 2021 and addendum report June 2022) provided within the Outline Planning Permission (OPP), and relevant local and national design guidance and standards.

Therefore, the risk to the proposed development from all sources of flooding is considered to be very low.

Geotechnical investigation and infiltration testing has shown the that infiltration drainage is not viable on the Folds and therefore, in accordance with the OPP Flood Risk Assessment, the proposed surface water strategy replicates greenfield discharge rates. The development run-off will be restricted to the greenfield Q_{MED} rate, which is equivalent to a 2 year return period, for all events up to an including the 100 year return period + climate change. As such the proposed development will reduce the flood risk for all higher order events, compared to existing greenfield rates.

The surface water drainage system will utilise SuDS treatment trains in line with the strategy established in the OPP, to manage water quality and quantity, using Prevention Measures, Source Control and Site Control Techniques, and Regional Control Features.

The proposed development will be safe from surface water flooding and the development will not increase flood risk elsewhere. The RMA SuDS drainage design will maintain water quality standards and has been prepared in accordance with the strategy developed for the OPP, the National Planning Policy Framework (NPPF), Planning practice Guidance (PPG) and the and the LLFA requirements.

1 Introduction

1.1.1 Stantec UK ("Stantec") has been appointed by Eastleigh Borough Council (One Horton Heath Team) to prepare a Flood Risk Statement and Surface Water Drainage Strategy to support a Reserved Matters Application (RMA) for the residential development at The Folds, One Horton Heath.

1.1.2 This report has been prepared in accordance with the following documents:

- Outline Planning Permission (LPA ref no. O/20/89498) granted in October 2025.
- One Horton Heath, Flood Risk Assessment (FRA), (ref: G277-DOC FRA), May 2021.
- Flood Risk Addendum - Ref: G277-FN14-FRA ADDENDUM (O-20-89498), June 2022.
- Eastleigh Borough Council Policy DM10: Water and Wastewater (see others in FRA report)
- One Horton Heath, Utilities and Foul Water Statement Report (ref: 26114-RP-IE-002)
- Hampshire County Council Level 1 Strategic Flood Risk Assessment (SFRA), 2024
- National Planning Policy Framework (NPPF), revised December 2024 and updated February 2025.
- National Planning Practice Guidance (NPPG), Flood Risk and Coastal Change, updated September 2025.
- Non-statutory Technical Standards for Sustainable Drainage Systems - Defra, March 2015. *(noting that these standards were superseded by the National Standards for Sustainable Drainage Systems, June 2025 which was part way through the design process)*, and
- Flood Risk Assessments: Climate Change Allowances - Environment Agency, May 2022.

2 Site Information

2.1 Site Location and Plan

2.1.1 The Folds development site is 13.92 ha in size and situated on land west of Burnetts Lane, Eastleigh, SO30 2HH, which is part of the One Horton Heath major mixed-use development.

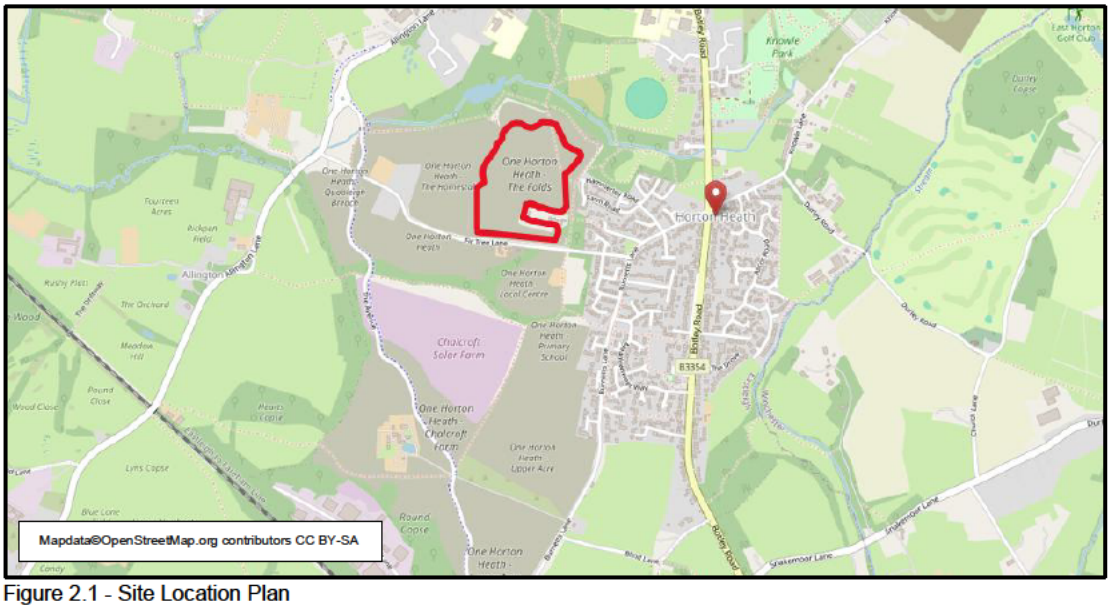


Figure 2.1 - Site Location Plan

2.1.2 The Folds is situated in the north-easternmost part of the OPP site. The Site is comprised predominantly of open agricultural land, though a small collection of temporary residential and ancillary buildings project into the centre of the site from the south-eastern corner.

2.1.3 The site is bound by dense woodland of Quobleigh Woods to the north which visually and physically separates the Site from the built form of the new residential development to the north-west along Allington Lane. An established hedgerow runs along the entirety of the Site's western boundary, separating The Folds from The Homestal, leading from Quobleigh Woods in the north to Fir Tree Lane to the south.

2.1.4 The eastern portion of The Folds is laid to grass, though the eastern boundary is similarly demarcated by dense soft landscaping separating the Site from the residential built form beyond.

2.1.5 To the north of the Folds the Fair Oak Stream, which is a 'main river', runs within the Quobleigh Woods. The Fair Oak stream flows in a south westerly direction and is a tributary of the River Itchen which is located 1.5km to the west of the site.

2.1.6 The topography of the Folds development area lies at an elevation of between 31.15m AOD (Above Ordnance Datum) at its high point (in the southern third of the site), falling to 23.00m AOD on the northern boundary and 26.50m AOD in the south east corner at the boundary with Fir Tree Lane.

2.2 Development Proposals

2.2.1 A Reserved Matters submission will be made relating to Layout, Scale, Appearance, and Landscaping pursuant to Condition 4 (RM Requirements) of Outline Planning Permission O/20/89498 for the erection of 629 dwellings within Phase 17 (The Folds), with associated public open space, landscaping, and cycle and vehicular parking, to include details relevant to the following Outline Planning Permission conditions:

- Condition 16 (Arb Assessment)
- Condition 21 (Design Code)
- Condition 25 (Refuse)
- Condition 31 (Higher Access Standards)
- Condition 45 (Noise Assessments)
- **Condition 58 (Flood Mitigation)**
- **Condition 59 (Foul Drainage)**
- **Condition 61 (SUDs)**
- Condition 64 (EMMP)
- Condition 67 (Landscaping)
- Condition 71 (BNG)
- Condition 76 (Nutrient Neutrality)

2.2.2 This report seeks to address the requirements of conditions 58 Flood Mitigation, 59 Foul Drainage, and 61 SuDS.

2.2.3 Condition 58 Flood Mitigation, requires demonstration that the development will not be built within flood zone 2 or 3, ensuring development is directed away from watercourses and any watercourse crossings do not exacerbate flood risk. Section 3 of this report details the scheme's response to these requirements.

2.2.4 Condition 59 Foul Drainage, requires details of the foul the means of foul drainage, in accordance with the Utilities and Foul Water Statement Report (ref: 26114-RP-IE-002), to be submitted and approved prior to commencement of the drainage system. Section 3.1.10 of this report details the scheme's response to these requirements.

2.2.5 Condition 61 SuDS, requires details of the surface water drainage scheme including SuDS, in accordance with the FRA (ref: G277-DOC FRA) and addendum (ref: G277-FN14-FRA ADDENDUM), to be to be submitted and approved prior to commencement of the drainage system. Sections 5 and 6 of this report details the scheme's response to these requirements.

2.2.6 More information on the development proposals can be found in the Design and Access Statement (DAS) and the Planning Statement documents.

2.2.7 A copy of the proposed Landscape General Arrangement (Ref: 332612639_STA-17-ZZ-DR-L-2001) is contained in **Appendix A**.

3 Flood Risk Statement

3.1.1 The development proposals have been prepared in accordance with the Flood Risk Assessment (Ref: G277-DOC01 FRA, May 2021 and addendum report June 2022) provided within the Outline Planning Permission (OPP).

3.1.2 The Folds development area lies within Flood Zone 1, defined by the NPPF as land with a low probability of flooding from rivers or the sea, specifically, it has less than a 1 in 1,000 annual probability of flooding (less than 0.1%) from rivers (Fluvial Flood Risk).



Figure 3.1 – EA Online Long-Term Flood Risk Mapping – Rivers and Sea Map Extract

3.1.3 The development proposals also include raising the development platform area as part of the One Horton Heath site wide earthworks strategy, which will provide further protection to the housing against extreme flooding events. The proposed catchment areas after land raising largely replicate the existing site catchments and are shown on drawing 332612639-STN-17-XX-DR-C-0513 in **Appendix B**. The proposed development will also restrict run-off to the QMED rate and so the post development site discharge will be reduced for both catchments in all events over the 2 year magnitude.

3.1.4 The Surface Water Flood map similarly shows the Folds site is not a risk of surface water flooding except for a small gully line in the northwest corner of the site, which is a natural low channel emanating from the higher central area of the site. This channel line collects rainfall run-off from the site area only, and routes it towards the Fair Oak Stream, it does not convey any off-site flows.

3.1.5 Implementation of the earthworks strategy as part of the development proposals will remove the channel line, however, its function will be replaced by the proposed surface water drainage system which will collect and manage this rainfall run-off in the future. The proposed surface water drainage strategy is explained further in further explained in Section 5.



Figure 3.2 – EA Online Long-Term Flood Risk Mapping – Surface Water Map Extract

3.1.6 The Environment Agency's Groundwater Source Protection Zone mapping, available on Defra's MAGIC map website, show the site is not located within a groundwater source protection zone.

3.1.7 The Hampshire County Council Level 1 Strategic Flood Risk Assessment (SFRA) 2024, Figure 4-B shows areas susceptible to groundwater flooding, and identifies the Folds development area as having a less than 25% probability of occurrence.

3.1.8 The British Geological Survey (BGS) Susceptibility to Groundwater Flooding mapping shows the Folds development area as limited potential for groundwater flooding. Refer to Figure 3.2 below.

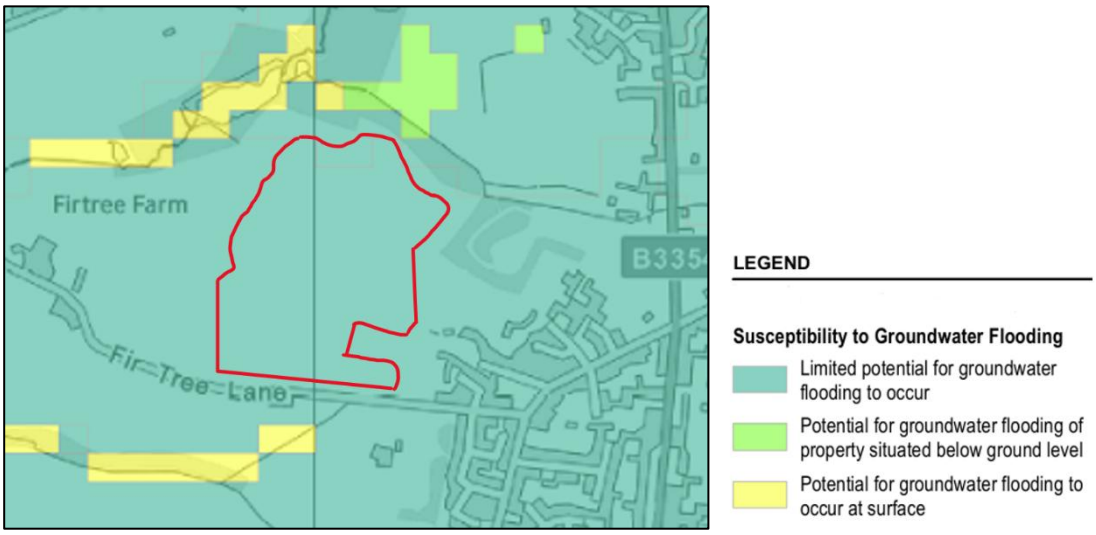


Figure 3.2 – BGS Susceptibility to Groundwater Flooding Map Extract

3.1.9 The GOV.UK flood risk map for reservoirs identifies that the site is not at risk from reservoir flooding.

3.1.10 The proposed foul water drainage layout for the Folds development follows the strategy set out in the Utilities and Foul Water Statement (report ref: 26114-RP-IE-002) from the OPP. The foul sewer layouts are designed to adoptable standards and discharge off the site by gravity in two locations. The larger northern drainage catchment discharges to the northwest into the adjacent development parcel known as the Homestal, and the southern drainage catchment discharges to the south into the Holme development parcel. Refer to the drainage layout drawings in **Appendix B**. The foul water drainage networks continue by gravity flowing to the west and

discharge to the new pumping station being constructed off the western end of Fir Tree Lane. From this pumping station flows are pumped to the Chrickenhall Farm Sewage Treatment works (STW) 2.1km from the site.

3.1.11 The surface water drainage strategy for the development is detailed in the following sections of this report. As a summary the drainage system will be designed to manage all rainfall events up to and including the 1 in 100 year design event, without surface flooding. All attenuation will be situated outside the floodplain and all water will be stored above the fluvial flood level. As such the Folds development will not be at risk from surface water flooding.

3.1.12 In summary the risk to the proposed development from all sources of flooding is considered to be very low, which accords with the One Horton Heath, Flood Risk Assessment (ref: G277-DOC FRA) May 2021, from the OPP.

4 Existing Surface Water Drainage Regime

4.1.1 The existing Folds site area is predominantly arable farmland, with the northeastern edge laid to grassland, as such there is no known existing drainage system. In extreme events overland flow is intercepted on the site boundaries by a network of existing ditches and streams, and routed into nearby watercourses at the greenfield run-off rate.

4.1.2 The Folds development area is split into two sub-catchments by a high point which bi-sects the site in an east-west direction. Existing run-off from the northern catchment discharges into the Fair Oak Stream, and run-off from the southern catchment discharges into the ordinary watercourse (known as Foxwood Stream) in the south-east corner of the Folds site, which flows to the south of Fir Lane across the northern end of the Solar Farm.

4.1.3 After the proposed earthworks exercise, which maintains the general landform but results in a net importation of fill on to the site, the high point / ridge will divide the site with approximately one third draining south and two thirds draining north.

4.1.4 Existing green-field run-off rates for the site have been calculated within the Flood Risk Assessment produced for the outline planning consent, using the Greenfield Runoff Tool developed by HR Wallingford available at the www.uksuds.com website. A summary of the rates are shown in the table below.

Return Period (years)	Calculated Greenfield Runoff Rate
1	7.8 l/s/ha
2 (Q_{Med})	8.1 l/s/ha
2.33 (Q_{bar})	9.2 l/s/ha
30	21.2 l/s/ha
100	29.4 l/s/ha

Table 4.1 – Greenfield Runoff Rates

5 Proposed Surface Water Drainage Strategy

5.1.1 The proposed surface water drainage scheme has been designed in accordance with the Defra Non-Statutory Technical Standards for Sustainable Drainage Systems, 2015. However, it is acknowledged that these standards have been superseded by the National Standards for Sustainable Drainage Systems (June 2025), although the release of these standards was part way through the design process and after the drainage strategy was fundamentally set by the earlier outline consent.

5.1.2 Hampshire County Council, as the Lead Local Flood Authority (LLFA) were consulted through the pre-application consultation process and advised that a transitional period for the implementation of the new standards would be applicable and the older 2015 standards could be used. The proposed drainage strategy details and modelling criteria, which are described in the sections below, were also discussed with the LLFA and agreed to be in line with the OPP FRA.

5.2 Proposed Discharge Destination

5.2.1 The discharge destination for the network has been determined in accordance with the discharge destination hierarchies of the NPPG and the Building Regulations H3.

See the Planning Practice Guidance

This states:

"Generally the aim should be discharge surface runoff as high up the following hierarchy of drainage options as reasonably practicable:

1. *Into the ground (infiltration)*
2. *To a surface water body;*
3. *To a surface water sewer, highway drain or another drainage system;*
4. *To a combined sewer."*

5.2.2 In accordance with the drainage destination hierarchy the preferred method for the disposal of surface water from a new development or redevelopment is via infiltration. However, during Geotechnical Investigations undertaken by Stantec in 2025 groundwater was encountered at depths between 0.75m to 3.5m below the surface. Therefore, making it difficult to achieve a 1m unsaturated zone beneath the base of infiltration devices. Refer to the Factual Ground Investigation Report, 19 September 2025 (ref: STA-ZZ-XX-RP-G-0001), and Preliminary Ground Investigation Report (ref: STA-ZZ-XX-RP-G-0002).

5.2.3 Ongoing groundwater monitoring is being undertaken as part of the 2025 investigation, with groundwater monitoring wells installed at each borehole. In September 2025 groundwater levels were recorded between 0.7 to 2.1m bgl in the standpipes installed within the Wittering Formation.

5.2.4 Infiltration testing was also undertaken within the 2025 Ground Investigation with limited results. A rate of 1.19×10^{-6} m/s was recorded in one borehole, based on a variable head method, and a rate of 3.52×10^{-6} m/s recorded in one trial pit based on only one result, and not three consecutive tests as per the BRE365 guidance. Further tests in another trial pit and borehole were abandoned as no appreciable infiltration occurred. As such, infiltration drainage is not proposed as the primary discharge method.

5.2.5 Therefore, the proposed surface water drainage system seeks to replicate the existing drainage regime by discharging rainfall run-off to the watercourses at the site's perimeter.

5.3 Peak Flow and Volume Control

5.3.1 As detailed within the One Horton Heath, Flood Risk Assessment (ref: G277-DOC FRA), the proposed surface water strategy for site seeks to replicate greenfield discharge rates.

5.3.2 The proposed redevelopment will result in an increase in the site's impermeable area and therefore an increase in the volumetric discharge. As the additional run-off cannot be effectively disposed of by infiltration it is proposed that the outfalls will be restricted to a greenfield peak discharge rate of Q_{MED} (8.1 l/s/ha), which is equivalent to a 2 year return period.

5.3.3 By restricting the run-off to the median annual peak rate (Q_{MED}) for all events up to an including the 100 year return period + climate change, the proposed development will reduce the flood risk for all higher order events, compared to existing greenfield rates.

5.3.4 The Q_{MED} discharge rate has been applied to contributing open space areas as well as all impermeable areas, to determine the allowable discharge rate.

5.3.5 Contributing permeable areas such as verges, bioretention areas and permeable paving have been conservatively included in the modelling at a runoff rate of 100%. Each individual combined catchment area has then been increased by an additional 10% to provide for the potential for urban creep. This robust allocation of additional runoff area provides the surface water strategy with additional capacity for the future.

5.3.6 The proposed catchment areas drawings (Ref: 332612639-STN-17-XX-DR-C-0507 to 0512) are contained in **Appendix C**.

5.3.7 Table 5.1 provides a summary of the greenfield and proposed discharge rates for the northern and southern catchments.

Return Period	Greenfield rate (l/s/ha)	Northern Catchment		Southern Catchment	
		Greenfield l/s (6.59 ha imp area)	Proposed Discharge (l/s)	Greenfield l/s (2.05 ha imp area)	Proposed Discharge (l/s)
1 year	7.8 l/s/ha	51.64 l/s	51.60 l/s	15.99 l/s	15.70 l/s
Q_{MED}	**8.1 l/s/ha**	53.62 l/s	-	16.61 l/s	-
30 year	21.2 l/s/ha	140.34 l/s	52.50 l/s	43.46 l/s	15.90 l/s
100 year	29.4 l/s/ha	194.63 l/s	52.50 l/s	60.27 l/s	15.90 l/s
100 year + 40% CC	-	-	52.50 l/s	-	15.90 l/s

Table 5.1: Proposed Discharge Rates

5.3.9 The drainage strategy modelling within the FRA (May 2021) undertaken for the outline consent was based on a potential 40% increase in rainfall intensity as a result of the effects of climate change.

5.3.10 The Environment Agency's, Climate Change Allowances for Peak Rainfall in England, guidance which supports the NPPF provides contingency allowances for potential increases in sea level rise, peak river flow and rainfall intensity, was updated in May 2022.

5.3.11 This guidance now shows the Upper End Allowance of 45% increase in rainfall intensity for a 1% annual probability event in the 2070s epoch, which should be used for developments with a lifetime of up to 2125.

5.3.12 Therefore, as part of the pre-application consultation with the LLFA it was agreed that the surface water modelling for the RMA would be undertaken using a 40% Climate Change allowance and sensitivity tested for 45%. The sensitivity test shows there is no surface flooding within either the northern or southern catchment areas in the 1 in 100 year + 45% climate change scenario.

5.3.13 The proposed surface water drainage layout drawings (Ref: 332612639-STN-17-XX-DR-C-0502 to 0506) are contained in **Appendix D**.

5.3.14 A copy of the proposed MicroDrainage calculations for the northern and southern networks are contained within **Appendices E** and **F** respectively.

5.3.15 The proposed peak discharge rates are achieved by using Sustainable Drainage System (SuDS) treatment trains in line with the approach set out in the FRA addendum. A copy of the proposed management train drawing is contained within **Appendix G.**

5.4 Flood Risk Within the Development

5.4.1 The proposed surface water drainage strategy has been developed to accommodate a 1 in 100 year + 40% climate change rainfall event below ground.

5.4.2 At the detail design stage the final parcel levels will be developed and areas of hard standing will be designed to route surface water away from buildings and towards surface water drainage features. Overland flow paths which could form in an exceedance event will also be identified and directed away from properties.

5.5 Water Quality and SuDS Selection

5.5.1 The NPPG paragraph 055 describes SuDS as follows:

> *'Sustainable drainage systems (or SuDS) are designed to control surface water run off close to where it falls, combining a mixture of built and nature-based techniques to mimic natural drainage as closely as possible, and accounting for the predicted impacts of climate change. They provide benefits for water quantity, water quality, biodiversity and amenity. Many types of sustainable drainage systems are possible, contributing to reducing the causes and impacts of flooding.'*

5.5.2 As described previously, the proposed development will utilise SuDS management train principles to manage water quality and quantity, using **Prevention Measures, Source Control and Site Control Techniques, and Regional Control Features.**

5.5.3 **Prevention Measures** will take the form of high-quality landscaping throughout the parcel minimising the impermeable area where practicable, and encouraging the uptake of water and evapotranspiration. Water butts will also be used within rear gardens to collect water for re-use, and trapped gullies and separators will be incorporated to prevent potential highway pollution.

5.5.4 **Source Control Techniques** will be used to manage water as close to the sources as possible. Given that infiltration is not viable as a primary discharge destination on the Folds these techniques will provide attenuation throughout the development to prevent and / or delay water entering the drainage system, maximising its efficiency. Refer to drawing 332612639-STN-17-XX-DR-C-0531 in **Appendix H** for typical construction details of the source control components.

5.5.5 The following Source Control techniques will be provided:

- **Bio-Retention Areas / Rain Gardens**: Where landscaping areas and strips are adjacent to paths, roads and parking areas, structured soil beds with under drains will be implemented to allow run-off to be directed into the landscape areas, promoting interception storage, filtering and evapotranspiration.

- **Cellular Storage**: Will be provided within private parking court areas to provide attenuation throughout the development, delaying run-off entry to the system and making the drainage network more efficient.
- **Permeable Paving**: Porous asphalt and permeable block paving options will be implemented in parking bays within private parking courts. Permeable pavements filter and treat contaminants and pollutants from stormwater runoff, such as heavy metals, sediment and hydrocarbons. The ground conditions are not conducive to infiltration as a primary discharge mechanism. However, as the development platform is being raised as part of the site earthworks strategy the pavement sub-base will be above the potential high groundwater level and therefore permeable parking bays will not be lined. Parking bays will be connected to the surface water drainage system using diffuser units within the stone sub-base storage.

5.5.6 **Site Control Techniques** are used to manage water between sub-catchments within a development area. Typically, swales, ditches, filter drains or rills are implemented to keep water on the surface and avoid deep systems.

5.5.7 However, surface drainage features reduce the net developable area, and the Folds development site is relatively steep in topography terms and consequently piped drainage networks are not driven excessively deep across the parcel. Therefore, to meet the required development density the use of SuDS conveyance features has been limited.

5.5.8 A section of swale has been used on the northern boundary of the northern catchment to convey run-off from the northern eastern corner of the development into the SuDS Basin.

5.5.9 **Regional Control Features** provide the primary attenuation for the development parcel at each discharge. For the two principal catchments on the Folds development Strategic SuDS basins will be provided to control the final discharge back to greenfield rates and provide water quality and habitat benefits. Typical SuDS basin layouts are shown on drawings 332612639-STN-17-XX-DR-C-0521 and 0522 and contained in **Appendix I.**

5.5.10 The SuDS basins will provide a planted wetland habitat across the base area with deeper sections creating seasonal micro pools, which will provide interception storage in smaller magnitude events.

5.5.11 Downstream defender vortex separators will be provided on the pipe network at each entry to the basin. Sediment forebays will also be provided on both inlets and the outfall to capture sediments and facilitate maintenance activities without damaging the planted habitat.

5.5.12 The micro pools will be linked by low flow channels from the inlet forebays so the pools will receive water for recharged first in each event. Once the pools are full further inflows will spread across the base of the basin before the outlet forebay berm is breached and controlled flow will be discharged.

5.5.13 The hydraulic control, in the form of a hydrobrake, will be provided in a chamber immediately downstream of the basin.

5.6 The SuDS Manual C753, CIRIA 2025, Simple Index Approach

5.6.1 To deliver adequate treatment, the Sustainable Drainage System (SuDS) components in the drainage system should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type).

Total SuDS Mitigation Index (for each contamination type)	≥	*Pollution Hazard Index (for each contamination type)*

5.6.2 Where two or more SuDS features are provided in a treatment train, the following equation is used to account for the performance of secondary components associated with already reduced inflow concentrations.

Total SuDS Mitigation Index = Mitigation Index$_1$ + 0.5(Mitigation Index$_2$)

Where: Mitigation Index$_n$ = Mitigation Index for Component n

5.6.3 Tables 4.2 to 4.3 below demonstrate how the northern and southern drainage catchments on the Folds parcels provide the necessary water treatment required prior to discharge.

	Land Use and Pollution Hazard Indices[1]	**Example SuDS Treatment Train Mitigation Indices[2]**		
	Residential Roofs (Very Low)	Permeable Paving	Attenuation Basin	**Total**
Total Suspended Solids	**0.2**	0.7	0.5	**0.95**
Metals	**0.2**	0.6	0.5	**0.85**
Hydrocarbons	**0.05**	0.7	0.6	**1.0**

[1] Land Use Pollution Indices and Hazard Levels are taken from Table 26.2 Pollution Hazard Indices for Different Land Use Classifications, of The SuDS Manual C753, CIRIA 2015.
[2] SuDS Mitigation Indices are taken from Table 26.3 Indicative SuDS Mitigation Indices for Discharge to Surface Waters, of The SuDS Manual C753, CIRIA 2015.

Table 5.2: Example Simple Index Approach for Residential Roof Areas

	Land Use and Pollution Hazard Indices[1]	**Example SuDS Treatment Train Mitigation Indices[2]**			
	Link Roads (Medium)	Permeable Paving	Bioretention	Attenuation Basin	**Total**
Total Suspended Solids	**0.7**	0.7	0.8	0.5	**1.35**
Metals	**0.6**	0.6	0.8	0.5	**1.25**
Hydrocarbons	**0.7**	0.7	0.8	0.6	**1.40**

[1] Land Use Pollution Indices and Hazard Levels are taken from Table 26.2 Pollution Hazard Indices for Different Land Use Classifications, of The SuDS Manual C753, CIRIA 2015.
[2] SuDS Mitigation Indices are taken from Table 26.3 Indicative SuDS Mitigation Indices for Discharge to Surface Waters, of The SuDS Manual C753, CIRIA 2015.

Table 5.3: Example Simple Index Approach for Roads

6 SuDS Maintenance Strategy

6.1 Introduction

6.1.1 All those responsible for maintenance should take appropriate health, safety and welfare precautions for all activities including lone working, if relevant, and risk assessments should always be undertaken. The site's infrastructure Health and Safety File should be consulted before carrying out any works either inside or outside of the development's boundary and information regarding the location of existing utilities passed on to operatives.

6.1.2 The requirements of the Health and Safety at Work Act 1974 and The Construction (Design and Management) Regulations 2015 should be adhered to and any residual risks identified in the Health and Safety File should be managed and information passed on to maintenance operatives through task specific risk assessments.

6.2 Ownership and Maintenance Arrangements

6.2.1 The piped sewer networks within the Folds development will be adopted and maintained by Southern Water.

6.2.2 Private surface water and foul water drainage serving privately owned buildings will be maintained by the riparian owner(s).

6.2.3 The communal private drainage and SuDS features will be maintained by an Eastleigh Borough Council appointed contractor that will undertake maintenance for the One Horton Heath site.

6.3 Operation and Maintenance

6.3.1 There are three types of maintenance activities associated with surface water drainage systems. The SuDS Manual C753, CIRIA 2015 defines these as:

- Regular maintenance – *'basic tasks carried out to a frequent and predictable schedule, including inspections/monitoring, silt or oil removal if required more frequently than once per year, vegetation management, sweeping of surfaces and litter and debris removal.'*
- Occasional maintenance – *'tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the regular tasks'*
- Remedial maintenance – *'intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design, construction and regular maintenance activities. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and so timings are difficult to predict*.'

6.3.2 The following maintenance schedules for specific SuDS features should be utilised for the first year of maintenance and the required frequency monitored so the schedules can be adjusted for ongoing use to suit the location and condition of the drainage feature in question.

6.3.3 The application of fertilisers, pesticides and herbicides should not be used as these pose a risk of entering surface water and downstream watercourses, or impacting the effectiveness of the SuDS systems.

6.3.4 De-icing agents which include urea or sodium chloride such as rock salt should be avoided and agents which use calcium magnesium acetate, potassium acetate or similar which have less of a less adverse environmental impact used instead. De-icing agents mixed with sand can also increase sediment loads and impact the effectiveness that a SuDS surface can allow water to move to its sub-base.

6.3.5 Silt / sediment removal is a maintenance activity associated with the majority of SuDS. Testing of the sediment should be undertaken to determine its classification and subsequent appropriate deposition / disposal which may vary depending on the SuDS location and / or association with a particular type of land use. Where necessary appropriate licences should be sought for disposal of silt.

Operation and Maintenance	SuDS Component					
	Swales	**Permeable Paving**	**Bioretention Area / Rain Gardens**	**Attenuation Basin**	**Cellular Storage**	**Piped Network / Inspection Chambers / Catchpits / Gullies**
Regular Maintenance						
Inspection	■	■	■	■	■	■
Litter and debris removal	■	■	■	■	□	■
Grass cutting	■	□	■	■	□	
Weed and invasive plant control	□	□	□	□		
Shrub management (including pruning)	■	□	■	■		
Aquatic vegetation management				□		
Occasional maintenance						
Sediment management[1]	■	■	■	■	■	■
Vegetation replacement	□		□	□		
Vacuum sweeping and brushing		■				
Remedial maintenance						
Structure rehabilitation / repair	□	□	□	□	□	□
Infiltration surface reconditioning	□	□	□			

■ will be required □ may be required

[1]Sediment should be collected and managed in pre-treatment systems, upstream of the main device

Table 6.1: Typical key SuDS components operation and maintenance activities

6.4 Swales

6.4.1 Swales are shallow, flat bottomed, vegetated open channels designed to convey, attenuate and in some cases treat surface water runoff. They can enhance the natural landscape and provide aesthetic and biodiversity benefits. Swales can have a variety of profiles, can be uniform or non-uniform, and can incorporate a range of different planting strategies.

6.4.2 Regular inspection and maintenance is important for the effective operation of swales as designed. One of the most regular activities required is cutting (and removal) of the vegetation, and removal of any accumulated silt. Inlet and outfall structures require checking for any erosion and to ensure that they don't become blocked either by litter or vegetation. Sediment removal and maintenance of any hydraulic controls should also be undertaken. Occasionally sediment will need to be removed, although this can be minimised by ensuring that upstream areas are stabilised and by incorporating effective pre-treatment devices.

6.4.3 Regular mowing is also required along maintenance strips and access routes. The use of fertiliser and / or weed killers in areas adjacent to swales can cause contamination of the runoff passing though the swale and if required needs to be carefully managed.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Litter and debris removal.	Monthly, or as required
	Cut grass – to retain grass height within specified design range.	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants.	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages and clear if required.	Monthly
	Inspect vegetation coverage.	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies.	Half yearly
Occasional Maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required.	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial Maintenance	Repair erosion or other damage by re-turfing or reseeding.	As required
	Relevel uneven surfaces and reinstate design levels.	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface.	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip.	As required
	Remove and dispose of oils or petrol residues using safe standard practices.	As required

Table 6.2: The SuDS Manual Table 17.1: Operation and maintenance requirements for swales

6.5 Permeable Paving

6.5.1 Permeable pavements have a surface that is formed of a material that is itself impervious to water, however the materials are laid to provide void space between the materials. These voids allow surface water to pass between the materials and through to the sub-base below where it is temporarily stored. As such the surface of the pavement needs to be regularly cleaned to remove silt and sediment build up to maintain movement of water from the surface to the sub-base.

6.5.2 Permeable pavements have been shown to reduce the concentrations of heavy metals, hydrocarbons, sediment and some nutrients. Treatment processes occurring within permeable pavements include:

- filtration of silt and the attached pollutants,
- biodegradation of organic pollutants, such as petrol and diesel,
- adsorption of pollutants, and the
- settlement and retention of solids.

6.5.3 Permeable pavements can provide amenity and visual benefits as there are a wide range of surface materials which can be selected to meet overall planning, architectural or landscape design.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface).	Once a year, after autumn leaf all, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas.	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection.	Monthly for three months after installation
	Inspect for evidence of poor operation and / or weed growth – if required take remedial action.	Three monthly, 48hr after large storm events in first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually
	Monitor inspection chambers.	Annually

Table 6.3: The SuDS Manual Table 20.10: O&M requirements for pervious pavements

6.6 Bioretention and Rain Gardens

6.6.1 Bioretention areas and rain gardens are landscaped areas with a depressed surface formed with structural soils and vegetation. Runoff enters via the surface and filters though the different layers towards a perforated underdrain pipe connected to the wider drainage network.

6.6.2 They can help reduce pollutant levels in surface water runoff by filtering out sediments, metals and hydrocarbons and also remove dissolved pollutants by sorption to the filter medium.

6.6.3 They can be incorporated into a wide variety of landscapes using different shapes, materials, and planting, which also promote evapotranspiration.

6.6.4 Adequate access must be provided for all bioretention areas for inspection and maintenance, including the appropriate equipment and vehicles. Litter (including leaf litter) and debris removal is a key maintenance requirement to allow the surface to continue to operate as designed and could result in ponding on the surface.

Maintenance Schedule	Required Action	Frequency
Regular Inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underlain (if appropriate) to determine if maintenance is necessary.	Quarterly
	Check operation of underdrains by inspection of flows after rain.	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary.	Quarterly
	Inspect inlets and outlets for blockage.	Quarterly
Regular Maintenance	Remove litter and surface debris and weeds.	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density.	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays.	Quarterly to biannually
Occasional Maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required.	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch.	As required
Remedial Actions	Remove and replace filter medium and vegetation above.	As required but likely to be > 20 years

Table 6.4: The SuDS Manual Table 18.3: O&M requirements for bioretention systems

6.7 Attenuation Basins

6.7.1 Attenuation basins are landscaped depressions that are normally dry except during and immediately following storm events. Vegetated attenuation basins provide treatment of surface water runoff through the removal of sediment and buoyant materials, but levels of nutrients, heavy metals, toxic materials and oxygen-demanding materials may also be significantly reduced.

6.7.2 They can include small permanent wet pools, to prevent re-suspension of particles during high intensity rainfall events and / or sediment forebays to provide pre-treatment.

6.7.3 Regular mowing is required along maintenance access routes and amenity areas. Mowing or vegetation management of the main storage area should ideally retain a minimum grass of plant heights of 75–150mm to assist in filtering pollutants and retaining sediments.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Remove litter and debris.	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial Maintenance	Repair erosion or other damage by reseeding or re-turfing.	As required
	Realignment of rip-rap.	As required
	Aerate pond where signs of eutrophication are detected	As required
	Repair / rehabilitate inlets, outlets and overflows.	As required
	Relevel uneven surfaces and reinstate design levels	As required

Table 6.5: The SuDS Manual Table 22.1: O&M requirements for detention basins

6.8 Geocellular Storage

6.8.1 Geocellular storage systems are high porosity modular plastic units that can be used to efficiently create a below ground structure for the temporary storage of surface water. Their inherent flexibility in size and shape means that they can be tailored to suit the specific characteristics and requirements of most sites. This is aided by their ability to be located below both public open space and trafficked areas.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required take remedial action.	Monthly for three months, then annually

Maintenance Schedule	Required Action	Frequency
	Remove debris from the catchment surface (where may cause risks to performance).	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by silt, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and / or internal forebays.	Annually, or as required
Remedial Maintenance	Repair / rehabilitation of inlets, outlets, overflows and vents.	As required
Monitoring	Inspect / check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually
	Survey inside the tank for sediment build-up and remove if necessary.	Every 5 year as required

Table 6.6: Operation and maintenance requirements for geocellular storage

6.9 Piped Network / Inspection Chambers / Catchpits / Gullies

6.9.1 Sewers adopted by Southern Water will be maintained in accordance with their own policies and responsibilities under the Water Industry Act.

6.9.2 Piped drainage network components require regular inspection and maintenance to ensure that the individual components continue to operate as designed, both in terms of hydraulic capacity and potential pollutant removal. All the gullies, inspection chambers and catchpits will therefore be inspected and cleaned regularly.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any features that are not operating correctly. If required take remedial action	Monthly for three months, then six monthly
	Debris removal from catchment surface / gratings (where may cause risks to performance)	Monthly (and after large storms)
	Remove sediment from trapped sumps, manholes and catchpits.	Annually or as required
Remedial Maintenance	Repair / rehabilitation of gratings, inlets and outlets	As required
Monitoring	Inspect / check all gratings, trapped sumps, manholes and catchpits to ensure that they are in good condition and operating as designed	Annually and after large storm events
Structure Rehabilitation / Repair	Regular Maintenance and Monitoring to identify if repair and / or replacement of features or pipework is required.	As required

Table 6.7: Operation and maintenance requirements for pipes, inspection chambers and gullies

7 Summary and Conclusion

7.1.1 The Folds development area lies within Flood Zone 1, defined by the NPPF as land with a low probability of flooding from rivers or the sea, specifically, it has less than a 1 in 1,000 annual probability of flooding (less than 0.1%) from rivers (Fluvial Flood Risk).

7.1.2 The Surface Water Flood map similarly shows the majority of the Folds site is not a risk of surface water flooding, except for a small gully line in the northwest corner of the site. Implementation of the site earthworks strategy and the proposed development's surface water drainage system will remove this low point and manage rainfall run-off on the site.

7.1.3 Geotechnical Investigations (GI) have shown the site has shallow groundwater, however, Hampshire County Council SFRA identifies the Folds development area as having a less than 25% probability of experiencing groundwater flooding. The British Geological Survey (BGS) Susceptibility to Groundwater Flooding mapping also shows the Folds development area has limited potential for groundwater flooding.

7.1.4 The GI and groundwater monitoring have shown that infiltration drainage is not viable as a primary discharge mechanism. Therefore, the proposed surface water drainage system seeks to replicate the existing drainage regime by discharging rainfall run-off to the watercourses at the site's perimeter

7.1.5 The surface water drainage system will be designed to manage all rainfall events up to and including the 1 in 100 year + climate change design event, without surface flooding. All attenuation will be situated outside the floodplain and all water will be stored above the fluvial flood level. As such the Folds development will not be at risk from surface water flooding.

7.1.6 The development run-off will be restricted to the greenfield Q_{MED} rate, which is equivalent to a 2 year return period, for all events up to an including the 100 year return period + climate change. Therefore, proposed development will reduce the flood risk for all higher order events, compared to existing greenfield rates.

7.1.7 The surface water drainage system will utilise SuDS treatment trains in line with the strategy established in the OPP, to manage water quality and quantity, using Prevention Measures, Source Control and Site Control Techniques, and Regional Control Features.

7.1.8 The Simple Index method for water quality assessment, from the CIRIA SuDS Manual C753, has been used to demonstrate the proposed drainage system will provide adequate treatment for any potential pollutants or contaminants in the run-off.

7.1.9 In summary, the Folds development will not be at risk from flooding from any source, as per the FRA submitted with the OPP.

7.1.10 The proposed development will be safe from surface water flooding and the development will not increase flood risk elsewhere. The RMA SuDS drainage design will maintain water quality standards and has been prepared in accordance with the strategy developed for the OPP, the National Planning Policy Framework (NPPF), Planning practice Guidance (PPG) and the and the LLFA requirements.

Appendix A Landscape General Arrangement

The scaling of this drawing cannot be assured.

REFER TO INSET AREA FOR DETAILS

Foxholes Cottage

Path

28.3m Pond

INSET AREA

N

PLANNING ISSUE

Project
One Horton Heath
Folds

Drawing Title
Landscape General Arrangement:
The Folds

Date	Scale	Drawn by	Check by
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Project No	Drawing No	Revision
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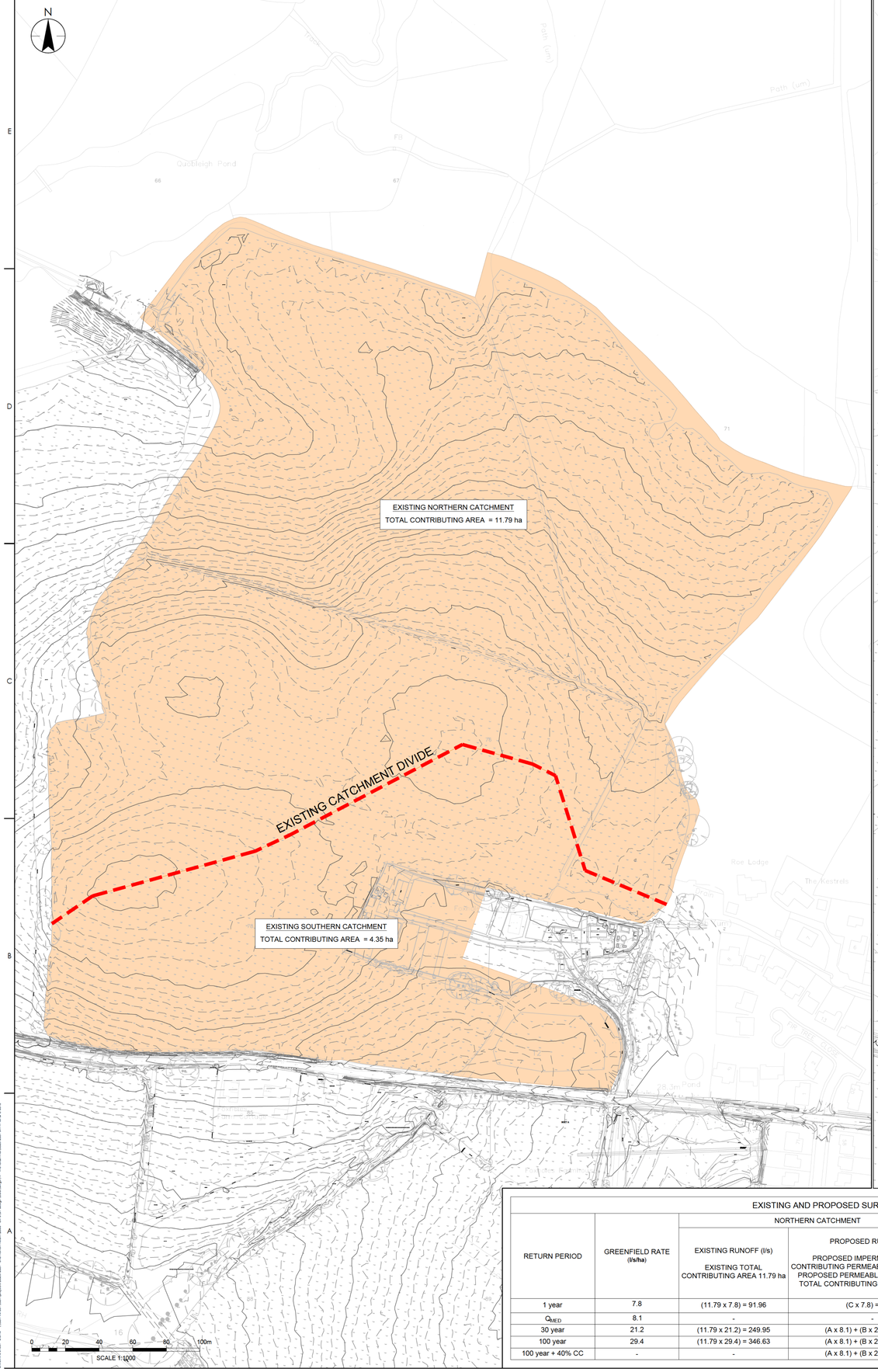
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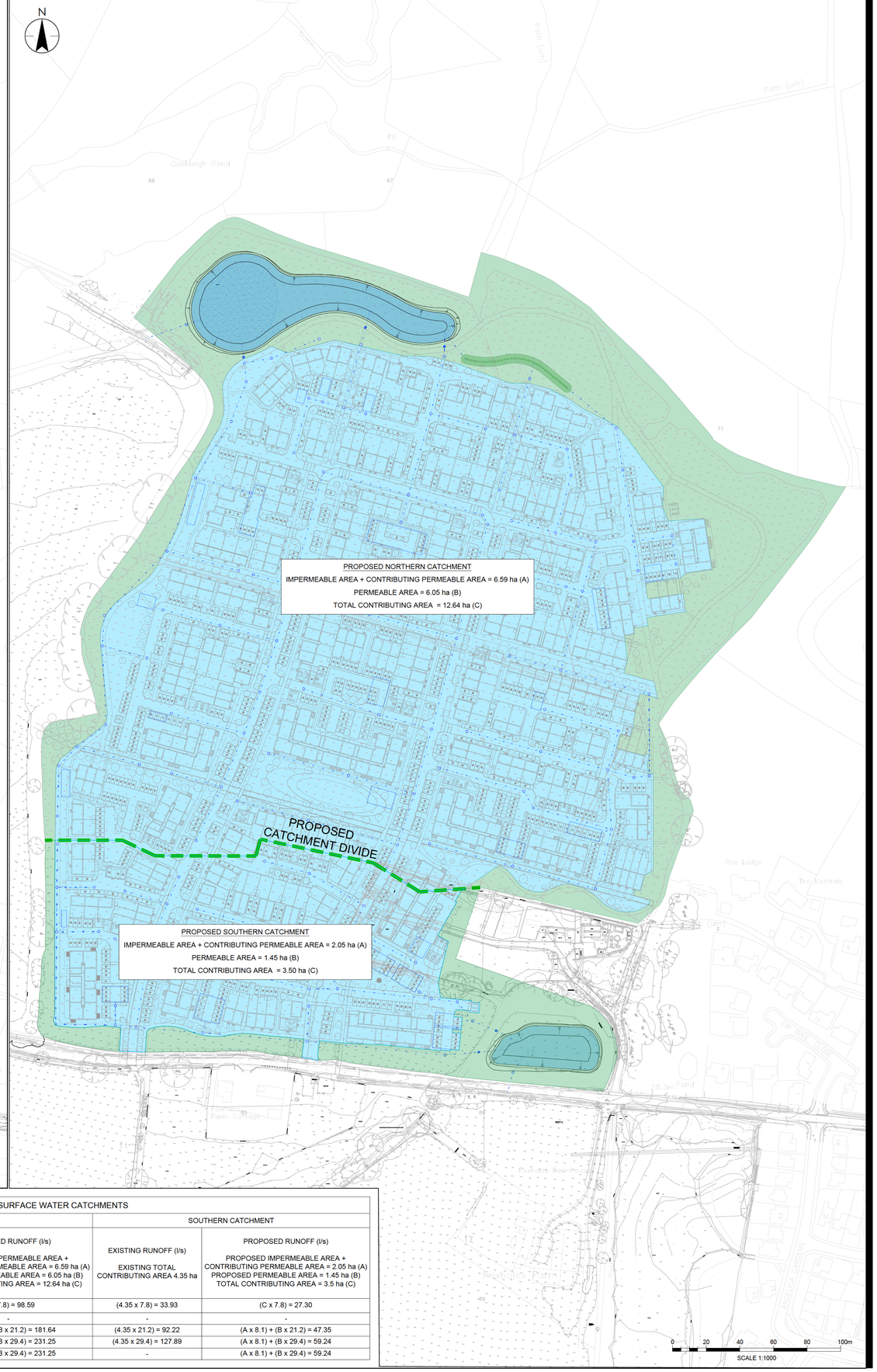
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Appendix B Existing and Proposed Catchments Drawing





EXISTING AND PROPOSED SURFACE WATER CATCHMENTS

RETURN PERIOD	GREENFIELD RATE (l/s/ha)	NORTHERN CATCHMENT		SOUTHERN CATCHMENT	
		EXISTING RUNOFF (l/s) EXISTING TOTAL CONTRIBUTING AREA 11.79 ha	PROPOSED RUNOFF (l/s) PROPOSED IMPERMEABLE AREA + CONTRIBUTING PERMEABLE AREA = 6.59 ha (A) PROPOSED PERMEABLE AREA = 6.05 ha (B) TOTAL CONTRIBUTING AREA = 12.64 ha (C)	EXISTING RUNOFF (l/s) EXISTING TOTAL CONTRIBUTING AREA 4.35 ha	PROPOSED RUNOFF (l/s) PROPOSED IMPERMEABLE AREA + CONTRIBUTING PERMEABLE AREA = 2.05 ha (A) PROPOSED PERMEABLE AREA = 1.45 ha (B) TOTAL CONTRIBUTING AREA = 3.5 ha (C)
1 year	7.8	(11.79 x 7.8) = 91.96	(C x 7.8) = 98.59	(4.35 x 7.8) = 33.93	(C x 7.8) = 27.30
Q_{MED}	8.1	-	-	-	-
30 year	21.2	(11.79 x 21.2) = 249.95	(A x 8.1) + (B x 21.2) = 181.64	(4.35 x 21.2) = 92.22	(A x 8.1) + (B x 21.2) = 47.35
100 year	29.4	(11.79 x 29.4) = 346.63	(A x 8.1) + (B x 29.4) = 231.25	(4.35 x 29.4) = 127.89	(A x 8.1) + (B x 29.4) = 59.24
100 year + 40% CC	-	-	(A x 8.1) + (B x 29.4) = 231.25	-	(A x 8.1) + (B x 29.4) = 59.24

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7. THE FOLDS HOUSING LAYOUT BASED ON DRAWING RFT-17-ZZ-DR-A-0130_S1_P12 PROVIDED BY RE-FORMAT (RECEIVED 03.12.2025).

Issued/Revision	By	Appd	
P01 FIRST ISSUE	DT	AB	2024.02.26 YYYY.MM.DD
	Dwn	Dsgn	Chkd
	DT	DT	AB 2024.02.26 YYYY.MM.DD

Issue Status

S5 - FOR REVIEW AND ACCEPTANCE

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ONE HORTON HEATH

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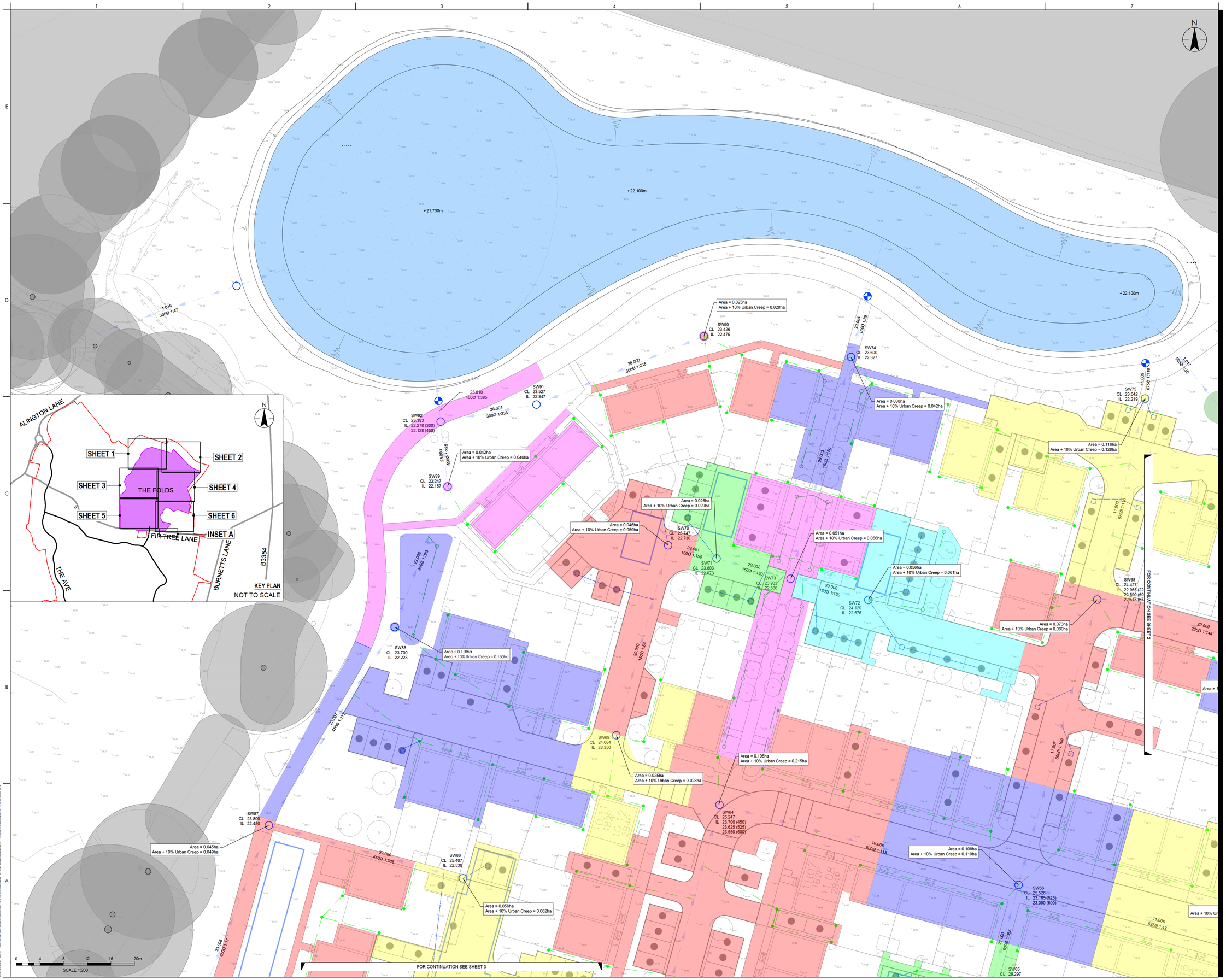
Title
THE FOLDS (PLOT 17)

EXISTING AND PROPOSED SURFACE WATER CATCHMENT AREAS

Project No.	A0 Scale
332612639	1:1000
Revision	Drawing No.
P01	332612639-STN-17-XX-DR-C-0513

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Appendix C Proposed Catchment Areas Drawings



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7. TREE SURVEY BASED ON DRAWING 11705_P36 & 11705_P37 PROVIDED BY TYLER GRANGE UNDERTAKEN ON JUNE 2025.
8. THE FOLDS HOUSING LAYOUT BASED ON DRAWING RFT-17-ZZ-DR-A-0130_S1_P12 PROVIDED BY RE-FORMAT (RECEIVED 03.12 2025).
9. ALL DRAINAGE WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS OFFERED FOR ADOPTION (DCG).
10. RWP AND SVP POSITIONS ARE SHOWN INDICATIVELY TO DEMONSTRATE HOW THE UNIT CAN CONNECT TO THE MAIN DRAINAGE SYSTEM. FINAL DETAILS WILL BE CONFIRMED AT THE DETAILED DESIGN STAGE.
11. PRIVATE SURFACE WATER DRAINS TO BE 100mm DIAMETER LAID AT 1:100 MIN GRADIENT
12. PRIVATE FOUL WATER DRAINS TO BE 100mm DIAMETER LAID BETWEEN 1:40 AND 1:80MM IN ACCORDANCE WITH PART H OF THE BUILDING REGULATIONS.

KEY

- PROPOSED ATTENUATION BASIN
- PROPOSED CELLULAR STORAGE
- PROPOSED SWALE
- PROPOSED CATCHMENTS AREAS

PROPOSED (S104 ADOPTABLE)

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED HEADWALL

PROPOSED (PRIVATE)

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED LAND DRAIN N PERMEABLE PAVING AND DIFFUSER UNIT
- PROPOSED LAND DRAIN N RAIN GARDEN / BIORETENTION AND D FFUSER UNIT
- EXIST NG TREE ROOT PROTECTION ZONES

P01	FIRST ISSUE	DT	AB	2026.02.13
Issued/Revision		By	Appd	YYYY.MM.DD
		DT	DT	AB	2026.02.13
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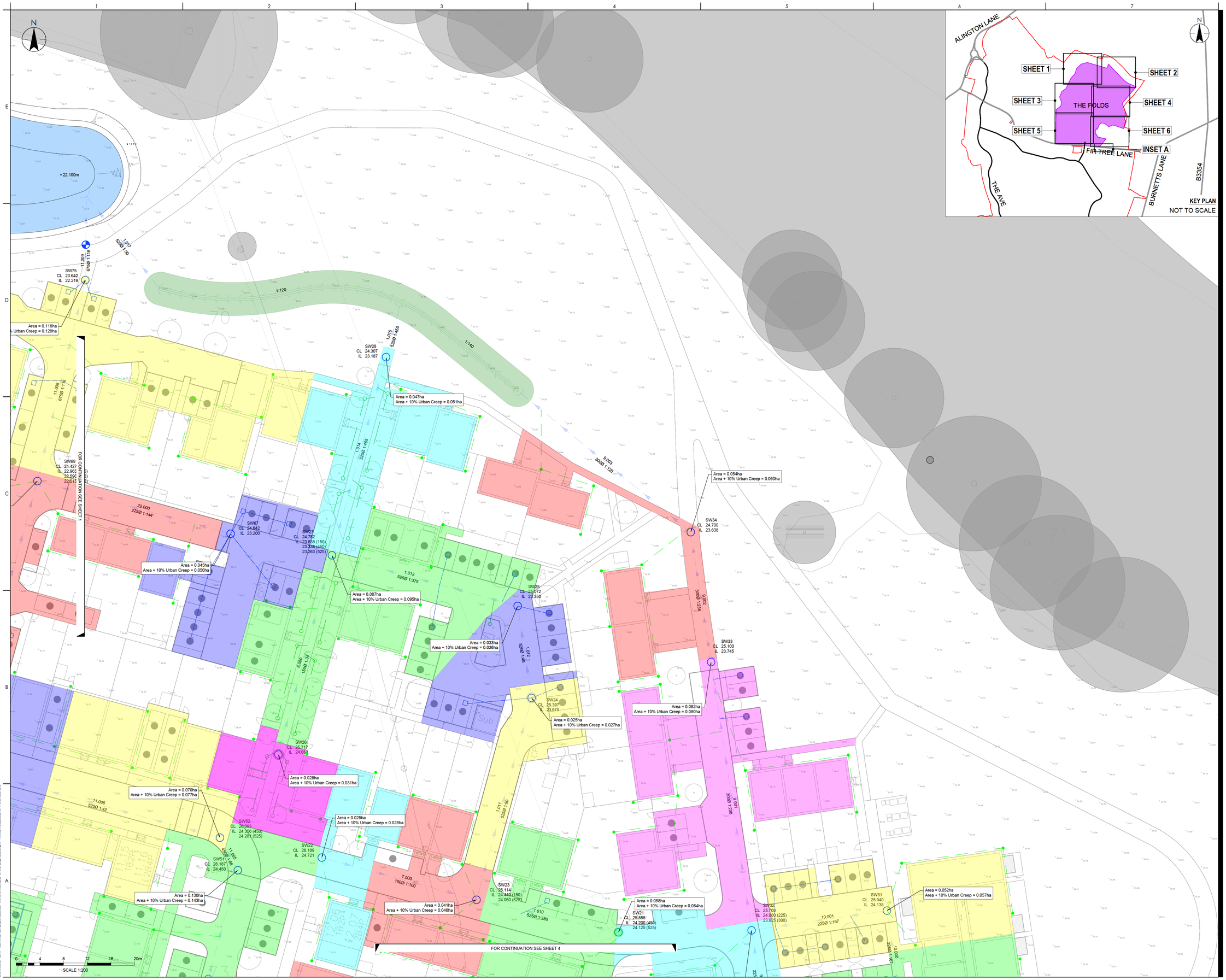
Title

THE FOLDS (PLOT 11)

SURFACE WATER CATCHMENT AREAS (SHEET 1 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	**Drawing No.**
P01	**332612639-STN-17-XX-DR-C-0507**

Plotted: 27.02.2026 10:05:27 | Last Plotted By: Bonhomme, Amy
Drawing Path: I:\332612639\07 Drawings\05 Civil\01 Design\Civil\Drawings\332612639-STN-17-XX-DR-C-0507.dwg



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KEY

- PROPOSED ATTENUATION BAS N
- PROPOSED CELLULAR STORAGE
- PROPOSED SWALE
- PROPOSED CATCHMENTS AREAS

PROPOSED (S104 ADOPTABLE)

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED HEADWALL

PROPOSED (PRIVATE)

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED LAND DRAIN N RAIN GARDEN / BIORETENTION AND D FFUSER UNIT
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P01 FIRST ISSUE		DT	AB	2024.02.13
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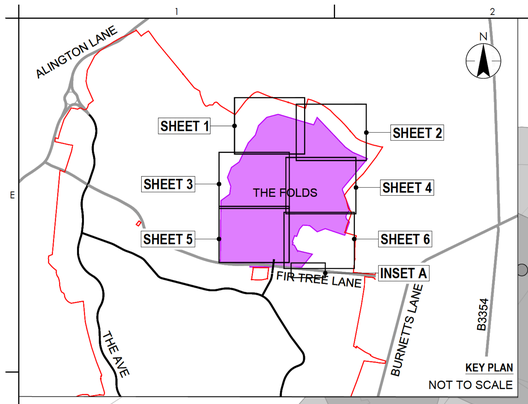
Title

THE FOLDS (PLOT 11)

SURFACE WATER CATCHMENT AREAS (SHEET 2 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P01	332612639-STN-17-XX-DR-C-0508

Plotted: 27.02.2026 20:52:27 2:31:39 PM By: BarthJohnsmeier, Anna
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FOR CONTINUATION SEE SHEET 1

SW85 CL 26.477 IL 25.350 (225) 25.275 (300) 25.125 (450)
Area = 0.015h
Area + 10% Urban Creep = 0.016h
26.000 2250 1:167
Area = 0.081ha
Area + 10% Urban Creep = 0.089ha
SW84 CL 27.542 IL 25.613
SW62 CL 27.772 IL 26.225
20.000 2250 1:30
Area = 0.029ha
Area + 10% Urban Creep = 0.032ha
23.005 3000 1:33
SW83 CL 27.505 IL 26.075 (225) 25.850 (450) 25.775 (525)
Area = 0.195ha
Area + 10% Urban Creep = 0.215ha
16.005 5250 1:33
Area = 0.097ha
Area + 10% Urban Creep = 0.107ha
SW48 CL 27.825 IL 26.475
15.000 2250 1:167
SW49 CL 28.551 IL 26.269
Area = 0.074ha
Area + 10% Urban Creep =
SW83 CL 28.125 IL 26.891
Area = 0.008ha
Area + 10% Urban Creep = 0.009h
SW59 CL 28.341 IL 26.841
19.000 3000 1:238
Area = 0.080ha
Area + 10% Urban Creep = 0.088ha
SW60 CL 28.513 IL 26.783
19.001 3000 1:238
Area = 0.057ha
Area + 10% Urban Creep = 0.610ha
16.004 4000 1:54
SW61 CL 28.665 IL 26.636 (300) 26.486 (450)
Area = 0.068ha
Area + 10% Urban Creep = 0.075ha
SW82 CL 29.025 IL 27.047 (225) 26.972 (300)
23.004 3000 1:238
25.000 2250 1:30
SW81 CL 29.212 IL 27.912
Area = 0.053ha
Area + 10% Urban Creep = 0.058ha
23.003 3000 1:167
SW58 CL 29.800 IL 27.547 (300) 27.397 (456)
Area = 0.085ha
Area + 10% Urban Creep = 0.093ha
16.002 3000 1:19
Area = 0.115ha
Area + 10% Urban Creep = 0.126ha
SW45 CL 29.645 IL 28.108
14.000 3000 1:238
Area = 0.154ha
Area + 10% Urban Creep = 0.169ha
SW46 30.259 27.985 (225 27.910 (300
Area = 0.095ha
Area + 10% Urban Creep = 0.105ha
SW56 CL 30.725 IL 29.225
18.000 3000 1:238
SW80 CL 29.509 IL 27.318 (225) 27.243 (300)
Area = 0.028ha
Area + 10% Urban Creep = 0.031ha
22.000 2250 1:167
SW57 CL 30.721 IL 29.036
Area = 0.057ha
Area + 10% Urban Creep = 0.063ha
Area = 0.076ha
Area + 10% Urban Creep = 0.083ha
SW42 CL 31.165 IL 28.990
Area = 0.083ha
Area + 10% Urban Creep = 0.091ha
SW79 CL 29.029 IL 27.477
23.001 2250 1:167
24.000 2250 1:167
SW78 CL 30.850 IL 29.425
Area = 0.071ha
Area + 10% Urban Creep = 0.078ha
16.001 3000 1:45
13.000 2250 1:167
Area = 0.065ha
Area + 10% Urban Creep = 0.071a
SW77 CL 28.730 IL 27.571
SW54 CL 31.500 IL 30.000
Area = 0.093ha
Area + 10% Urban Creep = 0.095ha
17.000 3000 1:238
SW43 CL 30.315 IL 28.695
13.001 2250 1:45
SW55
017ha
019ha

FOR CONTINUATION SEE SHEET 5

FOR CONTINUATION SEE SHEET 4

0 4 8 12 16 20m
SCALE 1:200

Printed: 27.02.2026 09:05:27 BY Ella Bartholomew Alma
DRAWING PART - ROAD - I:\cdm-49\05-cad\graphics\0326-0329 - one horton heath\0326 - one horton heath.dwg

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KEY

- PROPOSED ATTENUATION BASIN
- PROPOSED CELLULAR STORAGE
- PROPOSED SWALE
- PROPOSED CATCHMENTS AREAS

PROPOSED (S104 ADOPTABLE)

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED HEADWALL

PROPOSED (PRIVATE)

- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED LAND DRAIN N PERMEABLE PAVING AND DIFFUSER UNIT
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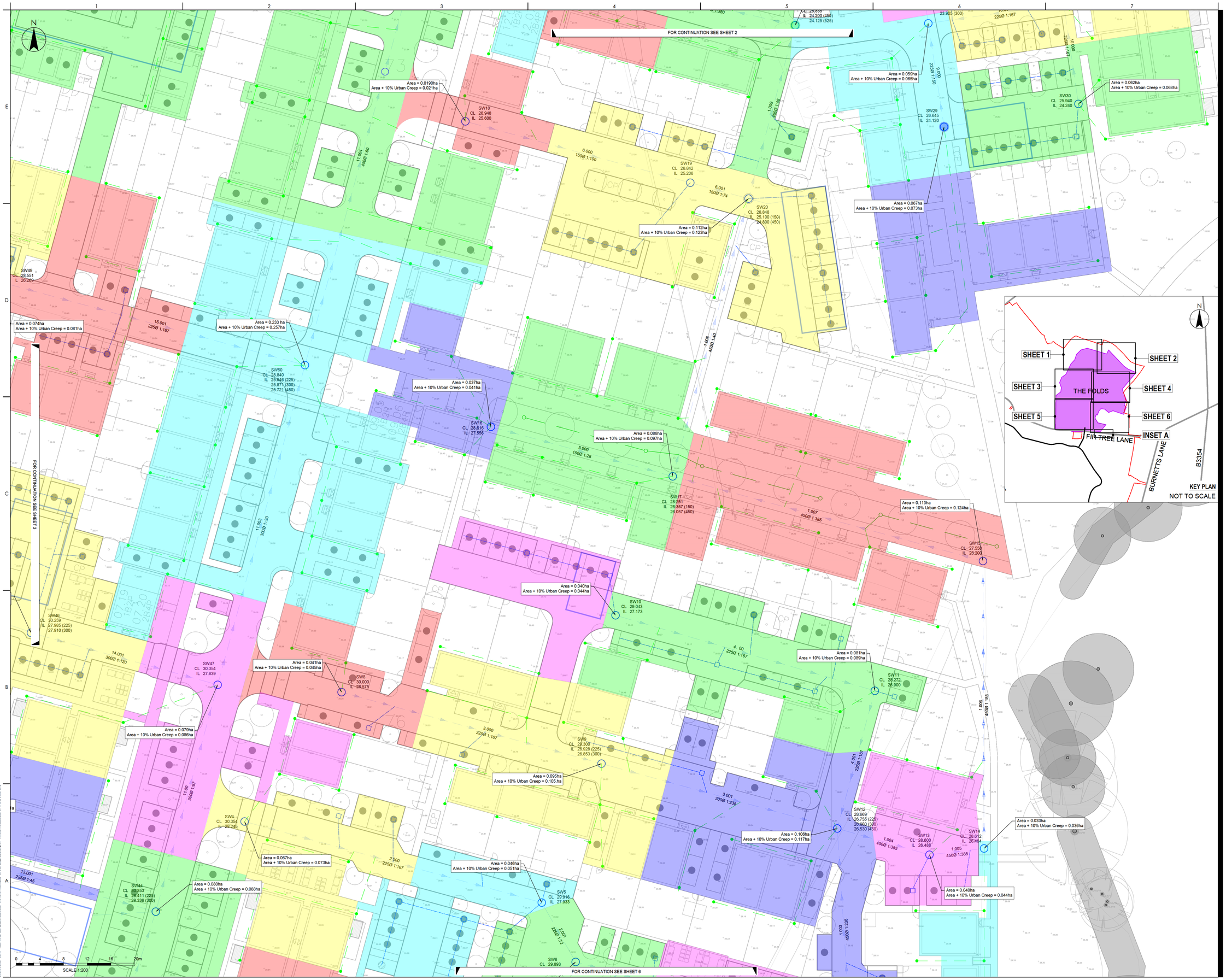
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Title
THE FOLDS (PLOT 11)

SURFACE WATER CATCHMENT AREAS (SHEET 3 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	**Drawing No.**
P01	**332612639-STN-17-XX-DR-C-0509**



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- PROPOSED CATCHMENTS AREAS

PROPOSED (S104 ADOPTABLE)

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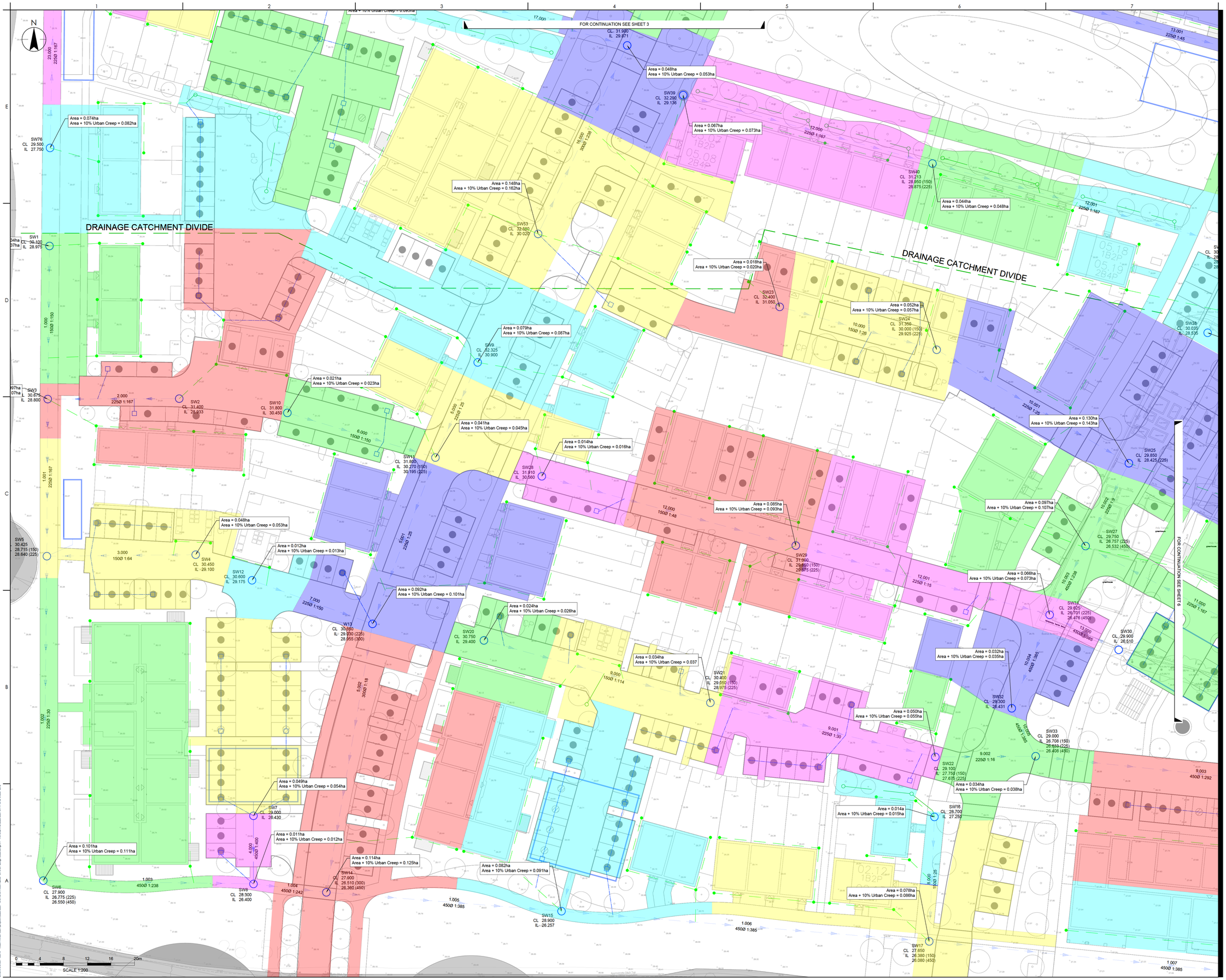
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Title

THE FOLDS (PLOT 11)

SURFACE WATER CATCHMENT AREAS (SHEET 4 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P01	332612639-STN-17-XX-DR-C-0510



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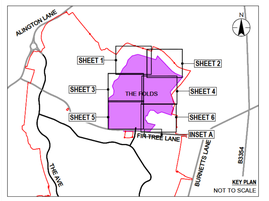
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PROPOSED (S104 ADOPTABLE)

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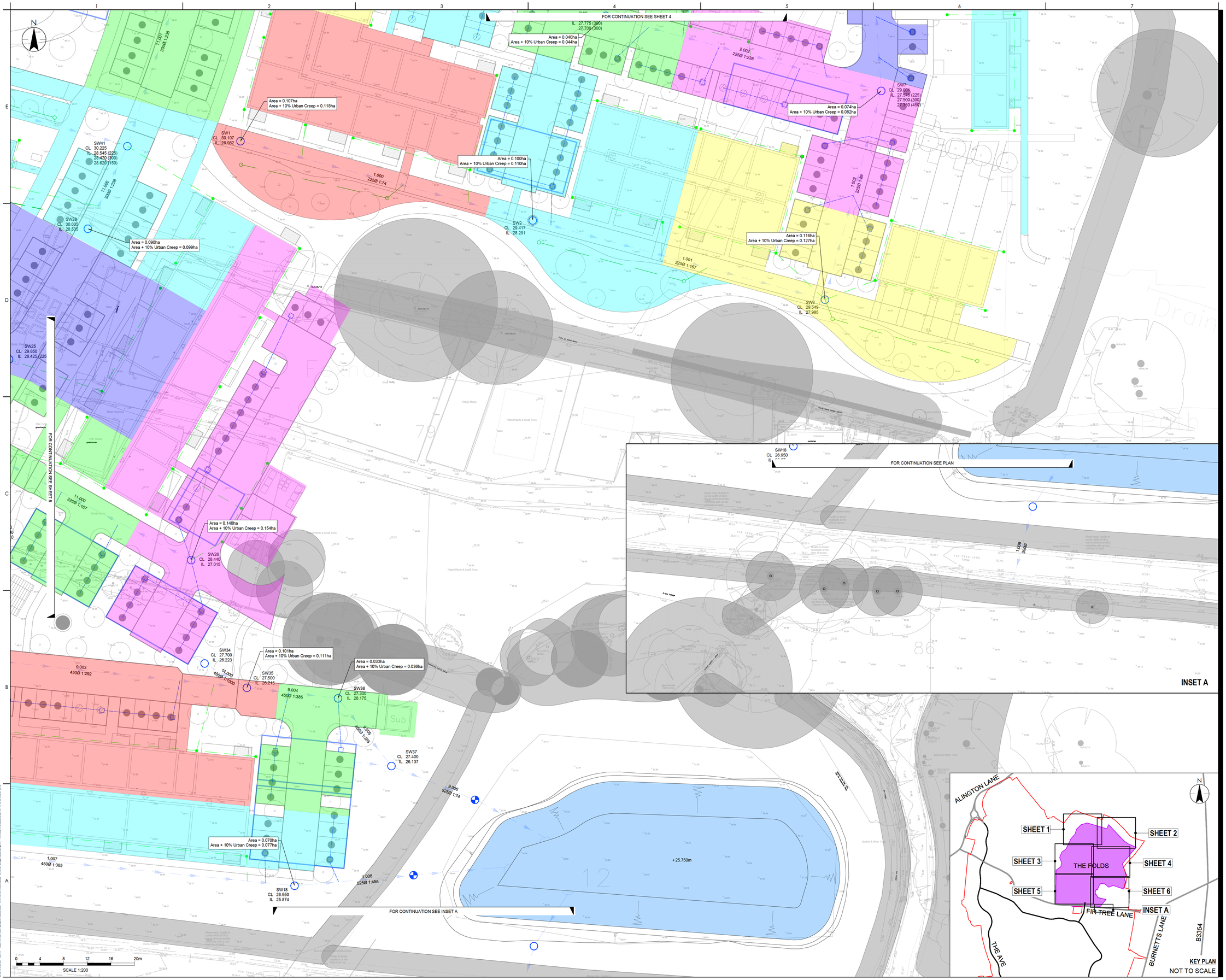
Title

THE FOLDS (PLOT 11)

SURFACE WATER CATCHMENT AREAS (SHEET 5 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P01	332612639-STN-17-XX-DR-C-0511

Plotted: 27.02.2026 20:52:27 | 1:2.54 | File By: BarthJohnsmeier, Anna
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Title
THE FOLDS (PLOT 17)

SURFACE WATER CATCHMENT AREAS (SHEET 6 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	**Drawing No.**
P01	**332612639-STN-17-XX-DR-C-0512**

Plotted: 27.02.2026 09:02:27 | By: Pat Fry, Bytelicense: Army
DRAWING SHEET - ISO A1 | C:\Users\PFRY\Desktop\temp\332612639_ONE HORTON HEATH_CIVILS_pfry.rvt | Model: Copy_of_Site Model | Model: Copy_of_Site Model

Appendix D Proposed Drainage Layout Drawings

NORTHERN ATTENUATION BASIN
BED LEVEL = 22.100
BED AREA = 3,000m² WITH 1:3 SIDE SLOPES
LOWER BED LEVEL = 21.700
LOWER BED AREA = 1,750m²
COVER LEVEL = 23.300
AREA AT COVER LEVEL = 4,725m²
FREEBOARD = 300mm
TOP WATER LEVEL (1:100YR + 40% CLIMATE CHANGE) = 23.021

+22.100m
+21.700m
+22.100m
+22.100m

HEADWALL
IL 22.100m

HEADWALL
IL 21.700m

SW93
CL 23.300
IL 21.700
CONTROL: HYDROBRAKE
MAXIMUM DISCHARGE RATE: 52.50l/s

HEADWALL
IL 21.100m

1.018
3000 1:47

HEADWALL
IL 22.100m

DOWNSTREAM DEFENDER

DOWNSTREAM DEFENDER

DOWNSTREAM DEFENDER

SW90
CL 23.426
IL 22.475

F31
CL 23.525
IL 22.025

F30
CL 23.525
IL 22.118

SW74
CL 23.600
IL 22.327

F32
CL 23.600
IL 21.825

SW91
CL 23.627
IL 22.347

SW92
CL 23.183
IL 22.278 (300)
22.128 (450)

SW89
CL 23.247
IL 22.157

F33
CL 23.350
IL 21.626

SW88
CL 23.700
IL 22.223

SW69
CL 24.684
IL 23.350

SW75
CL 23.642
IL 22.219

F28
CL 23.800
IL 22.450

F29
CL 23.975
IL 22.442

SW70
CL 23.747
IL 22.730

SW71
CL 23.803
IL 22.473

SW73
CL 23.933
IL 22.566

SW72
CL 24.129
IL 22.676

F27
CL 24.425
IL 23.075

SW68
CL 24.427
IL 22.965 (225)
22.590 (600)
22.515 (675)

F60
CL 22.625
IL 21.470 (150)
21.395 (225)

F58
CL 25.150
IL 23.900 (150)
23.725 (225)

SW64
CL 25.247
IL 23.700 (450)
23.625 (525)
23.550 (600)

F57
CL 25.375
IL 24.025

F48
CL 25.200
IL 23.850

F47
CL 25.200
IL 24.070

SW66
CL 25.528
IL 23.785 (525)
23.060 (600)

F75
CL 23.500
IL 21.330 (150)
21 255 (225)

SW87
CL 23.800
IL 22.450

SW86
CL 25.407
IL 22.538

F45
CL 26.800
IL 24.285

F46
CL 26.800

SW65
CL 26.297

Attenuation Tank
Area = 40m²
Height = 0.5m

Attenuation Tank
Area = 50m²
Height = 0.5m

Attenuation Tank
Area = 50m²
Height = 0.5m

Attenuation Tank
Area = 125m²
Height = 0.5m

Attenuation Tank
Area = 238m²
Height = 0.5m

28.000
3000 1:238

28.001
3000 1:238

23.010
4500 1:385

23.009
4500 1:385

23.008
4500 1:385

29.000
1500 1:54

29.004
1500 1:89

F1.015
1500 1:150

F1.016
1500 1:150

F1.017
1500 1:150

F1.014
1500 1:150

F1.013
1500 1:73

F1.012
1500 1:150

F1.011
1500 1:150

F1.010
1500 1:150

F1.009
1500 1:150

F1.008
1500 1:150

F1.007
1500 1:150

F1.018
1500 1:150

F1.019
2250 1:150

F9.010
2250 1:28

F9.009
1500 1:150

F9.008
1500 1:100

F9.007
1500 1:100

F13.001
1500 1:150

F17.008
1500 1:10

29.001
1500 1:150

29.002
1500 1:150

30.000
1500 1:150

29.003
1500 1:150

22.000
2250 1:144

11.009
6750 1:118

11.008
6750 1:118

11.007
6000 1:100

11.006
5250 1:42

1.017
5000 1:50

16.006
6000 1:113

21.006
4500 1:77

21.005
4500 1:77

27.000
4500 1:385

FOUL DRAINAGE NETWORK TO CONNECT INTO THE HOMESTAL FOUL DRAINAGE NETWORK

FOR CONTINUATION SEE SHEET 2

FOR CONTINUATION SEE SHEET 3

ALINGTON LANE
THE FOLDS
FIR TREE LANE
THE AVE
BURNETTS LANE
B3354
SHEET 1
SHEET 2
SHEET 3
SHEET 4
SHEET 5
SHEET 6
INSET A

KEY PLAN
NOT TO SCALE

0 4 8 12 16 20m
SCALE 1:200

N

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8. THE FOLDS HOUSING LAYOUT BASED ON DRAWING RFT-17-ZZ-DR-A-0130_S1_P12 PROVIDED BY RE-FORMAT (RECEIVED 03.12 2025).
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KEY

- PROPOSED ATTENUATION BASIN
- PROPOSED PERMEABLE PAVING
- PROPOSED CELLULAR STORAGE
- PROPOSED RAIN GARDEN / BIORETENTION
- PROPOSED SWALE

PROPOSED (S104 ADOPTABLE)

- PROPOSED FOUL WATER SEWER AND MANHOLE
- PROPOSED SURFACE WATER SEWER AND MANHOLE
- PROPOSED HEADWALL

PROPOSED (PRIVATE)

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- EXIST NG TREE ROOT PROTECTION ZONES

P03	NORTHERN POND DISCHARGE RATE AMENDED CHANGES TO PRIVATE SURFACE WATER DRAINAGE	AB	DH	2026.02.19
P02	MASTERPLAN LAYOUT UPDATED AND DRAINAGE AMENDED TO SUIT	DT	AB	2025.12.09
P01	FIRST ISSUE	DT	DH	2025.11.12
Issued/Revision		By	Appd	YYYY.MM.DD
		WH	JLW	DH
		Dwn	Dsgn	Chkd
				YYYY.MM.DD

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ONE HORTON HEATH

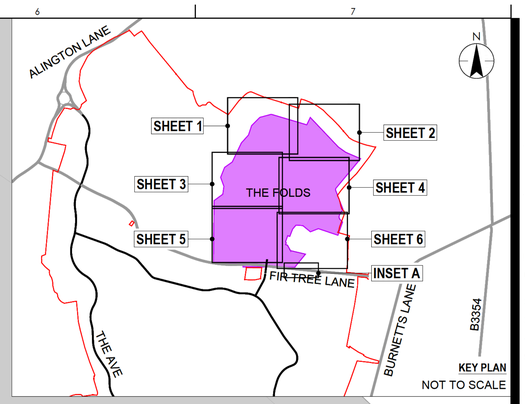
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Title
THE FOLDS (PLOT 11)

COMBINED DRAINAGE LAYOUT (SHEET 1 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P03	332612639-STN-17-XX-DR-C-0501

Plotted: 27.02.2026 10:54:32 | 17.40.51 | File By: BarthlomewA | Anne
Site Data: 332612639 - ONE HORTON HEATH\03 - Drawings\01 - Working\Civil\Drawings\17 - Plot 11\Site Area\332612639-STN-17-XX-DR-C-0501.dwg



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P03 CHANGES TO PRIVATE SURFACE WATER DRAINAGE	AB	DH	2026.02.19
P02 MASTERPLAN LAYOUT UPDATED AND DRAINAGE AMENDED TO SUIT	DT	AB	2025.12.09
P01 FIRST ISSUE	DT	DH	2025.11.12
Issued/Revision	By	Appd	YYYY.MM.DD
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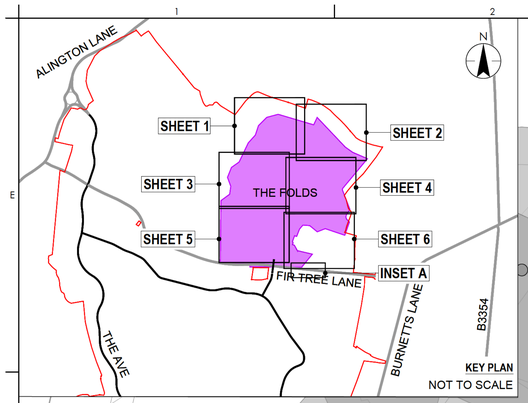
Title

THE FOLDS (PLOT 11)

COMBINED DRAINAGE LAYOUT (SHEET 2 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P03	332612639-STN-17-XX-DR-C-0502

SCALE 1:200



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P03 CHANGES TO PRIVATE SURFACE WATER DRAINAGE	AB	DH	2026.02.19
P02 MASTERPLAN LAYOUT UPDATED AND DRAINAGE AMENDED TO SUIT	DT	AB	2025.12.09
P01 FIRST ISSUE	DT	DH	2025.11.12
Issued/Revision	By	Appd	YYYY.MM.DD
	WH	AW	DH 2025.11.12
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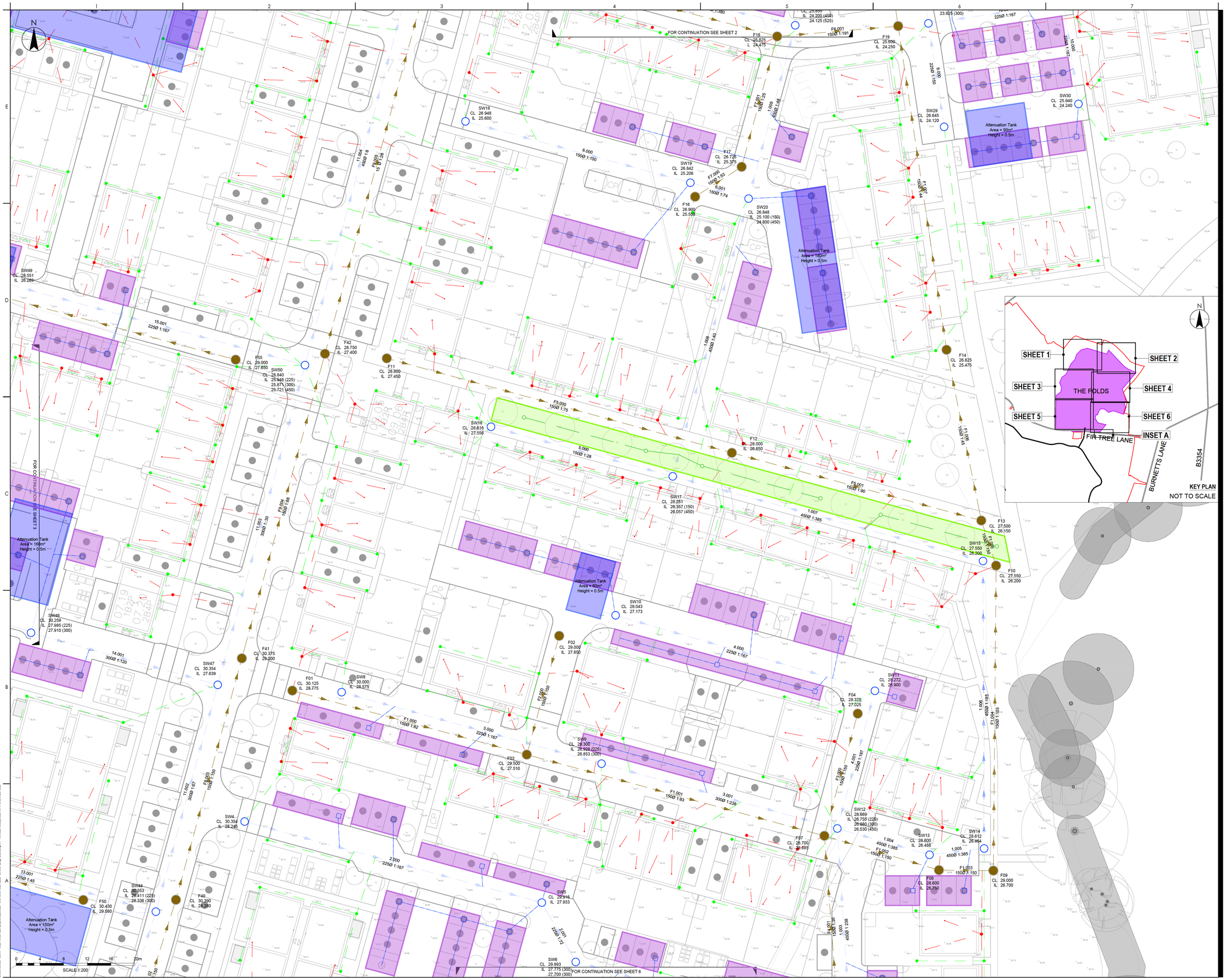
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Title

THE FOLDS (PLOT 11)

COMBINED DRAINAGE LAYOUT (SHEET 3 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P03	332612639-STN-17-XX-DR-C-0503



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Client/Project

ONE HORTON HEATH

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Title

THE FOLDS (PLOT 11)

COMBINED DRAINAGE LAYOUT (SHEET 4 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P03	332612639-STN-17-XX-DR-C-0504



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12. PRIVATE FOUL WATER DRAINS TO BE 100mm DIAMETER LAID BETWEEN 1:40 AND 1:80MM IN ACCORDANCE WITH PART H OF THE BUILDING REGULATIONS.

KEY

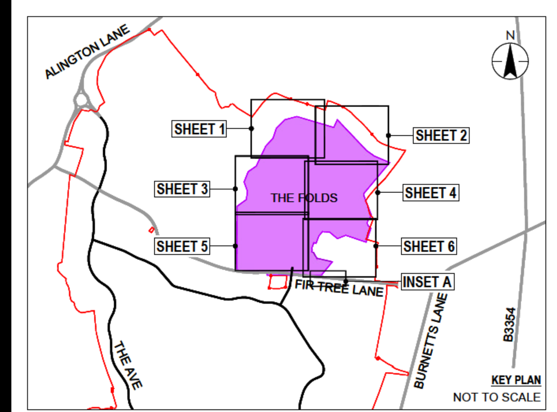
PROPOSED ATTENUATION BASIN
PROPOSED PERMEABLE PAVING
PROPOSED CELLULAR STORAGE
PROPOSED RAIN GARDEN / BIORETENTION
PROPOSED SWALE

PROPOSED (S104 ADOPTABLE)

PROPOSED FOUL WATER SEWER AND MANHOLE
PROPOSED SURFACE WATER SEWER AND MANHOLE
PROPOSED HEADWALL

PROPOSED (PRIVATE)

PROPOSED SURFACE WATER SEWER AND MANHOLE
PROPOSED FOUL WATER SEWER AND MANHOLE
PROPOSED LAND DRAIN N PERMEABLE PAVING AND DIFFUSER UNIT
PROPOSED LAND DRAIN N RAIN GARDEN / BIORETENTION AND D FFUSER UNIT
EXIST NG TREE ROOT PROTECTION ZONES



P03	CHANGES TO PRIVATE SURFACE WATER DRAINAGE	AB	DH	2026.02.20
P02	MASTERPLAN LAYOUT UPDATED AND DRAINAGE AMENDED TO SUIT	DT	AB	2025.12.09
P01	FIRST ISSUE	DT	DH	2025.11.12
Issued/Revision		By	Appd	YYYY MM DD

WH	JLW	DH	2025 11 12
Dwn	Dsgn	Chkd	YYYY MM DD

Issue Status

S5 - FOR REVIEW AND ACCEPTANCE

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Client/Project Logo

EASTLEIGH BOROUGH COUNCIL

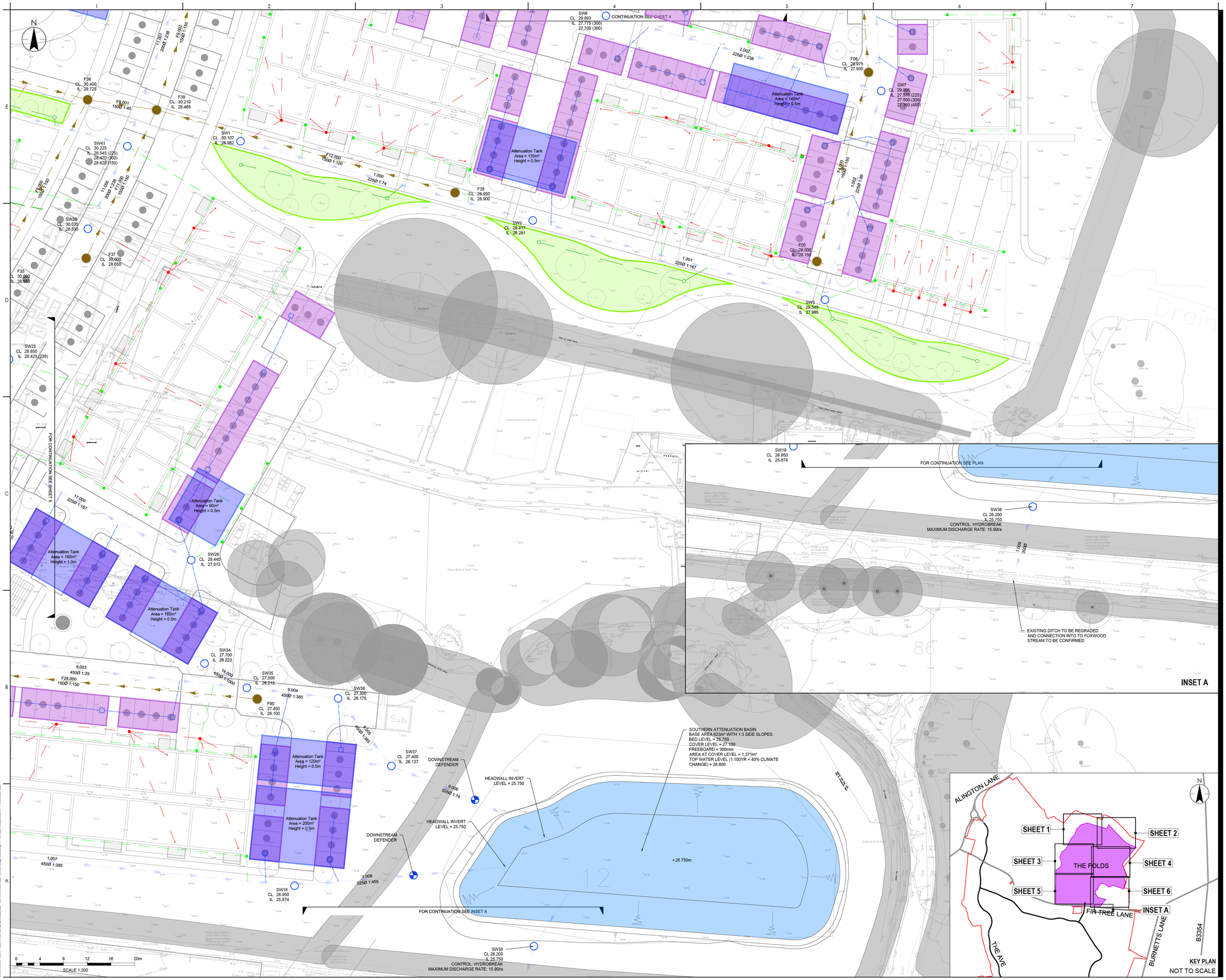
Client/Project
ONE HORTON HEATH

EASTLEIGH BOROUGH COUNCIL

Title
THE FOLDS (PLOT 11)

COMBINED DRAINAGE LAYOUT (SHEET 5 OF 6)

Project No. 332612639
A0 Scale 1:200
Revision P03
Drawing No. 332612639-STN-17-XX-DR-C-0505



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Notes

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEER'S AND LANDSCAPING DRAWINGS.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THIS DRAWING.
4. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM (AOD)
5. THE USE OF THIS DRAWING DOES NOT ABSOLVE THE CLIENT FROM THEIR RESPONSIBILITIES IN REGARDS TO HEALTH & SAFETY AND CDM REGULATIONS.
6. TOPOGRAPHICAL SURVEY PROVIDED BY ENCOMPASS SURVEYS UNDERTAKEN ON SEPTEMBER 2024. ADDITIONAL SURVEY OF FIR TREE LANE PROVIDED BY ENCOMPASS GEOSPATIAL UNDERTAKEN ON JULY 2025.
7. TREE SURVEY BASED ON DRAWING 11705_P36 & 11705_P37 PROVIDED BY TYLER GRANGE UNDERTAKEN ON JUNE 2025.
8. THE FOLDS HOUSING LAYOUT BASED ON DRAWING RFT-17-ZZ-DR-A-0130_S1_P12 PROVIDED BY RF-FORMAT (RECEIVED 03.12 2025).
9. ALL DRAINAGE WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS OFFERED FOR ADOPTION (DCG).
10. RWP AND SVP POSITIONS ARE SHOWN INDICATIVELY TO DEMONSTRATE HOW THE UNIT CAN CONNECT TO THE MAIN DRAINAGE SYSTEM. FINAL DETAILS WILL BE CONFIRMED AT THE DETAILED DESIGN STAGE.
11. PRIVATE SURFACE WATER DRAINS TO BE 100mm DIAMETER LAID AT 1:100 MIN GRADIENT
12. PRIVATE FOUL WATER DRAINS TO BE 100mm DIAMETER LAID BETWEEN 1:40 AND 1:80MM IN ACCORDANCE WITH PART H OF THE BUILDING REGULATIONS.

KEY

- PROPOSED ATTENUATION BAS N
- PROPOSED PERMEABLE PAVING
- PROPOSED CELLULAR STORAGE
- PROPOSED RAIN GARDEN / BIORETENTION
- PROPOSED SWALE

PROPOSED (S104 ADOPTABLE)

- PROPOSED FOUL WATER SEWER AND MANHOLE
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- EXIST NG TREE ROOT PROTECTION ZONES

Issued/Revision	By	Appd	YYYY.MM.DD
P03 CHANGES TO PRIVATE SURFACE WATER DRAINAGE AND SOUTHERN POND LEVELS AMENDED	AB	DH	2026.02.19
P02 MASTERPLAN LAYOUT UPDATED AND DRAINAGE AMENDED TO SUIT	DT	AB	2025.12.09
P01 FIRST ISSUE	DT	DH	2025.11.12
	WH	JLW	DH 2025.11.12
	Dwn	Dsgn	Chkd YYYY.MM.DD

Issue Status

S5 - FOR REVIEW AND ACCEPTANCE

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Client/Project Logo

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Client/Project
ONE HORTON HEATH

EASTLEIGH BOROUGH COUNCIL

Title
THE FOLDS (PLOT 17)

COMBINED DRAINAGE LAYOUT (SHEET 6 OF 6)

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P03	332612639-STN-17-XX-DR-C-0506

Plotted: 27.02.2026 20:02:27 | 332612639 | By: Ryan Bowman - Army
C:\Work\332612639\Design\Civil\332612639-STN-17-XX-DR-C-0506.dwg

Appendix E MicroDrainage Calculations Northern Network

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.840
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

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	51.134	0.691	74.0	0.118	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	51.134	0.305	167.7	0.110	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	36.515	0.410	89.1	0.127	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	50.00	4.56	28.982	0.118	0.0	0.0	0.0	1.52	60.5	17.9
1.001	50.00	5.41	28.291	0.228	0.0	0.0	0.0	1.01	40.0	34.6
1.002	48.79	5.85	27.985	0.355	0.0	0.0	0.0	1.39	55.1	52.5

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
2.000	52.025	0.312	167.0	0.073	4.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	11.541	0.158	73.0	0.051	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	48.181	0.200	240.9	0.044	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	35.301	0.820	43.1	0.082	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.000	45.524	1.647	27.6	0.045	4.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	41.292	0.173	238.7	0.105	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	45.606	0.273	167.1	0.044	4.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	24.107	0.145	166.0	0.089	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	16.192	0.042	385.5	0.117	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.005	9.281	0.024	386.7	0.044	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	48.556	0.262	185.0	0.036	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.007	54.304	0.145	375.7	0.124	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	31.825	1.198	26.6	0.041	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	48.630	1.257	38.7	0.097	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.000	39.365	0.394	100.0	0.021	4.00	0.0	0.600	o	150	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	50.00	4.86	28.245	0.073	0.0	0.0	0.0	1.01	40.1	11.1
2.001	50.00	4.98	27.933	0.124	0.0	0.0	0.0	1.53	60.9	18.8
2.002	49.11	5.78	27.700	0.168	0.0	0.0	0.0	1.01	71.3	25.0
1.003	47.87	6.03	27.350	0.605	0.0	0.0	0.0	3.11	493.9	87.9
3.000	50.00	4.30	28.575	0.045	0.0	0.0	0.0	2.50	99.3	6.8
3.001	50.00	4.98	26.853	0.150	0.0	0.0	0.0	1.01	71.6	22.7
4.000	50.00	4.75	27.173	0.044	0.0	0.0	0.0	1.01	40.1	6.7
4.001	50.00	5.15	26.900	0.133	0.0	0.0	0.0	1.01	40.2	20.2
1.004	46.67	6.30	26.530	1.005	0.0	0.0	0.0	1.03	163.7	142.3
1.005	46.02	6.45	26.488	1.049	0.0	0.0	0.0	1.03	163.5	146.4
1.006	43.86	6.99	26.464	1.085	0.0	0.0	0.0	1.49	237.2	146.4
1.007	40.90	7.86	26.201	1.209	0.0	0.0	0.0	1.04	165.9	150.0
5.000	50.00	4.27	27.556	0.041	0.0	0.0	0.0	1.96	34.7	6.2
1.008	40.15	8.11	26.057	1.347	0.0	0.0	0.0	3.28	521.1	164.0
6.000	50.00	4.65	25.600	0.021	0.0	0.0	0.0	1.00	17.8	3.2

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
6.001	10.191	0.106	96.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.009	29.292	0.600	48.8	0.123	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	24.667	0.065	379.5	0.064	0.00	0.0	0.600	o	525	Pipe/Conduit	
7.000	27.082	0.281	96.4	0.028	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.011	35.345	0.385	91.8	0.046	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.012	15.709	0.325	48.3	0.027	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.013	32.507	0.087	373.6	0.036	0.00	0.0	0.600	o	525	Pipe/Conduit	
8.000	34.627	1.012	34.2	0.031	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.014	34.699	0.076	456.6	0.095	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.015	8.866	0.028	316.6	0.051	0.00	0.0	0.600	o	525	Pipe/Conduit	
9.000	17.678	0.120	147.3	0.073	4.00	0.0	0.600	o	225	Pipe/Conduit	
10.000	17.110	0.102	167.7	0.068	4.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	23.097	0.138	167.4	0.057	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.001	42.874	0.180	238.0	0.065	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)
6.001	50.00	4.82	25.206	0.021	0.0	0.0	0.0	1.03	18.1	3.2
1.009	39.66	8.27	24.800	1.491	0.0	0.0	0.0	2.92	463.7	179.4
1.010	38.67	8.63	24.125	1.555	0.0	0.0	0.0	1.14	247.6	182.4
7.000	50.00	4.44	24.721	0.028	0.0	0.0	0.0	1.02	18.1	4.2
1.011	38.01	8.88	24.060	1.629	0.0	0.0	0.0	2.34	506.2	187.8
1.012	37.81	8.97	23.675	1.656	0.0	0.0	0.0	3.23	698.7	189.9
1.013	36.67	9.44	23.350	1.692	0.0	0.0	0.0	1.15	249.5	189.9
8.000	50.00	4.33	24.650	0.031	0.0	0.0	0.0	1.73	30.5	4.7
1.014	35.44	9.99	23.263	1.818	0.0	0.0	0.0	1.04	225.5	195.4
1.015	35.20	10.11	23.187	1.869	0.0	0.0	0.0	1.25	271.3	199.5
9.000	50.00	4.27	24.120	0.073	0.0	0.0	0.0	1.08	42.7	11.1
10.000	50.00	4.28	24.240	0.068	0.0	0.0	0.0	1.01	40.0	10.3
10.001	50.00	4.67	24.138	0.125	0.0	0.0	0.0	1.01	40.1	19.0
9.001	50.00	5.37	23.925	0.263	0.0	0.0	0.0	1.01	71.7	39.9

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
9.002	25.048	0.107	234.0	0.090	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.003	37.243	0.298	125.0	0.060	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.004	25.140	0.182	138.1	0.000	0.00	0.0	0.600		-1	Pipe/Conduit	
1.016	40.615	0.284	143.0	0.000	0.00	0.0	0.600		-1	Pipe/Conduit	
1.017	19.806#	0.700	28.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
11.000	15.593	0.065	239.9	0.099	4.00	0.0	0.600	o	300	Pipe/Conduit	
12.000	43.648	0.261	167.0	0.073	4.00	0.0	0.600	o	225	Pipe/Conduit	
12.001	55.128	0.330	167.1	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.001	31.959	0.134	238.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
13.000	49.256	0.295	167.0	0.083	4.00	0.0	0.600	o	225	Pipe/Conduit	
13.001	40.512	0.284	142.6	0.071	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.002	39.715	0.697	57.0	0.088	0.00	0.0	0.600	o	300	Pipe/Conduit	
14.000	47.178	0.198	238.0	0.126	4.00	0.0	0.600	o	300	Pipe/Conduit	
14.001	32.739	0.271	120.8	0.169	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)
9.002	49.13	5.78	23.745	0.353	0.0	0.0	0.0	1.02	72.3	52.6
9.003	47.02	6.22	23.638	0.413	0.0	0.0	0.0	1.41	99.3	58.9
9.004	46.47	6.34	23.340	0.413	0.0	0.0	0.0	3.36	4638.7	58.9
1.016	34.78	10.31	23.084	2.282	0.0	0.0	0.0	3.30	4558.6	240.7
1.017	34.62	10.39	22.800	2.282	0.0	0.0	0.0	4.22	914.1	240.7
11.000	50.00	4.26	28.535	0.099	0.0	0.0	0.0	1.01	71.4	15.0
12.000	50.00	4.72	29.136	0.073	0.0	0.0	0.0	1.01	40.1	11.1
12.001	49.89	5.63	28.875	0.121	0.0	0.0	0.0	1.01	40.1	18.3
11.001	47.30	6.16	28.470	0.220	0.0	0.0	0.0	1.01	71.7	31.6
13.000	50.00	4.81	28.990	0.083	0.0	0.0	0.0	1.01	40.1	12.6
13.001	50.00	5.43	28.695	0.154	0.0	0.0	0.0	1.09	43.4	23.4
11.002	45.91	6.47	28.336	0.462	0.0	0.0	0.0	2.09	147.5	64.3
14.000	50.00	4.77	28.108	0.126	0.0	0.0	0.0	1.01	71.7	19.1
14.001	50.00	5.16	27.910	0.295	0.0	0.0	0.0	1.43	101.0	44.7

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
11.003	55.971	1.768	31.7	0.086	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.000	34.355	0.206	166.8	0.107	4.00	0.0	0.600	o	225	Pipe/Conduit	
15.001	53.787	0.322	167.0	0.081	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.004	70.353	1.271	55.4	0.257	0.00	0.0	0.600	o	450	Pipe/Conduit	
11.005	6.271	0.094	66.7	0.143	0.00	0.0	0.600	o	450	Pipe/Conduit	
11.006	45.738	1.116	41.0	0.077	0.00	0.0	0.600	o	525	Pipe/Conduit	
16.000	35.211	0.149	236.3	0.162	4.00	0.0	0.600	o	300	Pipe/Conduit	
17.000	30.643	0.129	238.0	0.078	4.00	0.0	0.600	o	300	Pipe/Conduit	
16.001	34.614	0.835	41.5	0.053	0.00	0.0	0.600	o	300	Pipe/Conduit	
18.000	44.935	0.189	237.8	0.105	4.00	0.0	0.600	o	300	Pipe/Conduit	
16.002	26.120	1.489	17.5	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.003	32.211	0.911	35.4	0.093	0.00	0.0	0.600	o	450	Pipe/Conduit	
19.000	35.000	0.103	339.8	0.088	4.00	0.0	0.600	o	300	Pipe/Conduit	
19.001	35.000	0.103	339.8	0.061	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)
11.003	44.56	6.81	27.639	0.843	0.0	0.0	0.0	2.80	198.2	113.9
15.000	50.00	4.57	26.475	0.107	0.0	0.0	0.0	1.01	40.1	16.2
15.001	50.00	5.46	26.269	0.188	0.0	0.0	0.0	1.01	40.1	28.5
11.004	42.96	7.24	25.721	1.288	0.0	0.0	0.0	2.74	435.3	167.8
11.005	42.81	7.28	24.450	1.431	0.0	0.0	0.0	2.49	396.3	185.8
11.006	42.07	7.49	24.281	1.508	0.0	0.0	0.0	3.51	759.0	192.4
16.000	50.00	4.58	30.020	0.162	0.0	0.0	0.0	1.02	72.0	24.6
17.000	50.00	4.50	30.000	0.078	0.0	0.0	0.0	1.01	71.7	11.8
16.001	50.00	4.81	29.871	0.293	0.0	0.0	0.0	2.45	173.1	44.4
18.000	50.00	4.74	29.225	0.105	0.0	0.0	0.0	1.02	71.8	15.9
16.002	50.00	4.93	29.036	0.461	0.0	0.0	0.0	3.77	266.6	69.9
16.003	50.00	5.08	27.397	0.554	0.0	0.0	0.0	3.43	545.2	84.0
19.000	50.00	4.69	26.841	0.088	0.0	0.0	0.0	0.85	59.9	13.3
19.001	50.00	5.38	26.738	0.149	0.0	0.0	0.0	0.85	59.9	22.6

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
16.004	34.206	0.636	53.8	0.075	0.00	0.0	0.600	o	450	Pipe/Conduit	
20.000	24.152	0.150	161.0	0.032	4.00	0.0	0.600	o	225	Pipe/Conduit	
16.005	69.886	2.150	32.5	0.215	0.00	0.0	0.600	o	525	Pipe/Conduit	
16.006	52.269	0.460	113.6	0.215	0.00	0.0	0.600	o	600	Pipe/Conduit	
21.000	16.784	0.045	373.0	0.109	4.00	0.0	0.600	o	600	Pipe/Conduit	
11.007	49.971	0.499	100.1	0.119	0.00	0.0	0.600	o	600	Pipe/Conduit	
22.000	33.820	0.235	143.9	0.050	4.00	0.0	0.600	o	225	Pipe/Conduit	
11.008	34.900	0.296	117.9	0.080	0.00	0.0	0.600	o	675	Pipe/Conduit	
11.009	14.171#	0.119	119.1	0.128	0.00	0.0	0.600	o	675	Pipe/Conduit	
23.000	29.849	0.179	166.8	0.082	4.00	0.0	0.600	o	225	Pipe/Conduit	
23.001	15.684	0.094	166.9	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
24.000	38.537	1.948	19.8	0.095	4.00	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)
16.004	50.00	5.58	26.486	0.778	0.0	0.0	0.0	2.78	441.7	118.0
20.000	50.00	4.39	26.225	0.032	0.0	0.0	0.0	1.03	40.9	4.9
16.005	48.63	5.88	25.775	1.025	0.0	0.0	0.0	3.94	852.6	151.2
16.006	46.84	6.26	23.550	1.240	0.0	0.0	0.0	2.28	645.7	176.2
21.000	50.00	4.22	23.135	0.109	0.0	0.0	0.0	1.25	354.8	16.5
11.007	40.96	7.84	23.090	2.976	0.0	0.0	0.0	2.43	688.1	369.8
22.000	50.00	4.52	23.200	0.050	0.0	0.0	0.0	1.09	43.3	7.6
11.008	40.23	8.08	22.515	3.106	0.0	0.0	0.0	2.41	863.4	379.0
11.009	39.94	8.18	22.219	3.234	0.0	0.0	0.0	2.40	859.1	391.8
23.000	50.00	4.49	27.750	0.082	0.0	0.0	0.0	1.01	40.1	12.4
23.001	50.00	4.75	27.571	0.101	0.0	0.0	0.0	1.01	40.1	15.3
24.000	50.00	4.22	29.425	0.095	0.0	0.0	0.0	2.96	117.5	14.4

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
23.002	21.625	0.129	167.6	0.091	0.00	0.0	0.600	o	225	Pipe/Conduit	
23.003	46.973	0.271	173.3	0.031	0.00	0.0	0.600	o	300	Pipe/Conduit	
25.000	27.549	0.865	31.8	0.058	4.00	0.0	0.600	o	225	Pipe/Conduit	
23.004	18.104	0.081	223.5	0.009	0.00	0.0	0.600	o	300	Pipe/Conduit	
23.005	53.408	1.616	33.0	0.016	0.00	0.0	0.600	o	300	Pipe/Conduit	
26.000	44.005	0.263	167.3	0.089	4.00	0.0	0.600	o	225	Pipe/Conduit	
23.006	46.758	2.675	17.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
27.000	33.967	0.088	385.0	0.062	4.00	0.0	0.600	o	450	Pipe/Conduit	
23.007	39.670	0.227	174.8	0.049	0.00	0.0	0.600	o	450	Pipe/Conduit	
23.008	25.363	0.066	384.3	0.130	0.00	0.0	0.600	o	450	Pipe/Conduit	
23.009	11.019	0.029	380.0	0.046	0.00	0.0	0.600	o	450	Pipe/Conduit	
28.000	30.545	0.128	238.6	0.028	4.00	0.0	0.600	o	300	Pipe/Conduit	
28.001	16.443	0.069	238.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
23.010	11.000#	0.028	392.9	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)
23.002	50.00	5.11	27.447	0.287	0.0	0.0	0.0	1.01	40.0«	43.5
23.003	49.19	5.77	27.243	0.318	0.0	0.0	0.0	1.19	84.2	47.4
25.000	50.00	4.20	27.912	0.058	0.0	0.0	0.0	2.33	92.5	8.8
23.004	47.78	6.05	26.972	0.385	0.0	0.0	0.0	1.05	74.0	55.8
23.005	46.31	6.38	26.891	0.401	0.0	0.0	0.0	2.74	194.0	56.3
26.000	50.00	4.73	25.613	0.089	0.0	0.0	0.0	1.01	40.1	13.5
23.006	45.64	6.54	25.125	0.490	0.0	0.0	0.0	4.88	776.3	67.8
27.000	50.00	4.55	22.538	0.062	0.0	0.0	0.0	1.03	163.8	9.4
23.007	43.93	6.97	22.450	0.601	0.0	0.0	0.0	1.53	244.1	80.1
23.008	42.46	7.38	22.223	0.731	0.0	0.0	0.0	1.03	164.0	94.1
23.009	41.86	7.56	22.157	0.777	0.0	0.0	0.0	1.04	164.9	98.7
28.000	50.00	4.50	22.475	0.028	0.0	0.0	0.0	1.01	71.6	4.2
28.001	50.00	4.77	22.347	0.028	0.0	0.0	0.0	1.01	71.7	4.2
23.010	41.28	7.74	22.128	0.805	0.0	0.0	0.0	1.02	162.2	100.8

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
29.000	33.581	0.620	54.2	0.028	4.00	0.0	0.600	o	150	Pipe/Conduit	
29.001	8.479	0.057	148.8	0.059	0.00	0.0	0.600	o	150	Pipe/Conduit	
29.002	12.963	0.087	149.0	0.029	0.00	0.0	0.600	o	150	Pipe/Conduit	
30.000	13.610	0.090	151.2	0.061	4.00	0.0	0.600	o	150	Pipe/Conduit	
29.003	38.810	0.253	153.4	0.056	0.00	0.0	0.600	o	150	Pipe/Conduit	
29.004	20.353#	0.227	89.7	0.042	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.018	24.754#	0.600	41.3	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)
29.000	50.00	4.41	23.350	0.028	0.0	0.0	0.0	1.37	24.2	4.2
29.001	50.00	4.58	22.730	0.087	0.0	0.0	0.0	0.82	14.5	13.2
29.002	50.00	4.84	22.673	0.116	0.0	0.0	0.0	0.82	14.5«	17.6
30.000	50.00	4.28	22.676	0.061	0.0	0.0	0.0	0.81	14.4	9.3
29.003	49.83	5.64	22.586	0.233	0.0	0.0	0.0	0.81	14.3«	35.2
29.004	48.22	5.96	22.327	0.275	0.0	0.0	0.0	1.06	18.8«	40.2
1.018	34.36	10.52	21.700	6.596	0.0	0.0	0.0	3.17	504.6«	687.5

Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m²)
-1		4000	600			1.312	1.380

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW1	30.107	1.125	Open Manhole	1200	1.000	28.982	225				
SW2	29.417	1.126	Open Manhole	1200	1.001	28.291	225	1.000	28.291	225	
SW3	29.549	1.564	Open Manhole	1200	1.002	27.985	225	1.001	27.986	225	1
SW4	30.354	2.109	Open Manhole	1200	2.000	28.245	225				
SW5	29.916	1.983	Open Manhole	1200	2.001	27.933	225	2.000	27.933	225	
SW6	29.893	2.193	Open Manhole	1200	2.002	27.700	300	2.001	27.775	225	
SW7	29.001	1.651	Open Manhole	1350	1.003	27.350	450	1.002	27.575	225	
								2.002	27.500	300	
SW8	30.000	1.425	Open Manhole	1200	3.000	28.575	225				
SW9	29.302	2.449	Open Manhole	1200	3.001	26.853	300	3.000	26.928	225	
SW10	29.043	1.870	Open Manhole	1200	4.000	27.173	225				
SW11	28.272	1.372	Open Manhole	1200	4.001	26.900	225	4.000	26.900	225	
SW12	28.669	2.139	Open Manhole	1350	1.004	26.530	450	1.003	26.530	450	
								3.001	26.680	300	
								4.001	26.755	225	
SW13	28.600	2.112	Open Manhole	1350	1.005	26.488	450	1.004	26.488	450	
SW14	28.612	2.148	Open Manhole	1350	1.006	26.464	450	1.005	26.464	450	
SW15	27.550	1.349	Open Manhole	1350	1.007	26.201	450	1.006	26.201	450	
SW16	28.616	1.060	Open Manhole	1200	5.000	27.556	150				
SW17	28.251	2.194	Open Manhole	1350	1.008	26.057	450	1.007	26.057	450	
								5.000	26.358	150	1
SW18	26.948	1.348	Open Manhole	1200	6.000	25.600	150				
SW19	26.842	1.636	Open Manhole	1200	6.001	25.206	150	6.000	25.206	150	
SW20	26.848	2.048	Open Manhole	1350	1.009	24.800	450	1.008	24.800	450	
								6.001	25.100	150	
SW21	25.855	1.730	Open Manhole	1500	1.010	24.125	525	1.009	24.200	450	
SW22	26.189	1.468	Open Manhole	1200	7.000	24.721	150				
SW23	26.114	2.054	Open Manhole	1500	1.011	24.060	525	1.010	24.060	525	
								7.000	24.440	150	5
SW24	25.397	1.723	Open Manhole	1500	1.012	23.675	525	1.011	23.675	525	
SW25	25.072	1.722	Open Manhole	1500	1.013	23.350	525	1.012	23.350	525	
SW26	25.717	1.067	Open Manhole	1200	8.000	24.650	150				
SW27	24.782	1.519	Open Manhole	1500	1.014	23.263	525	1.013	23.263	525	
								8.000	23.638	150	
SW28	24.307	1.120	Open Manhole	1500	1.015	23.187	525	1.014	23.187	525	
SW29	26.645	2.525	Open Manhole	1200	9.000	24.120	225				
SW30	25.940	1.700	Open Manhole	1200	10.000	24.240	225				
SW31	25.940	1.802	Open Manhole	1200	10.001	24.138	225	10.000	24.138	225	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW32	25.700	1.775	Open Manhole	1200	9.001	23.925	300	9.000	24.000	225	
								10.001	24.000	225	
SW33	25.102	1.357	Open Manhole	1200	9.002	23.745	300	9.001	23.745	300	
SW34	24.701	1.063	Open Manhole	1200	9.003	23.638	300	9.002	23.638	300	
SW35	25.000	1.660	Junction		9.004	23.340	-1	9.003	23.340	300	
SW36	25.000	1.916	Junction		1.016	23.084	-1	1.015	23.159	525	
								9.004	23.158	-1	74
SW37	25.000	2.200	Junction		1.017	22.800	525	1.016	22.800	-1	
SW38	30.035	1.500	Open Manhole	1200	11.000	28.535	300				
SW39	32.290	3.154	Open Manhole	1200	12.000	29.136	225				
SW40	31.213	2.338	Open Manhole	1200	12.001	28.875	225	12.000	28.875	225	
SW41	30.350	1.880	Open Manhole	1200	11.001	28.470	300	11.000	28.470	300	
								12.001	28.545	225	
SW42	31.165	2.175	Open Manhole	1200	13.000	28.990	225				
SW43	30.315	1.620	Open Manhole	1200	13.001	28.695	225	13.000	28.695	225	
SW44	30.353	2.017	Open Manhole	1200	11.002	28.336	300	11.001	28.336	300	
								13.001	28.411	225	
SW45	29.645	1.537	Open Manhole	1200	14.000	28.108	300				
SW46	30.259	2.349	Open Manhole	1200	14.001	27.910	300	14.000	27.910	300	
SW47	30.354	2.715	Open Manhole	1200	11.003	27.639	300	11.002	27.639	300	
								14.001	27.639	300	
SW48	27.825	1.350	Open Manhole	1200	15.000	26.475	225				
SW49	28.551	2.282	Open Manhole	1200	15.001	26.269	225	15.000	26.269	225	
SW50	28.840	3.119	Open Manhole	1350	11.004	25.721	450	11.003	25.871	300	
								15.001	25.947	225	1
SW51	26.187	1.737	Open Manhole	1350	11.005	24.450	450	11.004	24.450	450	
SW52	26.093	1.812	Open Manhole	1500	11.006	24.281	525	11.005	24.356	450	
SW53	32.581	2.561	Open Manhole	1200	16.000	30.020	300				
SW54	31.498	1.498	Open Manhole	1200	17.000	30.000	300				
SW55	31.900	2.029	Open Manhole	1200	16.001	29.871	300	16.000	29.871	300	
								17.000	29.871	300	
SW56	30.725	1.500	Open Manhole	1200	18.000	29.225	300				
SW57	30.721	1.685	Open Manhole	1200	16.002	29.036	300	16.001	29.036	300	
								18.000	29.036	300	
SW58	29.799	2.402	Open Manhole	1350	16.003	27.397	450	16.002	27.547	300	
SW59	28.341	1.500	Open Manhole	1200	19.000	26.841	300				
SW60	28.513	1.775	Open Manhole	1200	19.001	26.738	300	19.000	26.738	300	
SW61	28.685	2.199	Open Manhole	1350	16.004	26.486	450	16.003	26.486	450	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								19.001	26.635	300	
SW62	27.722	1.497	Open Manhole	1200	20.000	26.225	225				
SW63	27.505	1.730	Open Manhole	1500	16.005	25.775	525	16.004	25.850	450	
								20.000	26.075	225	
SW64	25.247	1.697	Open Manhole	1500	16.006	23.550	600	16.005	23.625	525	
SW65	26.297	3.162	Open Manhole	1500	21.000	23.135	600				
SW66	25.526	2.436	Open Manhole	1500	11.007	23.090	600	11.006	23.165	525	
								16.006	23.090	600	
								21.000	23.090	600	
SW67	24.642	1.442	Open Manhole	1200	22.000	23.200	225				
SW68	24.427	1.912	Open Manhole	1500	11.008	22.515	675	11.007	22.591	600	1
								22.000	22.965	225	
SW75	23.642	1.423	Open Manhole	1500	11.009	22.219	675	11.008	22.219	675	
SW76	29.500	1.750	Open Manhole	1200	23.000	27.750	225				
SW77	28.730	1.159	Open Manhole	1200	23.001	27.571	225	23.000	27.571	225	
SW78	30.850	1.425	Open Manhole	1200	24.000	29.425	225				
SW79	29.029	1.582	Open Manhole	1200	23.002	27.447	225	23.001	27.477	225	30
								24.000	27.477	225	30
SW80	29.509	2.266	Open Manhole	1200	23.003	27.243	300	23.002	27.318	225	
SW81	29.212	1.300	Open Manhole	1200	25.000	27.912	225				
SW82	29.025	2.053	Open Manhole	1200	23.004	26.972	300	23.003	26.972	300	
								25.000	27.047	225	
SW83	28.125	1.234	Open Manhole	1200	23.005	26.891	300	23.004	26.891	300	
SW84	27.542	1.929	Open Manhole	1200	26.000	25.613	225				
SW85	26.477	1.352	Open Manhole	1350	23.006	25.125	450	23.005	25.275	300	
								26.000	25.350	225	
SW86	25.407	2.869	Open Manhole	1350	27.000	22.538	450				
SW87	23.800	1.350	Open Manhole	1350	23.007	22.450	450	23.006	22.450	450	
								27.000	22.450	450	
SW88	23.700	1.477	Open Manhole	1350	23.008	22.223	450	23.007	22.223	450	
SW89	23.247	1.090	Open Manhole	1350	23.009	22.157	450	23.008	22.157	450	
SW90	23.426	0.951	Open Manhole	1200	28.000	22.475	300				
SW91	23.527	1.180	Open Manhole	1200	28.001	22.347	300	28.000	22.347	300	
SW92	23.183	1.055	Open Manhole	1350	23.010	22.128	450	23.009	22.128	450	
								28.001	22.278	300	
SW69	24.684	1.334	Open Manhole	1200	29.000	23.350	150				
SW70	23.747	1.017	Open Manhole	1200	29.001	22.730	150	29.000	22.730	150	
SW71	23.803	1.130	Open Manhole	1200	29.002	22.673	150	29.001	22.673	150	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW72	24.129	1.453	Open Manhole	1200	30.000	22.676	150				
SW73	23.933	1.347	Open Manhole	1200	29.003	22.586	150	29.002	22.586	150	
								30.000	22.586	150	
SW74	23.600	1.273	Open Manhole	1200	29.004	22.327	150	29.003	22.333	150	6
SW93	23.300	1.600	Open Manhole	1500	1.018	21.700	450	1.017	22.100	525	475
								11.009	22.100	675	625
								23.010	22.100	450	400
								29.004	22.100	150	100
	24.000	2.900	Open Manhole	0		OUTFALL		1.018	21.100	450	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW1	449048.036	117436.138	449048.036	117436.138	Required	
SW2	449097.388	117422.757	449097.388	117422.757	Required	
SW3	449146.741	117409.376	449146.741	117409.376	Required	
SW4	449053.838	117481.036	449053.838	117481.036	Required	
SW5	449104.028	117467.341	449104.028	117467.341	Required	
SW6	449109.753	117457.320	449109.753	117457.320	Required	
SW7	449156.234	117444.635	449156.234	117444.635	Required	
SW8	449070.221	117502.885	449070.221	117502.885	Required	
SW9	449114.115	117490.812	449114.115	117490.812	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW10	449116.487	117515.867	449116.487	117515.867	Required	
SW11	449160.275	117503.118	449160.275	117503.118	Required	
SW12	449153.929	117479.861	449153.929	117479.861	Required	
SW13	449169.501	117475.422	449169.501	117475.422	Required	
SW14	449178.721	117476.482	449178.721	117476.482	Required	
SW15	449178.532	117525.038	449178.532	117525.038	Required	
SW16	449095.440	117547.711	449095.440	117547.711	Required	
SW17	449126.143	117539.333	449126.143	117539.333	Required	
SW18	449091.136	117599.293	449091.136	117599.293	Required	
SW19	449129.113	117588.931	449129.113	117588.931	Required	
SW20	449138.945	117586.248	449138.945	117586.248	Required	
SW21	449146.656	117614.507	449146.656	117614.507	Required	
SW22	449096.732	117628.130	449096.732	117628.130	Required	
SW23	449122.859	117621.001	449122.859	117621.001	Required	
SW24	449132.163	117655.099	449132.163	117655.099	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW25	449129.808	117670.631	449129.808	117670.631	Required	
SW26	449089.332	117645.782	449089.332	117645.782	Required	
SW27	449098.448	117679.188	449098.448	117679.188	Required	
SW28	449107.582	117712.663	449107.582	117712.663	Required	
SW29	449171.966	117598.370	449171.966	117598.370	Required	
SW30	449194.653	117602.243	449194.653	117602.243	Required	
SW31	449192.166	117619.171	449192.166	117619.171	Required	
SW32	449169.309	117615.847	449169.309	117615.847	Required	
SW33	449162.836	117658.229	449162.836	117658.229	Required	
SW34	449159.193	117683.011	449159.193	117683.011	Required	
SW35	449130.347	117706.569			No Entry	
SW36	449109.916	117721.217			No Entry	
SW37	449069.430	117724.462			No Entry	
SW38	449022.260	117421.346	449022.260	117421.346	Required	
SW39	448933.697	117461.483	448933.697	117461.483	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW40	448975.789	117449.931	448975.789	117449.931	Required	
SW41	449028.972	117435.420	449028.972	117435.420	Required	
SW42	448952.338	117489.770	448952.338	117489.770	Required	
SW43	448999.808	117476.625	448999.808	117476.625	Required	
SW44	449038.850	117465.813	449038.850	117465.813	Required	
SW45	448973.123	117528.186	448973.123	117528.186	Required	
SW46	449017.792	117513.003	449017.792	117513.003	Required	
SW47	449049.305	117504.127	449049.305	117504.127	Required	
SW48	448979.005	117581.326	448979.005	117581.326	Required	
SW49	449012.149	117572.283	449012.149	117572.283	Required	
SW50	449064.038	117558.124	449064.038	117558.124	Required	
SW51	449082.558	117625.996	449082.558	117625.996	Required	
SW52	449079.538	117631.491	449079.538	117631.491	Required	
SW53	448909.197	117438.044	448909.197	117438.044	Required	
SW54	448894.685	117477.968	448894.685	117477.968	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW55	448924.242	117469.879	448924.242	117469.879	Required	
SW56	448894.424	117513.570	448894.424	117513.570	Required	
SW57	448937.773	117501.739	448937.773	117501.739	Required	
SW58	448946.991	117526.179	448946.991	117526.179	Required	
SW59	448889.587	117575.187	448889.587	117575.187	Required	
SW60	448923.352	117565.972	448923.352	117565.972	Required	
SW61	448957.117	117556.757	448957.117	117556.757	Required	
SW62	448943.228	117596.001	448943.228	117596.001	Required	
SW63	448966.529	117589.644	448966.529	117589.644	Required	
SW64	448984.926	117657.064	448984.926	117657.064	Required	
SW65	449031.046	117627.348	449031.046	117627.348	Required	
SW66	449035.418	117643.552	449035.418	117643.552	Required	
SW67	449081.336	117682.820	449081.336	117682.820	Required	
SW68	449048.709	117691.723	449048.709	117691.723	Required	
SW75	449056.795	117725.673	449056.795	117725.673	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW76	448826.778	117452.566	448826.778	117452.566	Required	
SW77	448827.512	117482.406	448827.512	117482.406	Required	
SW78	448875.498	117483.276	448875.498	117483.276	Required	
SW79	448838.396	117493.699	448838.396	117493.699	Required	
SW80	448855.619	117506.777	448855.619	117506.777	Required	
SW81	448879.969	117546.526	448879.969	117546.526	Required	
SW82	448853.370	117553.696	448853.370	117553.696	Required	
SW83	448854.590	117571.759	448854.590	117571.759	Required	
SW84	448934.307	117598.436	448934.307	117598.436	Required	
SW85	448891.854	117610.019	448891.854	117610.019	Required	
SW86	448941.591	117644.649	448941.591	117644.649	Required	
SW87	448908.823	117653.590	448908.823	117653.590	Required	
SW88	448930.089	117687.078	448930.089	117687.078	Required	
SW89	448939.011	117710.820	448939.011	117710.820	Required	
SW90	448982.301	117736.207	448982.301	117736.207	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW91	448954.020	117724.666	448954.020	117724.666	Required	
SW92	448937.833	117721.775	448937.833	117721.775	Required	
SW69	448967.410	117668.501	448967.410	117668.501	Required	
SW70	448976.250	117700.898	448976.250	117700.898	Required	
SW71	448984.430	117698.666	448984.430	117698.666	Required	
SW72	449010.066	117691.671	449010.066	117691.671	Required	
SW73	448996.936	117695.253	448996.936	117695.253	Required	
SW74	449007.131	117732.700	449007.131	117732.700	Required	
SW93	448911.729	117777.262	448911.729	117777.262	Required	
	448879.954	117736.702			No Entry	



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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	SW1	30.107	28.982	0.900	Open Manhole	1200
1.001	o	225	SW2	29.417	28.291	0.901	Open Manhole	1200
1.002	o	225	SW3	29.549	27.985	1.339	Open Manhole	1200
2.000	o	225	SW4	30.354	28.245	1.884	Open Manhole	1200
2.001	o	225	SW5	29.916	27.933	1.758	Open Manhole	1200
2.002	o	300	SW6	29.893	27.700	1.893	Open Manhole	1200
1.003	o	450	SW7	29.001	27.350	1.201	Open Manhole	1350
3.000	o	225	SW8	30.000	28.575	1.200	Open Manhole	1200
3.001	o	300	SW9	29.302	26.853	2.149	Open Manhole	1200
4.000	o	225	SW10	29.043	27.173	1.645	Open Manhole	1200
4.001	o	225	SW11	28.272	26.900	1.147	Open Manhole	1200
1.004	o	450	SW12	28.669	26.530	1.689	Open Manhole	1350
1.005	o	450	SW13	28.600	26.488	1.662	Open Manhole	1350
1.006	o	450	SW14	28.612	26.464	1.698	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	51.134	74.0	SW2	29.417	28.291	0.901	Open Manhole	1200
1.001	51.134	167.7	SW3	29.549	27.986	1.338	Open Manhole	1200
1.002	36.515	89.1	SW7	29.001	27.575	1.201	Open Manhole	1350
2.000	52.025	167.0	SW5	29.916	27.933	1.758	Open Manhole	1200
2.001	11.541	73.0	SW6	29.893	27.775	1.893	Open Manhole	1200
2.002	48.181	240.9	SW7	29.001	27.500	1.201	Open Manhole	1350
1.003	35.301	43.1	SW12	28.669	26.530	1.689	Open Manhole	1350
3.000	45.524	27.6	SW9	29.302	26.928	2.149	Open Manhole	1200
3.001	41.292	238.7	SW12	28.669	26.680	1.689	Open Manhole	1350
4.000	45.606	167.1	SW11	28.272	26.900	1.147	Open Manhole	1200
4.001	24.107	166.0	SW12	28.669	26.755	1.689	Open Manhole	1350
1.004	16.192	385.5	SW13	28.600	26.488	1.662	Open Manhole	1350
1.005	9.281	386.7	SW14	28.612	26.464	1.698	Open Manhole	1350
1.006	48.556	185.0	SW15	27.550	26.201	0.899	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.007	o	450	SW15	27.550	26.201	0.899	Open Manhole	1350
5.000	o	150	SW16	28.616	27.556	0.910	Open Manhole	1200
1.008	o	450	SW17	28.251	26.057	1.744	Open Manhole	1350
6.000	o	150	SW18	26.948	25.600	1.198	Open Manhole	1200
6.001	o	150	SW19	26.842	25.206	1.486	Open Manhole	1200
1.009	o	450	SW20	26.848	24.800	1.598	Open Manhole	1350
1.010	o	525	SW21	25.855	24.125	1.205	Open Manhole	1500
7.000	o	150	SW22	26.189	24.721	1.318	Open Manhole	1200
1.011	o	525	SW23	26.114	24.060	1.529	Open Manhole	1500
1.012	o	525	SW24	25.397	23.675	1.198	Open Manhole	1500
1.013	o	525	SW25	25.072	23.350	1.197	Open Manhole	1500
8.000	o	150	SW26	25.717	24.650	0.917	Open Manhole	1200
1.014	o	525	SW27	24.782	23.263	0.994	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.007	54.304	375.7	SW17	28.251	26.057	1.744	Open Manhole	1350
5.000	31.825	26.6	SW17	28.251	26.358	1.743	Open Manhole	1350
1.008	48.630	38.7	SW20	26.848	24.800	1.598	Open Manhole	1350
6.000	39.365	100.0	SW19	26.842	25.206	1.486	Open Manhole	1200
6.001	10.191	96.0	SW20	26.848	25.100	1.598	Open Manhole	1350
1.009	29.292	48.8	SW21	25.855	24.200	1.205	Open Manhole	1500
1.010	24.667	379.5	SW23	26.114	24.060	1.529	Open Manhole	1500
7.000	27.082	96.4	SW23	26.114	24.440	1.524	Open Manhole	1500
1.011	35.345	91.8	SW24	25.397	23.675	1.198	Open Manhole	1500
1.012	15.709	48.3	SW25	25.072	23.350	1.197	Open Manhole	1500
1.013	32.507	373.6	SW27	24.782	23.263	0.994	Open Manhole	1500
8.000	34.627	34.2	SW27	24.782	23.638	0.994	Open Manhole	1500
1.014	34.699	456.6	SW28	24.307	23.187	0.595	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.015	o	525	SW28	24.307	23.187	0.595	Open Manhole	1500
9.000	o	225	SW29	26.645	24.120	2.300	Open Manhole	1200
10.000	o	225	SW30	25.940	24.240	1.475	Open Manhole	1200
10.001	o	225	SW31	25.940	24.138	1.577	Open Manhole	1200
9.001	o	300	SW32	25.700	23.925	1.475	Open Manhole	1200
9.002	o	300	SW33	25.102	23.745	1.057	Open Manhole	1200
9.003	o	300	SW34	24.701	23.638	0.763	Open Manhole	1200
9.004		-1	SW35	25.000	23.340	1.060	Junction	
1.016		-1	SW36	25.000	23.084	1.316	Junction	
1.017	o	525	SW37	25.000	22.800	1.675	Junction	
11.000	o	300	SW38	30.035	28.535	1.200	Open Manhole	1200
12.000	o	225	SW39	32.290	29.136	2.929	Open Manhole	1200
12.001	o	225	SW40	31.213	28.875	2.113	Open Manhole	1200
11.001	o	300	SW41	30.350	28.470	1.580	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.015	8.866	316.6	SW36	25.000	23.159	1.316	Junction	
9.000	17.678	147.3	SW32	25.700	24.000	1.475	Open Manhole	1200
10.000	17.110	167.7	SW31	25.940	24.138	1.577	Open Manhole	1200
10.001	23.097	167.4	SW32	25.700	24.000	1.475	Open Manhole	1200
9.001	42.874	238.0	SW33	25.102	23.745	1.057	Open Manhole	1200
9.002	25.048	234.0	SW34	24.701	23.638	0.763	Open Manhole	1200
9.003	37.243	125.0	SW35	25.000	23.340	1.360	Junction	
9.004	25.140	138.1	SW36	25.000	23.158	1.242	Junction	
1.016	40.615	143.0	SW37	25.000	22.800	1.600	Junction	
1.017	19.806#	28.3	SW93	23.300	22.100	0.675	Open Manhole	1500
11.000	15.593	239.9	SW41	30.350	28.470	1.580	Open Manhole	1200
12.000	43.648	167.0	SW40	31.213	28.875	2.113	Open Manhole	1200
12.001	55.128	167.1	SW41	30.350	28.545	1.580	Open Manhole	1200
11.001	31.959	238.5	SW44	30.353	28.336	1.717	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
13.000	o	225	SW42	31.165	28.990	1.950	Open Manhole	1200
13.001	o	225	SW43	30.315	28.695	1.395	Open Manhole	1200
11.002	o	300	SW44	30.353	28.336	1.717	Open Manhole	1200
14.000	o	300	SW45	29.645	28.108	1.237	Open Manhole	1200
14.001	o	300	SW46	30.259	27.910	2.049	Open Manhole	1200
11.003	o	300	SW47	30.354	27.639	2.415	Open Manhole	1200
15.000	o	225	SW48	27.825	26.475	1.125	Open Manhole	1200
15.001	o	225	SW49	28.551	26.269	2.057	Open Manhole	1200
11.004	o	450	SW50	28.840	25.721	2.669	Open Manhole	1350
11.005	o	450	SW51	26.187	24.450	1.287	Open Manhole	1350
11.006	o	525	SW52	26.093	24.281	1.287	Open Manhole	1500
16.000	o	300	SW53	32.581	30.020	2.261	Open Manhole	1200
17.000	o	300	SW54	31.498	30.000	1.198	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
13.000	49.256	167.0	SW43	30.315	28.695	1.395	Open Manhole	1200
13.001	40.512	142.6	SW44	30.353	28.411	1.717	Open Manhole	1200
11.002	39.715	57.0	SW47	30.354	27.639	2.415	Open Manhole	1200
14.000	47.178	238.0	SW46	30.259	27.910	2.049	Open Manhole	1200
14.001	32.739	120.8	SW47	30.354	27.639	2.415	Open Manhole	1200
11.003	55.971	31.7	SW50	28.840	25.871	2.669	Open Manhole	1350
15.000	34.355	166.8	SW49	28.551	26.269	2.057	Open Manhole	1200
15.001	53.787	167.0	SW50	28.840	25.947	2.668	Open Manhole	1350
11.004	70.353	55.4	SW51	26.187	24.450	1.287	Open Manhole	1350
11.005	6.271	66.7	SW52	26.093	24.356	1.287	Open Manhole	1500
11.006	45.738	41.0	SW66	25.526	23.165	1.836	Open Manhole	1500
16.000	35.211	236.3	SW55	31.900	29.871	1.729	Open Manhole	1200
17.000	30.643	238.0	SW55	31.900	29.871	1.729	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
16.001	o	300	SW55	31.900	29.871	1.729	Open Manhole	1200
18.000	o	300	SW56	30.725	29.225	1.200	Open Manhole	1200
16.002	o	300	SW57	30.721	29.036	1.385	Open Manhole	1200
16.003	o	450	SW58	29.799	27.397	1.952	Open Manhole	1350
19.000	o	300	SW59	28.341	26.841	1.200	Open Manhole	1200
19.001	o	300	SW60	28.513	26.738	1.475	Open Manhole	1200
16.004	o	450	SW61	28.685	26.486	1.749	Open Manhole	1350
20.000	o	225	SW62	27.722	26.225	1.272	Open Manhole	1200
16.005	o	525	SW63	27.505	25.775	1.205	Open Manhole	1500
16.006	o	600	SW64	25.247	23.550	1.097	Open Manhole	1500
21.000	o	600	SW65	26.297	23.135	2.562	Open Manhole	1500
11.007	o	600	SW66	25.526	23.090	1.836	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
16.001	34.614	41.5	SW57	30.721	29.036	1.385	Open Manhole	1200
18.000	44.935	237.8	SW57	30.721	29.036	1.385	Open Manhole	1200
16.002	26.120	17.5	SW58	29.799	27.547	1.952	Open Manhole	1350
16.003	32.211	35.4	SW61	28.685	26.486	1.749	Open Manhole	1350
19.000	35.000	339.8	SW60	28.513	26.738	1.475	Open Manhole	1200
19.001	35.000	339.8	SW61	28.685	26.635	1.750	Open Manhole	1350
16.004	34.206	53.8	SW63	27.505	25.850	1.205	Open Manhole	1500
20.000	24.152	161.0	SW63	27.505	26.075	1.205	Open Manhole	1500
16.005	69.886	32.5	SW64	25.247	23.625	1.097	Open Manhole	1500
16.006	52.269	113.6	SW66	25.526	23.090	1.836	Open Manhole	1500
21.000	16.784	373.0	SW66	25.526	23.090	1.836	Open Manhole	1500
11.007	49.971	100.1	SW68	24.427	22.591	1.236	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
22.000	o	225	SW67	24.642	23.200	1.217	Open Manhole	1200
11.008	o	675	SW68	24.427	22.515	1.237	Open Manhole	1500
11.009	o	675	SW75	23.642	22.219	0.748	Open Manhole	1500
23.000	o	225	SW76	29.500	27.750	1.525	Open Manhole	1200
23.001	o	225	SW77	28.730	27.571	0.934	Open Manhole	1200
24.000	o	225	SW78	30.850	29.425	1.200	Open Manhole	1200
23.002	o	225	SW79	29.029	27.447	1.357	Open Manhole	1200
23.003	o	300	SW80	29.509	27.243	1.966	Open Manhole	1200
25.000	o	225	SW81	29.212	27.912	1.075	Open Manhole	1200
23.004	o	300	SW82	29.025	26.972	1.753	Open Manhole	1200
23.005	o	300	SW83	28.125	26.891	0.934	Open Manhole	1200
26.000	o	225	SW84	27.542	25.613	1.704	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
22.000	33.820	143.9	SW68	24.427	22.965	1.237	Open Manhole	1500
11.008	34.900	117.9	SW75	23.642	22.219	0.748	Open Manhole	1500
11.009	14.171#	119.1	SW93	23.300	22.100	0.525	Open Manhole	1500
23.000	29.849	166.8	SW77	28.730	27.571	0.934	Open Manhole	1200
23.001	15.684	166.9	SW79	29.029	27.477	1.327	Open Manhole	1200
24.000	38.537	19.8	SW79	29.029	27.477	1.327	Open Manhole	1200
23.002	21.625	167.6	SW80	29.509	27.318	1.966	Open Manhole	1200
23.003	46.973	173.3	SW82	29.025	26.972	1.753	Open Manhole	1200
25.000	27.549	31.8	SW82	29.025	27.047	1.753	Open Manhole	1200
23.004	18.104	223.5	SW83	28.125	26.891	0.934	Open Manhole	1200
23.005	53.408	33.0	SW85	26.477	25.275	0.902	Open Manhole	1350
26.000	44.005	167.3	SW85	26.477	25.350	0.902	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
23.006	o	450	SW85	26.477	25.125	0.902	Open Manhole	1350
27.000	o	450	SW86	25.407	22.538	2.419	Open Manhole	1350
23.007	o	450	SW87	23.800	22.450	0.900	Open Manhole	1350
23.008	o	450	SW88	23.700	22.223	1.027	Open Manhole	1350
23.009	o	450	SW89	23.247	22.157	0.640	Open Manhole	1350
28.000	o	300	SW90	23.426	22.475	0.651	Open Manhole	1200
28.001	o	300	SW91	23.527	22.347	0.880	Open Manhole	1200
23.010	o	450	SW92	23.183	22.128	0.605	Open Manhole	1350
29.000	o	150	SW69	24.684	23.350	1.184	Open Manhole	1200
29.001	o	150	SW70	23.747	22.730	0.867	Open Manhole	1200
29.002	o	150	SW71	23.803	22.673	0.980	Open Manhole	1200
30.000	o	150	SW72	24.129	22.676	1.303	Open Manhole	1200
29.003	o	150	SW73	23.933	22.586	1.197	Open Manhole	1200
29.004	o	150	SW74	23.600	22.327	1.123	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
23.006	46.758	17.5	SW87	23.800	22.450	0.900	Open Manhole	1350
27.000	33.967	385.0	SW87	23.800	22.450	0.900	Open Manhole	1350
23.007	39.670	174.8	SW88	23.700	22.223	1.027	Open Manhole	1350
23.008	25.363	384.3	SW89	23.247	22.157	0.640	Open Manhole	1350
23.009	11.019	380.0	SW92	23.183	22.128	0.605	Open Manhole	1350
28.000	30.545	238.6	SW91	23.527	22.347	0.880	Open Manhole	1200
28.001	16.443	238.0	SW92	23.183	22.278	0.605	Open Manhole	1350
23.010	11.000#	392.9	SW93	23.300	22.100	0.750	Open Manhole	1500
29.000	33.581	54.2	SW70	23.747	22.730	0.867	Open Manhole	1200
29.001	8.479	148.8	SW71	23.803	22.673	0.980	Open Manhole	1200
29.002	12.963	149.0	SW73	23.933	22.586	1.197	Open Manhole	1200
30.000	13.610	151.2	SW73	23.933	22.586	1.197	Open Manhole	1200
29.003	38.810	153.4	SW74	23.600	22.333	1.117	Open Manhole	1200
29.004	20.353#	89.7	SW93	23.300	22.100	1.050	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.018	o	450	SW93	23.300	21.700	1.150	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.018	24.754#	41.3		24.000	21.100	2.450	Open Manhole	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	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	18
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.840
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW93, DS/PN: 1.018, Volume (m³): 13.3

Unit Reference	MD-SHE-0297-5360-1550-5360
Design Head (m)	1.550
Design Flow (l/s)	53.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	297
Invert Level (m)	21.700
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.550	53.5
Flush-Flo™	0.524	53.4
Kick-Flo®	1.104	45.5
Mean Flow over Head Range	-	45.2

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	9.1	1.200	47.3	3.000	73.6	7.000	111.2
0.200	30.5	1.400	50.9	3.500	79.4	7.500	115.0
0.300	50.8	1.600	54.3	4.000	84.7	8.000	118.7
0.400	52.8	1.800	57.5	4.500	89.7	8.500	122.3
0.500	53.4	2.000	60.5	5.000	94.4	9.000	125.7
0.600	53.3	2.200	63.4	5.500	98.9	9.500	129.1
0.800	52.0	2.400	66.1	6.000	103.2		
1.000	49.0	2.600	68.7	6.500	107.3		

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Storage Structures for Storm

Cellular Storage Manhole: SW2, DS/PN: 1.001

Invert Level (m) 28.291 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	135.0	0.0	0.501	0.0	0.0
0.500	135.0	0.0			

Cellular Storage Manhole: SW7, DS/PN: 1.003

Invert Level (m) 27.350 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	140.0	0.0	0.501	0.0	0.0
0.500	140.0	0.0			

Cellular Storage Manhole: SW10, DS/PN: 4.000

Invert Level (m) 27.173 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	60.0	0.0	0.501	0.0	0.0
0.500	60.0	0.0			

Cellular Storage Manhole: SW20, DS/PN: 1.009

Invert Level (m) 24.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	180.0	0.0	0.501	0.0	0.0
0.500	180.0	0.0			

Cellular Storage Manhole: SW29, DS/PN: 9.000

Invert Level (m) 24.120 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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Cellular Storage Manhole: SW29, DS/PN: 9.000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	152.0	0.0	0.501	0.0	0.0
0.500	152.0	0.0			

Cellular Storage Manhole: SW44, DS/PN: 11.002

Invert Level (m) 28.336 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	0.0	0.501	0.0	0.0
0.500	150.0	0.0			

Cellular Storage Manhole: SW46, DS/PN: 14.001

Invert Level (m) 27.910 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	160.0	0.0	0.501	0.0	0.0
0.500	160.0	0.0			

Cellular Storage Manhole: SW49, DS/PN: 15.001

Invert Level (m) 26.269 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	80.0	0.0	0.501	0.0	0.0
0.500	80.0	0.0			

Cellular Storage Manhole: SW56, DS/PN: 18.000

Invert Level (m) 29.225 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	40.0	0.0	0.501	0.0	0.0
0.500	40.0	0.0			

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Cellular Storage Manhole: SW59, DS/PN: 19.000

Invert Level (m) 26.841 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	75.0	0.0	0.501	0.0	0.0
0.500	75.0	0.0			

Cellular Storage Manhole: SW65, DS/PN: 21.000

Invert Level (m) 23.135 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	442.0	0.0	0.501	0.0	0.0
0.500	442.0	0.0			

Cellular Storage Manhole: SW77, DS/PN: 23.001

Invert Level (m) 27.571 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	80.0	0.0	0.501	0.0	0.0
0.500	80.0	0.0			

Cellular Storage Manhole: SW86, DS/PN: 27.000

Invert Level (m) 22.477 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	238.0	0.0	0.501	0.0	0.0
0.500	238.0	0.0			

Cellular Storage Manhole: SW87, DS/PN: 23.007

Invert Level (m) 22.450 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	125.0	0.0	0.500	125.0	0.0

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Cellular Storage Manhole: SW87, DS/PN: 23.007

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.501	0.0	0.0			

Cellular Storage Manhole: SW70, DS/PN: 29.001

Invert Level (m) 22.730 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	40.0	0.0	0.501	0.0	0.0
0.500	40.0	0.0			

Cellular Storage Manhole: SW71, DS/PN: 29.002

Invert Level (m) 22.673 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	50.0	0.0	0.501	0.0	0.0
0.500	50.0	0.0			

Cellular Storage Manhole: SW72, DS/PN: 30.000

Invert Level (m) 22.676 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	50.0	0.0	0.501	0.0	0.0
0.500	50.0	0.0			

Tank or Pond Manhole: SW93, DS/PN: 1.018

Invert Level (m) 21.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1750.0	0.900	3561.0	1.700	4725.0
0.500	3003.0	1.400	4280.0		

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	18
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
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, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

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	SW1	15 Summer	1	+0%	100/15 Summer				29.056
1.001	SW2	60 Summer	1	+0%	100/15 Summer				28.364
1.002	SW3	60 Summer	1	+0%	30/15 Summer				28.069
2.000	SW4	15 Summer	1	+0%	100/15 Summer				28.317
2.001	SW5	15 Summer	1	+0%	100/15 Summer				28.009
2.002	SW6	15 Summer	1	+0%	100/15 Summer				27.801
1.003	SW7	60 Summer	1	+0%	100/15 Summer				27.425
3.000	SW8	15 Summer	1	+0%					28.609
3.001	SW9	15 Summer	1	+0%	30/15 Summer				26.948
4.000	SW10	60 Summer	1	+0%	100/15 Summer				27.204
4.001	SW11	15 Summer	1	+0%	30/15 Summer				26.973

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1	-0.151	0.000	0.24			13.7	OK	
1.001	SW2	-0.152	0.000	0.23		31	8.9	OK	
1.002	SW3	-0.141	0.000	0.29			15.3	OK	
2.000	SW4	-0.153	0.000	0.21			8.1	OK	
2.001	SW5	-0.149	0.000	0.24			12.6	OK	
2.002	SW6	-0.199	0.000	0.24			16.4	OK	
1.003	SW7	-0.375	0.000	0.07		28	28.5	OK	
3.000	SW8	-0.191	0.000	0.06			5.3	OK	
3.001	SW9	-0.205	0.000	0.22			14.4	OK	
4.000	SW10	-0.194	0.000	0.05		31	1.8	OK	
4.001	SW11	-0.152	0.000	0.23			8.4	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.004	SW12	30 Summer	1	+0%	30/15 Summer				26.762
1.005	SW13	30 Summer	1	+0%	30/15 Summer				26.725
1.006	SW14	30 Summer	1	+0%	30/15 Summer				26.619
1.007	SW15	30 Summer	1	+0%	30/15 Summer				26.401
5.000	SW16	15 Summer	1	+0%					27.594
1.008	SW17	60 Summer	1	+0%					26.170
6.000	SW18	15 Summer	1	+0%					25.638
6.001	SW19	15 Summer	1	+0%	100/30 Summer				25.245
1.009	SW20	60 Summer	1	+0%	100/15 Summer				24.925
1.010	SW21	60 Summer	1	+0%	30/15 Summer				24.341
7.000	SW22	15 Summer	1	+0%	100/15 Summer				24.765
1.011	SW23	60 Summer	1	+0%	100/15 Summer				24.204
1.012	SW24	60 Summer	1	+0%	100/15 Summer				23.819
1.013	SW25	60 Summer	1	+0%	30/15 Summer				23.591
8.000	SW26	15 Summer	1	+0%					24.685
1.014	SW27	60 Summer	1	+0%	30/15 Summer				23.519
1.015	SW28	60 Summer	1	+0%	30/30 Summer				23.440
9.000	SW29	120 Summer	1	+0%	100/15 Summer				24.150
10.000	SW30	15 Summer	1	+0%	30/15 Summer				24.312
10.001	SW31	15 Summer	1	+0%	30/15 Summer				24.231
9.001	SW32	15 Summer	1	+0%	30/15 Summer				24.034
9.002	SW33	15 Summer	1	+0%	30/15 Summer				23.876
9.003	SW34	15 Summer	1	+0%	100/15 Summer				23.755
9.004	SW35	15 Summer	1	+0%					23.378
1.016	SW36	60 Summer	1	+0%					23.167
1.017	SW37	60 Summer	1	+0%					22.933
11.000	SW38	15 Summer	1	+0%	100/15 Summer				28.630
12.000	SW39	15 Summer	1	+0%	100/15 Summer				29.208
12.001	SW40	15 Summer	1	+0%	30/15 Summer				28.963
11.001	SW41	15 Summer	1	+0%	100/15 Summer				28.591
13.000	SW42	15 Summer	1	+0%	100/15 Summer				29.067
13.001	SW43	15 Summer	1	+0%	30/15 Summer				28.791
11.002	SW44	30 Summer	1	+0%	100/15 Summer				28.425
14.000	SW45	15 Summer	1	+0%	100/15 Summer				28.203
14.001	SW46	60 Summer	1	+0%	100/15 Summer				27.984
11.003	SW47	60 Summer	1	+0%	100/15 Summer				27.736
15.000	SW48	15 Summer	1	+0%	30/15 Summer				26.564
15.001	SW49	60 Summer	1	+0%	100/15 Summer				26.346
11.004	SW50	60 Summer	1	+0%	100/15 Summer				25.843
11.005	SW51	60 Summer	1	+0%	30/15 Summer				24.656
11.006	SW52	60 Summer	1	+0%					24.400
16.000	SW53	15 Summer	1	+0%	100/15 Summer				30.130
17.000	SW54	15 Summer	1	+0%	100/15 Summer				30.075
16.001	SW55	15 Summer	1	+0%	100/15 Summer				29.963
18.000	SW56	30 Summer	1	+0%	100/15 Summer				29.292
16.002	SW57	15 Summer	1	+0%	100/15 Summer				29.121
16.003	SW58	15 Summer	1	+0%					27.495
19.000	SW59	60 Summer	1	+0%					26.890

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	SW12	-0.218	0.000	0.44			50.8	OK	
1.005	SW13	-0.213	0.000	0.54			53.4	OK	
1.006	SW14	-0.295	0.000	0.26			55.3	OK	
1.007	SW15	-0.250	0.000	0.40			61.3	OK	
5.000	SW16	-0.112	0.000	0.15			4.8	OK	
1.008	SW17	-0.337	0.000	0.14			67.5	OK	
6.000	SW18	-0.112	0.000	0.14			2.4	OK	
6.001	SW19	-0.111	0.000	0.15			2.4	OK	
1.009	SW20	-0.324	0.000	0.17		25	69.2	OK	
1.010	SW21	-0.309	0.000	0.36			71.3	OK	
7.000	SW22	-0.106	0.000	0.19			3.3	OK	
1.011	SW23	-0.381	0.000	0.17			73.6	OK	
1.012	SW24	-0.380	0.000	0.17			74.4	OK	
1.013	SW25	-0.283	0.000	0.36			75.1	OK	
8.000	SW26	-0.115	0.000	0.12			3.7	OK	
1.014	SW27	-0.269	0.000	0.41			78.1	OK	
1.015	SW28	-0.272	0.000	0.47			79.3	OK	
9.000	SW29	-0.195	0.000	0.04		70	1.7	OK	
10.000	SW30	-0.153	0.000	0.22			8.0	OK	
10.001	SW31	-0.132	0.000	0.35			12.8	OK	
9.001	SW32	-0.191	0.000	0.27			18.4	OK	
9.002	SW33	-0.168	0.000	0.39			25.4	OK	
9.003	SW34	-0.183	0.000	0.32			29.2	OK	
9.004	SW35	-0.562	0.000	0.01			29.4	OK	
1.016	SW36	-0.517	0.000	0.04			93.5	OK	
1.017	SW37	-0.392	0.000	0.15			93.5	OK*	
11.000	SW38	-0.205	0.000	0.19			11.5	OK	
12.000	SW39	-0.153	0.000	0.22			8.3	OK	
12.001	SW40	-0.136	0.000	0.31			11.9	OK	
11.001	SW41	-0.179	0.000	0.34			22.0	OK	
13.000	SW42	-0.148	0.000	0.24			9.3	OK	
13.001	SW43	-0.129	0.000	0.38			15.6	OK	
11.002	SW44	-0.211	0.000	0.19		16	26.3	OK	
14.000	SW45	-0.205	0.000	0.22			14.8	OK	
14.001	SW46	-0.226	0.000	0.14		29	12.8	OK	
11.003	SW47	-0.203	0.000	0.23			43.2	OK	
15.000	SW48	-0.136	0.000	0.33			12.4	OK	
15.001	SW49	-0.148	0.000	0.26		24	9.9	OK	
11.004	SW50	-0.328	0.000	0.16			66.5	OK	
11.005	SW51	-0.244	0.000	0.43			74.5	OK	
11.006	SW52	-0.406	0.000	0.12			78.8	OK	
16.000	SW53	-0.190	0.000	0.28			18.6	OK	
17.000	SW54	-0.225	0.000	0.14			9.0	OK	
16.001	SW55	-0.208	0.000	0.20			31.9	OK	
18.000	SW56	-0.233	0.000	0.11		14	7.3	OK	
16.002	SW57	-0.215	0.000	0.18			42.8	OK	
16.003	SW58	-0.352	0.000	0.11			50.7	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
19.000	SW59	-0.251	0.000	0.06		32	3.5	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
19.001	SW60	30 Summer	1	+0%	100/15 Summer			
16.004	SW61	15 Summer	1	+0%	100/15 Summer			
20.000	SW62	15 Summer	1	+0%				
16.005	SW63	15 Summer	1	+0%				
16.006	SW64	15 Summer	1	+0%	100/15 Summer			
21.000	SW65	480 Summer	1	+0%	100/15 Summer			
11.007	SW66	30 Summer	1	+0%	100/15 Summer			
22.000	SW67	15 Summer	1	+0%	100/15 Summer			
11.008	SW68	30 Summer	1	+0%	30/15 Summer			
11.009	SW75	30 Summer	1	+0%	30/15 Summer			
23.000	SW76	15 Summer	1	+0%	100/15 Summer			
23.001	SW77	60 Summer	1	+0%	100/15 Summer			
24.000	SW78	15 Summer	1	+0%				
23.002	SW79	15 Summer	1	+0%	30/15 Summer			
23.003	SW80	15 Summer	1	+0%	100/15 Summer			
25.000	SW81	15 Summer	1	+0%				
23.004	SW82	15 Summer	1	+0%	30/15 Summer			
23.005	SW83	15 Summer	1	+0%				
26.000	SW84	15 Summer	1	+0%	100/15 Summer			
23.006	SW85	15 Summer	1	+0%				
27.000	SW86	1440 Winter	1	+0%	100/360 Summer			
23.007	SW87	60 Summer	1	+0%	100/240 Summer			
23.008	SW88	60 Summer	1	+0%	100/15 Summer			
23.009	SW89	60 Summer	1	+0%	100/15 Summer			
28.000	SW90	15 Summer	1	+0%	100/120 Summer			
28.001	SW91	15 Summer	1	+0%	100/15 Summer			
23.010	SW92	60 Summer	1	+0%	100/15 Summer			
29.000	SW69	15 Summer	1	+0%	100/15 Summer			
29.001	SW70	60 Summer	1	+0%	30/15 Summer			
29.002	SW71	60 Summer	1	+0%	30/15 Summer			
30.000	SW72	60 Summer	1	+0%	30/15 Summer			
29.003	SW73	60 Summer	1	+0%	30/15 Summer			
29.004	SW74	60 Summer	1	+0%	30/15 Summer			
1.018	SW93	480 Summer	1	+0%	30/60 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
19.001	SW60	26.810	-0.228	0.000	0.13			7.2	OK	
16.004	SW61	26.607	-0.329	0.000	0.16			63.1	OK	
20.000	SW62	26.273	-0.177	0.000	0.10			3.8	OK	
16.005	SW63	25.890	-0.410	0.000	0.11			84.2	OK	
16.006	SW64	23.721	-0.429	0.000	0.18			100.2	OK	
21.000	SW65	23.193	-0.542	0.000	0.01		124	2.8	OK	
11.007	SW66	23.301	-0.389	0.000	0.27			162.1	OK	
22.000	SW67	23.257	-0.168	0.000	0.15			5.9	OK	

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
11.008	SW68	22.742	-0.448	0.000	0.25			170.7	OK	
11.009	SW75	22.510	-0.384	0.000	0.39			180.0	OK	
23.000	SW76	27.827	-0.148	0.000	0.26			9.7	OK	
23.001	SW77	27.623	-0.173	0.000	0.12		30	4.3	OK	
24.000	SW78	29.473	-0.177	0.000	0.10			11.2	OK	
23.002	SW79	27.567	-0.105	0.000	0.54			19.7	OK	
23.003	SW80	27.352	-0.191	0.000	0.28			21.9	OK	
25.000	SW81	27.954	-0.183	0.000	0.08			6.9	OK	
23.004	SW82	27.112	-0.160	0.000	0.44			27.9	OK	
23.005	SW83	26.971	-0.220	0.000	0.16			29.6	OK	
26.000	SW84	25.693	-0.145	0.000	0.27			10.5	OK	
23.006	SW85	25.193	-0.382	0.000	0.05			38.4	OK	
27.000	SW86	22.542	-0.446	0.000	0.00			0.2	OK	
23.007	SW87	22.555	-0.345	0.000	0.12		25	26.9	OK	
23.008	SW88	22.394	-0.279	0.000	0.24			32.7	OK	
23.009	SW89	22.343	-0.263	0.000	0.33			34.6	OK	
28.000	SW90	22.518	-0.257	0.000	0.05			3.2	OK	
28.001	SW91	22.391	-0.256	0.000	0.05			3.2	OK	
23.010	SW92	22.313	-0.265	0.000	0.35			35.8	OK	
29.000	SW69	23.387	-0.113	0.000	0.14			3.3	OK	
29.001	SW70	22.794	-0.086	0.000	0.38		22	4.8	OK	
29.002	SW71	22.735	-0.088	0.000	0.36		30	4.7	OK	
30.000	SW72	22.723	-0.103	0.000	0.22		28	2.9	OK	
29.003	SW73	22.680	-0.056	0.000	0.70			9.7	OK	
29.004	SW74	22.417	-0.060	0.000	0.67			11.8	OK	
1.018	SW93	22.029	-0.121	0.000	0.12			51.5	OK	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	18
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
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, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

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	SW1	15 Summer	30	+0%	100/15 Summer				29.130
1.001	SW2	30 Summer	30	+0%	100/15 Summer				28.459
1.002	SW3	15 Summer	30	+0%	30/15 Summer				28.273
2.000	SW4	15 Summer	30	+0%	100/15 Summer				28.386
2.001	SW5	15 Summer	30	+0%	100/15 Summer				28.097
2.002	SW6	15 Summer	30	+0%	100/15 Summer				27.925
1.003	SW7	15 Summer	30	+0%	100/15 Summer				27.512
3.000	SW8	15 Summer	30	+0%					28.639
3.001	SW9	15 Summer	30	+0%	30/15 Summer				27.326
4.000	SW10	15 Summer	30	+0%	100/15 Summer				27.256
4.001	SW11	15 Summer	30	+0%	30/15 Summer				27.274

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1	-0.077	0.000	0.75			43.5	OK	
1.001	SW2	-0.057	0.000	0.88		17	33.8	OK	
1.002	SW3	0.063	0.000	1.08			56.0	SURCHARGED	
2.000	SW4	-0.084	0.000	0.67			25.9	OK	
2.001	SW5	-0.061	0.000	0.85			43.9	OK	
2.002	SW6	-0.075	0.000	0.90			60.4	OK	
1.003	SW7	-0.288	0.000	0.28		11	119.4	OK	
3.000	SW8	-0.161	0.000	0.18			16.9	OK	
3.001	SW9	0.173	0.000	0.75			50.0	SURCHARGED	
4.000	SW10	-0.142	0.000	0.22		10	8.4	OK	
4.001	SW11	0.149	0.000	0.78			28.8	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.004	SW12	15 Summer	30	+0%	30/15 Summer				27.242
1.005	SW13	15 Summer	30	+0%	30/15 Summer				27.132
1.006	SW14	15 Summer	30	+0%	30/15 Summer				27.013
1.007	SW15	15 Summer	30	+0%	30/15 Summer				26.782
5.000	SW16	15 Summer	30	+0%					27.628
1.008	SW17	30 Summer	30	+0%					26.276
6.000	SW18	15 Summer	30	+0%					25.671
6.001	SW19	15 Summer	30	+0%	100/30 Summer				25.280
1.009	SW20	30 Summer	30	+0%	100/15 Summer				25.047
1.010	SW21	15 Winter	30	+0%	30/15 Summer				24.655
7.000	SW22	15 Summer	30	+0%	100/15 Summer				24.806
1.011	SW23	30 Summer	30	+0%	100/15 Summer				24.340
1.012	SW24	30 Summer	30	+0%	100/15 Summer				24.025
1.013	SW25	30 Summer	30	+0%	30/15 Summer				23.956
8.000	SW26	15 Summer	30	+0%					24.715
1.014	SW27	30 Summer	30	+0%	30/15 Summer				23.845
1.015	SW28	30 Summer	30	+0%	30/30 Summer				23.721
9.000	SW29	30 Summer	30	+0%	100/15 Summer				24.187
10.000	SW30	15 Summer	30	+0%	30/15 Summer				24.494
10.001	SW31	15 Summer	30	+0%	30/15 Summer				24.420
9.001	SW32	15 Summer	30	+0%	30/15 Summer				24.242
9.002	SW33	15 Summer	30	+0%	30/15 Summer				24.107
9.003	SW34	15 Summer	30	+0%	100/15 Summer				23.936
9.004	SW35	15 Summer	30	+0%					23.421
1.016	SW36	30 Summer	30	+0%					23.248
1.017	SW37	30 Summer	30	+0%					23.055
11.000	SW38	15 Summer	30	+0%	100/15 Summer				28.809
12.000	SW39	15 Summer	30	+0%	100/15 Summer				29.278
12.001	SW40	15 Summer	30	+0%	30/15 Summer				29.118
11.001	SW41	15 Summer	30	+0%	100/15 Summer				28.758
13.000	SW42	15 Summer	30	+0%	100/15 Summer				29.187
13.001	SW43	15 Summer	30	+0%	30/15 Summer				29.031
11.002	SW44	15 Summer	30	+0%	100/15 Summer				28.531
14.000	SW45	15 Summer	30	+0%	100/15 Summer				28.294
14.001	SW46	30 Summer	30	+0%	100/15 Summer				28.073
11.003	SW47	30 Summer	30	+0%	100/15 Summer				27.857
15.000	SW48	15 Summer	30	+0%	30/15 Summer				26.714
15.001	SW49	15 Summer	30	+0%	100/15 Summer				26.450
11.004	SW50	15 Summer	30	+0%	100/15 Summer				25.976
11.005	SW51	30 Summer	30	+0%	30/15 Summer				25.017
11.006	SW52	30 Summer	30	+0%					24.521
16.000	SW53	15 Summer	30	+0%	100/15 Summer				30.246
17.000	SW54	15 Summer	30	+0%	100/15 Summer				30.141
16.001	SW55	15 Summer	30	+0%	100/15 Summer				30.054
18.000	SW56	15 Summer	30	+0%	100/15 Summer				29.370
16.002	SW57	15 Summer	30	+0%	100/15 Summer				29.215
16.003	SW58	15 Summer	30	+0%					27.596
19.000	SW59	30 Summer	30	+0%					26.953

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	SW12	0.262	0.000	1.63			190.1	SURCHARGED	
1.005	SW13	0.194	0.000	2.01			197.8	SURCHARGED	
1.006	SW14	0.100	0.000	0.93			199.7	SURCHARGED	
1.007	SW15	0.131	0.000	1.38			209.4	SURCHARGED	
5.000	SW16	-0.078	0.000	0.46			15.5	OK	
1.008	SW17	-0.230	0.000	0.48			224.8	OK	
6.000	SW18	-0.079	0.000	0.45			7.7	OK	
6.001	SW19	-0.077	0.000	0.47			7.6	OK	
1.009	SW20	-0.203	0.000	0.58		16	231.3	OK	
1.010	SW21	0.005	0.000	1.12			224.7	SURCHARGED	
7.000	SW22	-0.065	0.000	0.61			10.6	OK	
1.011	SW23	-0.245	0.000	0.55			240.4	OK	
1.012	SW24	-0.175	0.000	0.55			240.0	OK	
1.013	SW25	0.081	0.000	1.14			241.0	SURCHARGED	
8.000	SW26	-0.085	0.000	0.40			11.7	OK	
1.014	SW27	0.058	0.000	1.28			246.1	SURCHARGED	
1.015	SW28	0.009	0.000	1.47			248.5	SURCHARGED	
9.000	SW29	-0.158	0.000	0.19		28	7.4	OK	
10.000	SW30	0.029	0.000	0.65			23.3	SURCHARGED	
10.001	SW31	0.057	0.000	1.15			42.3	SURCHARGED	
9.001	SW32	0.017	0.000	0.85			57.0	SURCHARGED	
9.002	SW33	0.062	0.000	1.25			80.7	SURCHARGED	
9.003	SW34	-0.002	0.000	1.00			91.9	OK	
9.004	SW35	-0.519	0.000	0.04			91.9	OK	
1.016	SW36	-0.436	0.000	0.12			305.8	OK	
1.017	SW37	-0.270	0.000	0.48			305.7	OK*	
11.000	SW38	-0.026	0.000	0.59			35.7	OK	
12.000	SW39	-0.083	0.000	0.69			26.4	OK	
12.001	SW40	0.018	0.000	1.01			39.1	SURCHARGED	
11.001	SW41	-0.012	0.000	1.00			65.3	OK	
13.000	SW42	-0.028	0.000	0.76			29.1	OK	
13.001	SW43	0.111	0.000	1.17			48.3	SURCHARGED	
11.002	SW44	-0.105	0.000	0.75		9	102.3	OK	
14.000	SW45	-0.114	0.000	0.67			44.9	OK	
14.001	SW46	-0.137	0.000	0.57		15	52.7	OK	
11.003	SW47	-0.082	0.000	0.87			163.7	OK	
15.000	SW48	0.014	0.000	1.02			38.6	SURCHARGED	
15.001	SW49	-0.044	0.000	0.99		9	38.3	OK	
11.004	SW50	-0.195	0.000	0.57			230.2	OK	
11.005	SW51	0.117	0.000	1.56			268.8	SURCHARGED	
11.006	SW52	-0.285	0.000	0.42			283.7	OK	
16.000	SW53	-0.074	0.000	0.90			59.5	OK	
17.000	SW54	-0.159	0.000	0.44			28.9	OK	
16.001	SW55	-0.117	0.000	0.66			105.7	OK	
18.000	SW56	-0.155	0.000	0.45		7	30.0	OK	
16.002	SW57	-0.121	0.000	0.65			155.4	OK	
16.003	SW58	-0.251	0.000	0.39			185.4	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
19.000	SW59	-0.188	0.000	0.29		16	16.0	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
19.001	SW60	15 Summer	30	+0%	100/15 Summer				26.895
16.004	SW61	15 Summer	30	+0%	100/15 Summer				26.744
20.000	SW62	15 Summer	30	+0%					26.312
16.005	SW63	15 Summer	30	+0%					26.011
16.006	SW64	15 Summer	30	+0%	100/15 Summer				23.920
21.000	SW65	120 Summer	30	+0%	100/15 Summer				23.304
11.007	SW66	15 Summer	30	+0%	100/15 Summer				23.647
22.000	SW67	15 Summer	30	+0%	100/15 Summer				23.307
11.008	SW68	15 Summer	30	+0%	30/15 Summer				23.203
11.009	SW75	15 Summer	30	+0%	30/15 Summer				22.982
23.000	SW76	15 Summer	30	+0%	100/15 Summer				27.906
23.001	SW77	15 Summer	30	+0%	100/15 Summer				27.743
24.000	SW78	15 Summer	30	+0%					29.512
23.002	SW79	15 Summer	30	+0%	30/15 Summer				27.828
23.003	SW80	15 Summer	30	+0%	100/15 Summer				27.483
25.000	SW81	15 Summer	30	+0%					27.989
23.004	SW82	15 Summer	30	+0%	30/15 Summer				27.315
23.005	SW83	15 Summer	30	+0%					27.038
26.000	SW84	15 Summer	30	+0%	100/15 Summer				25.776
23.006	SW85	15 Summer	30	+0%					25.247
27.000	SW86	480 Summer	30	+0%	100/360 Summer				22.569
23.007	SW87	30 Summer	30	+0%	100/240 Summer				22.659
23.008	SW88	30 Summer	30	+0%	100/15 Summer				22.593
23.009	SW89	30 Summer	30	+0%	100/15 Summer				22.542
28.000	SW90	15 Summer	30	+0%	100/120 Summer				22.555
28.001	SW91	30 Summer	30	+0%	100/15 Summer				22.512
23.010	SW92	30 Summer	30	+0%	100/15 Summer				22.509
29.000	SW69	15 Summer	30	+0%	100/15 Summer				23.421
29.001	SW70	30 Summer	30	+0%	30/15 Summer				22.904
29.002	SW71	60 Summer	30	+0%	30/15 Summer				22.878
30.000	SW72	60 Summer	30	+0%	30/15 Summer				22.861
29.003	SW73	15 Summer	30	+0%	30/15 Summer				22.855
29.004	SW74	15 Summer	30	+0%	30/15 Summer				22.703
1.018	SW93	480 Summer	30	+0%	30/60 Summer				22.455

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
19.001	SW60	-0.143	0.000	0.51			28.0	OK	
16.004	SW61	-0.192	0.000	0.61			237.0	OK	
20.000	SW62	-0.138	0.000	0.32			12.1	OK	
16.005	SW63	-0.289	0.000	0.41			317.6	OK	
16.006	SW64	-0.230	0.000	0.68			383.8	OK	
21.000	SW65	-0.431	0.000	0.09		49	21.2	OK	
11.007	SW66	-0.043	0.000	0.95			572.0	OK	
22.000	SW67	-0.118	0.000	0.46			18.9	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
11.008	SW68	0.013	0.000	0.86			596.0	SURCHARGED	
11.009	SW75	0.088	0.000	1.32			614.6	SURCHARGED	
23.000	SW76	-0.069	0.000	0.81			30.4	OK	
23.001	SW77	-0.053	0.000	0.70		10	24.9	OK	
24.000	SW78	-0.138	0.000	0.32			35.8	OK	
23.002	SW79	0.156	0.000	1.50			54.8	SURCHARGED	
23.003	SW80	-0.060	0.000	0.79			62.3	OK	
25.000	SW81	-0.148	0.000	0.25			21.9	OK	
23.004	SW82	0.043	0.000	1.29			82.1	SURCHARGED	
23.005	SW83	-0.153	0.000	0.47			87.0	OK	
26.000	SW84	-0.062	0.000	0.88			33.5	OK	
23.006	SW85	-0.328	0.000	0.16			114.9	OK	
27.000	SW86	-0.419	0.000	0.01			1.4	OK	
23.007	SW87	-0.241	0.000	0.37		15	80.9	OK	
23.008	SW88	-0.080	0.000	0.68			94.3	OK	
23.009	SW89	-0.065	0.000	0.95			98.9	OK	
28.000	SW90	-0.220	0.000	0.16			10.4	OK	
28.001	SW91	-0.135	0.000	0.12			7.1	OK	
23.010	SW92	-0.069	0.000	1.00			101.1	OK	
29.000	SW69	-0.079	0.000	0.45			10.5	OK	
29.001	SW70	0.024	0.000	1.06		21	13.5	SURCHARGED	
29.002	SW71	0.055	0.000	0.69		28	9.2	SURCHARGED	
30.000	SW72	0.035	0.000	0.38		26	5.1	SURCHARGED	
29.003	SW73	0.119	0.000	1.15			15.9	SURCHARGED	
29.004	SW74	0.226	0.000	1.42			25.0	SURCHARGED	
1.018	SW93	0.305	0.000	0.12			52.5	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	18
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
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, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

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	SW1	15 Summer	100	+40%	100/15 Summer				29.985
1.001	SW2	30 Summer	100	+40%	100/15 Summer				28.751
1.002	SW3	15 Summer	100	+40%	30/15 Summer				28.845
2.000	SW4	15 Summer	100	+40%	100/15 Summer				29.296
2.001	SW5	15 Summer	100	+40%	100/15 Summer				28.780
2.002	SW6	15 Summer	100	+40%	100/15 Summer				28.367
1.003	SW7	15 Summer	100	+40%	100/15 Summer				27.918
3.000	SW8	15 Summer	100	+40%					28.671
3.001	SW9	15 Summer	100	+40%	30/15 Summer				28.324
4.000	SW10	30 Winter	100	+40%	100/15 Summer				27.593
4.001	SW11	15 Summer	100	+40%	30/15 Summer				27.887

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1	0.778	0.000	1.38			80.2	FLOOD RISK	
1.001	SW2	0.235	0.000	1.19		18	45.8	SURCHARGED	
1.002	SW3	0.635	0.000	1.58			82.4	SURCHARGED	
2.000	SW4	0.826	0.000	1.24			47.9	SURCHARGED	
2.001	SW5	0.622	0.000	1.60			82.7	SURCHARGED	
2.002	SW6	0.367	0.000	1.59			106.5	SURCHARGED	
1.003	SW7	0.118	0.000	0.39		10	167.3	SURCHARGED	
3.000	SW8	-0.129	0.000	0.38			36.0	OK	
3.001	SW9	1.171	0.000	1.61			107.6	SURCHARGED	
4.000	SW10	0.195	0.000	0.80		13	30.8	SURCHARGED	
4.001	SW11	0.762	0.000	0.92			34.1	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.004	SW12	15 Summer	100	+40%	30/15 Summer				27.812
1.005	SW13	15 Summer	100	+40%	30/15 Summer				27.715
1.006	SW14	15 Summer	100	+40%	30/15 Summer				27.564
1.007	SW15	15 Summer	100	+40%	30/15 Summer				27.217
5.000	SW16	15 Summer	100	+40%					27.675
1.008	SW17	15 Summer	100	+40%					26.380
6.000	SW18	15 Summer	100	+40%					25.718
6.001	SW19	30 Summer	100	+40%	100/30 Summer				25.515
1.009	SW20	30 Summer	100	+40%	100/15 Summer				25.479
1.010	SW21	30 Summer	100	+40%	30/15 Summer				25.073
7.000	SW22	15 Summer	100	+40%	100/15 Summer				25.029
1.011	SW23	30 Summer	100	+40%	100/15 Summer				24.887
1.012	SW24	30 Summer	100	+40%	100/15 Summer				24.684
1.013	SW25	30 Summer	100	+40%	30/15 Summer				24.498
8.000	SW26	15 Summer	100	+40%					24.756
1.014	SW27	30 Summer	100	+40%	30/15 Summer				24.270
1.015	SW28	30 Summer	100	+40%	30/30 Summer				23.943
9.000	SW29	15 Summer	100	+40%	100/15 Summer				24.387
10.000	SW30	15 Summer	100	+40%	30/15 Summer				25.764
10.001	SW31	15 Summer	100	+40%	30/15 Summer				25.602
9.001	SW32	15 Summer	100	+40%	30/15 Summer				24.929
9.002	SW33	15 Summer	100	+40%	30/15 Summer				24.840
9.003	SW34	15 Summer	100	+40%	100/15 Summer				24.516
9.004	SW35	15 Summer	100	+40%					23.447
1.016	SW36	30 Summer	100	+40%					23.299
1.017	SW37	30 Summer	100	+40%					23.162
11.000	SW38	15 Summer	100	+40%	100/15 Summer				29.282
12.000	SW39	15 Summer	100	+40%	100/15 Summer				30.805
12.001	SW40	15 Summer	100	+40%	30/15 Summer				30.434
11.001	SW41	15 Summer	100	+40%	100/15 Summer				29.207
13.000	SW42	15 Summer	100	+40%	100/15 Summer				30.754
13.001	SW43	15 Summer	100	+40%	30/15 Summer				30.194
11.002	SW44	15 Summer	100	+40%	100/15 Summer				28.778
14.000	SW45	15 Summer	100	+40%	100/15 Summer				28.639
14.001	SW46	30 Summer	100	+40%	100/15 Summer				28.303
11.003	SW47	15 Summer	100	+40%	100/15 Summer				28.274
15.000	SW48	15 Summer	100	+40%	30/15 Summer				27.489
15.001	SW49	15 Summer	100	+40%	100/15 Summer				26.743
11.004	SW50	15 Summer	100	+40%	100/15 Summer				26.644
11.005	SW51	15 Summer	100	+40%	30/15 Summer				25.498
11.006	SW52	15 Summer	100	+40%					24.802
16.000	SW53	15 Summer	100	+40%	100/15 Summer				31.230
17.000	SW54	15 Summer	100	+40%	100/15 Summer				30.901
16.001	SW55	15 Summer	100	+40%	100/15 Summer				30.808
18.000	SW56	15 Summer	100	+40%	100/15 Summer				29.607
16.002	SW57	15 Summer	100	+40%	100/15 Summer				29.535
16.003	SW58	15 Summer	100	+40%					27.671
19.000	SW59	15 Summer	100	+40%					27.109

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	SW12	0.832	0.000	1.94			226.2	SURCHARGED	
1.005	SW13	0.777	0.000	2.39			235.2	SURCHARGED	
1.006	SW14	0.650	0.000	1.14			244.2	SURCHARGED	
1.007	SW15	0.566	0.000	2.06			312.5	SURCHARGED	
5.000	SW16	-0.031	0.000	0.99			32.8	OK	
1.008	SW17	-0.127	0.000	0.83			393.7	OK	
6.000	SW18	-0.032	0.000	0.95			16.3	OK	
6.001	SW19	0.158	0.000	0.82			13.3	SURCHARGED	
1.009	SW20	0.229	0.000	0.85		16	335.9	SURCHARGED	
1.010	SW21	0.423	0.000	1.69			339.4	SURCHARGED	
7.000	SW22	0.158	0.000	1.20			20.7	SURCHARGED	
1.011	SW23	0.302	0.000	0.81			349.5	SURCHARGED	
1.012	SW24	0.485	0.000	0.80			351.9	SURCHARGED	
1.013	SW25	0.623	0.000	1.68			355.5	SURCHARGED	
8.000	SW26	-0.044	0.000	0.84			24.8	OK	
1.014	SW27	0.482	0.000	2.00			385.5	SURCHARGED	
1.015	SW28	0.231	0.000	2.39			403.5	SURCHARGED	
9.000	SW29	0.042	0.000	1.02		12	39.1	SURCHARGED	
10.000	SW30	1.299	0.000	1.26			44.8	FLOOD RISK	
10.001	SW31	1.239	0.000	2.26			83.0	SURCHARGED	
9.001	SW32	0.704	0.000	1.02			68.1	SURCHARGED	
9.002	SW33	0.795	0.000	1.72			111.4	FLOOD RISK	
9.003	SW34	0.578	0.000	1.68			154.6	FLOOD RISK	
9.004	SW35	-0.493	0.000	0.06			154.3	OK	
1.016	SW36	-0.385	0.000	0.20			526.5	OK	
1.017	SW37	-0.163	0.000	0.82			524.1	OK*	
11.000	SW38	0.447	0.000	1.16			70.1	SURCHARGED	
12.000	SW39	1.444	0.000	1.17			44.7	SURCHARGED	
12.001	SW40	1.335	0.000	1.84			71.1	SURCHARGED	
11.001	SW41	0.437	0.000	1.95			127.9	SURCHARGED	
13.000	SW42	1.539	0.000	1.34			51.4	SURCHARGED	
13.001	SW43	1.274	0.000	2.26			93.1	FLOOD RISK	
11.002	SW44	0.142	0.000	1.01		8	138.6	SURCHARGED	
14.000	SW45	0.231	0.000	1.40			94.6	SURCHARGED	
14.001	SW46	0.093	0.000	0.98		15	90.7	SURCHARGED	
11.003	SW47	0.335	0.000	1.07			200.4	SURCHARGED	
15.000	SW48	0.789	0.000	2.02			76.3	SURCHARGED	
15.001	SW49	0.249	0.000	1.31		11	50.7	SURCHARGED	
11.004	SW50	0.473	0.000	0.93			375.7	SURCHARGED	
11.005	SW51	0.598	0.000	2.70			467.1	SURCHARGED	
11.006	SW52	-0.004	0.000	0.77			513.5	OK	
16.000	SW53	0.910	0.000	1.68			111.0	SURCHARGED	
17.000	SW54	0.601	0.000	0.80			52.4	SURCHARGED	
16.001	SW55	0.637	0.000	1.22			194.1	SURCHARGED	
18.000	SW56	0.082	0.000	0.92		6	61.9	SURCHARGED	
16.002	SW57	0.199	0.000	1.07			255.1	SURCHARGED	
16.003	SW58	-0.176	0.000	0.67			317.2	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
19.000	SW59	-0.032	0.000	0.69		8	37.9	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
19.001	SW60	15 Summer	100	+40%	100/15 Summer				27.090
16.004	SW61	15 Summer	100	+40%	100/15 Summer				27.023
20.000	SW62	15 Summer	100	+40%					26.362
16.005	SW63	15 Summer	100	+40%					26.121
16.006	SW64	15 Summer	100	+40%	100/15 Summer				24.876
21.000	SW65	30 Summer	100	+40%	100/15 Summer				24.193
11.007	SW66	30 Summer	100	+40%	100/15 Summer				24.189
22.000	SW67	15 Summer	100	+40%	100/15 Summer				23.728
11.008	SW68	15 Summer	100	+40%	30/15 Summer				23.524
11.009	SW75	15 Summer	100	+40%	30/15 Summer				23.183
23.000	SW76	15 Summer	100	+40%	100/15 Summer				28.430
23.001	SW77	15 Summer	100	+40%	100/15 Summer				28.354
24.000	SW78	15 Summer	100	+40%					29.562
23.002	SW79	15 Summer	100	+40%	30/15 Summer				28.372
23.003	SW80	15 Summer	100	+40%	100/15 Summer				27.927
25.000	SW81	15 Summer	100	+40%					28.030
23.004	SW82	15 Summer	100	+40%	30/15 Summer				27.570
23.005	SW83	15 Summer	100	+40%					27.097
26.000	SW84	15 Summer	100	+40%	100/15 Summer				26.437
23.006	SW85	15 Summer	100	+40%					25.295
27.000	SW86	480 Winter	100	+40%	100/360 Summer				23.056
23.007	SW87	480 Winter	100	+40%	100/240 Summer				23.056
23.008	SW88	480 Winter	100	+40%	100/15 Summer				23.053
23.009	SW89	480 Winter	100	+40%	100/15 Summer				23.051
28.000	SW90	480 Winter	100	+40%	100/120 Summer				23.049
28.001	SW91	480 Winter	100	+40%	100/15 Summer				23.050
23.010	SW92	480 Winter	100	+40%	100/15 Summer				23.050
29.000	SW69	15 Summer	100	+40%	100/15 Summer				23.539
29.001	SW70	60 Summer	100	+40%	30/15 Summer				23.191
29.002	SW71	60 Summer	100	+40%	30/15 Summer				23.169
30.000	SW72	60 Summer	100	+40%	30/15 Summer				23.149
29.003	SW73	15 Summer	100	+40%	30/15 Summer				23.163
29.004	SW74	15 Summer	100	+40%	30/15 Summer				23.143
1.018	SW93	480 Winter	100	+40%	30/60 Summer				23.048

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
19.001	SW60	0.052	0.000	0.94			51.6	SURCHARGED	
16.004	SW61	0.087	0.000	1.07			412.1	SURCHARGED	
20.000	SW62	-0.088	0.000	0.68			25.6	OK	
16.005	SW63	-0.179	0.000	0.75			583.7	OK	
16.006	SW64	0.726	0.000	1.26			718.3	SURCHARGED	
21.000	SW65	0.458	0.000	0.39		34	94.8	SURCHARGED	
11.007	SW66	0.499	0.000	1.24			746.6	SURCHARGED	
22.000	SW67	0.303	0.000	0.87			35.2	SURCHARGED	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
11.008	SW68	0.334	0.000	1.08			744.4	SURCHARGED	
11.009	SW75	0.289	0.000	1.77			827.0	SURCHARGED	
23.000	SW76	0.455	0.000	1.60			60.1	SURCHARGED	
23.001	SW77	0.558	0.000	1.15		13	40.8	SURCHARGED	
24.000	SW78	-0.088	0.000	0.68			76.1	OK	
23.002	SW79	0.700	0.000	2.06			75.3	SURCHARGED	
23.003	SW80	0.384	0.000	1.12			88.7	SURCHARGED	
25.000	SW81	-0.107	0.000	0.54			46.5	OK	
23.004	SW82	0.298	0.000	2.16			137.8	SURCHARGED	
23.005	SW83	-0.094	0.000	0.81			148.7	OK	
26.000	SW84	0.599	0.000	1.80			68.6	SURCHARGED	
23.006	SW85	-0.280	0.000	0.31			216.1	OK	
27.000	SW86	0.068	0.000	0.02			2.6	SURCHARGED	
23.007	SW87	0.156	0.000	0.18			39.4	SURCHARGED	
23.008	SW88	0.381	0.000	0.34			47.3	SURCHARGED	
23.009	SW89	0.444	0.000	0.47			49.5	FLOOD RISK	
28.000	SW90	0.274	0.000	0.03			2.1	SURCHARGED	
28.001	SW91	0.403	0.000	0.03			2.1	SURCHARGED	
23.010	SW92	0.472	0.000	0.50			50.3	FLOOD RISK	
29.000	SW69	0.039	0.000	0.91			21.1	SURCHARGED	
29.001	SW70	0.311	0.000	0.93		53	11.8	SURCHARGED	
29.002	SW71	0.346	0.000	0.73		57	9.7	SURCHARGED	
30.000	SW72	0.323	0.000	0.43		58	5.7	SURCHARGED	
29.003	SW73	0.427	0.000	1.41			19.5	SURCHARGED	
29.004	SW74	0.666	0.000	1.99			35.1	SURCHARGED	
1.018	SW93	0.898	0.000	0.12			52.4	FLOOD RISK	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.840
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

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	51.134	0.691	74.0	0.118	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	51.134	0.305	167.7	0.110	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	36.515	0.410	89.1	0.127	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	50.00	4.56	28.982	0.118	0.0	0.0	0.0	1.52	60.5	17.9
1.001	50.00	5.41	28.291	0.228	0.0	0.0	0.0	1.01	40.0	34.6
1.002	48.79	5.85	27.985	0.355	0.0	0.0	0.0	1.39	55.1	52.5

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
2.000	52.025	0.312	167.0	0.073	4.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	11.541	0.158	73.0	0.051	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	48.181	0.200	240.9	0.044	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	35.301	0.820	43.1	0.082	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.000	45.524	1.647	27.6	0.045	4.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	41.292	0.173	238.7	0.105	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	45.606	0.273	167.1	0.044	4.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	24.107	0.145	166.0	0.089	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	16.192	0.042	385.5	0.117	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.005	9.281	0.024	386.7	0.044	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	48.556	0.262	185.0	0.036	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.007	54.304	0.145	375.7	0.124	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	31.825	1.198	26.6	0.041	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	48.630	1.257	38.7	0.097	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)
2.000	50.00	4.86	28.245	0.073	0.0	0.0	0.0	1.01	40.1	11.1
2.001	50.00	4.98	27.933	0.124	0.0	0.0	0.0	1.53	60.9	18.8
2.002	49.11	5.78	27.700	0.168	0.0	0.0	0.0	1.01	71.3	25.0
1.003	47.87	6.03	27.350	0.605	0.0	0.0	0.0	3.11	493.9	87.9
3.000	50.00	4.30	28.575	0.045	0.0	0.0	0.0	2.50	99.3	6.8
3.001	50.00	4.98	26.853	0.150	0.0	0.0	0.0	1.01	71.6	22.7
4.000	50.00	4.75	27.173	0.044	0.0	0.0	0.0	1.01	40.1	6.7
4.001	50.00	5.15	26.900	0.133	0.0	0.0	0.0	1.01	40.2	20.2
1.004	46.67	6.30	26.530	1.005	0.0	0.0	0.0	1.03	163.7	142.3
1.005	46.02	6.45	26.488	1.049	0.0	0.0	0.0	1.03	163.5	146.4
1.006	43.86	6.99	26.464	1.085	0.0	0.0	0.0	1.49	237.2	146.4
1.007	40.90	7.86	26.201	1.209	0.0	0.0	0.0	1.04	165.9	150.0
5.000	50.00	4.27	27.556	0.041	0.0	0.0	0.0	1.96	34.7	6.2
1.008	40.15	8.11	26.057	1.347	0.0	0.0	0.0	3.28	521.1	164.0

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
6.000	39.365	0.394	100.0	0.021	4.00	0.0	0.600	o	150	Pipe/Conduit	
6.001	10.191	0.106	96.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.009	29.292	0.600	48.8	0.123	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	24.667	0.065	379.5	0.064	0.00	0.0	0.600	o	525	Pipe/Conduit	
7.000	27.082	0.281	96.4	0.028	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.011	35.345	0.385	91.8	0.046	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.012	15.709	0.325	48.3	0.027	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.013	32.507	0.087	373.6	0.036	0.00	0.0	0.600	o	525	Pipe/Conduit	
8.000	34.627	1.012	34.2	0.031	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.014	34.699	0.076	456.6	0.095	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.015	8.866	0.028	316.6	0.051	0.00	0.0	0.600	o	525	Pipe/Conduit	
9.000	17.678	0.120	147.3	0.073	4.00	0.0	0.600	o	225	Pipe/Conduit	
10.000	17.110	0.102	167.7	0.068	4.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	23.097	0.138	167.4	0.057	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)
6.000	50.00	4.65	25.600	0.021	0.0	0.0	0.0	1.00	17.8	3.2
6.001	50.00	4.82	25.206	0.021	0.0	0.0	0.0	1.03	18.1	3.2
1.009	39.66	8.27	24.800	1.491	0.0	0.0	0.0	2.92	463.7	179.4
1.010	38.67	8.63	24.125	1.555	0.0	0.0	0.0	1.14	247.6	182.4
7.000	50.00	4.44	24.721	0.028	0.0	0.0	0.0	1.02	18.1	4.2
1.011	38.01	8.88	24.060	1.629	0.0	0.0	0.0	2.34	506.2	187.8
1.012	37.81	8.97	23.675	1.656	0.0	0.0	0.0	3.23	698.7	189.9
1.013	36.67	9.44	23.350	1.692	0.0	0.0	0.0	1.15	249.5	189.9
8.000	50.00	4.33	24.650	0.031	0.0	0.0	0.0	1.73	30.5	4.7
1.014	35.44	9.99	23.263	1.818	0.0	0.0	0.0	1.04	225.5	195.4
1.015	35.20	10.11	23.187	1.869	0.0	0.0	0.0	1.25	271.3	199.5
9.000	50.00	4.27	24.120	0.073	0.0	0.0	0.0	1.08	42.7	11.1
10.000	50.00	4.28	24.240	0.068	0.0	0.0	0.0	1.01	40.0	10.3
10.001	50.00	4.67	24.138	0.125	0.0	0.0	0.0	1.01	40.1	19.0

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
9.001	42.874	0.180	238.0	0.065	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.002	25.048	0.107	234.0	0.090	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.003	37.243	0.298	125.0	0.060	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.004	25.140	0.182	138.1	0.000	0.00	0.0	0.600		-1	Pipe/Conduit	
1.016	40.615	0.284	143.0	0.000	0.00	0.0	0.600		-1	Pipe/Conduit	
1.017	19.806#	0.700	28.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
11.000	15.593	0.065	239.9	0.099	4.00	0.0	0.600	o	300	Pipe/Conduit	
12.000	43.648	0.261	167.0	0.073	4.00	0.0	0.600	o	225	Pipe/Conduit	
12.001	55.128	0.330	167.1	0.048	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.001	31.959	0.134	238.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
13.000	49.256	0.295	167.0	0.083	4.00	0.0	0.600	o	225	Pipe/Conduit	
13.001	40.512	0.284	142.6	0.071	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.002	39.715	0.697	57.0	0.088	0.00	0.0	0.600	o	300	Pipe/Conduit	
14.000	47.178	0.198	238.0	0.126	4.00	0.0	0.600	o	300	Pipe/Conduit	
14.001	32.739	0.271	120.8	0.169	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)
9.001	50.00	5.37	23.925	0.263	0.0	0.0	0.0	1.01	71.7	39.9
9.002	49.13	5.78	23.745	0.353	0.0	0.0	0.0	1.02	72.3	52.6
9.003	47.02	6.22	23.638	0.413	0.0	0.0	0.0	1.41	99.3	58.9
9.004	46.47	6.34	23.340	0.413	0.0	0.0	0.0	3.36	4638.7	58.9
1.016	34.78	10.31	23.084	2.282	0.0	0.0	0.0	3.30	4558.6	240.7
1.017	34.62	10.39	22.800	2.282	0.0	0.0	0.0	4.22	914.1	240.7
11.000	50.00	4.26	28.535	0.099	0.0	0.0	0.0	1.01	71.4	15.0
12.000	50.00	4.72	29.136	0.073	0.0	0.0	0.0	1.01	40.1	11.1
12.001	49.89	5.63	28.875	0.121	0.0	0.0	0.0	1.01	40.1	18.3
11.001	47.30	6.16	28.470	0.220	0.0	0.0	0.0	1.01	71.7	31.6
13.000	50.00	4.81	28.990	0.083	0.0	0.0	0.0	1.01	40.1	12.6
13.001	50.00	5.43	28.695	0.154	0.0	0.0	0.0	1.09	43.4	23.4
11.002	45.91	6.47	28.336	0.462	0.0	0.0	0.0	2.09	147.5	64.3
14.000	50.00	4.77	28.108	0.126	0.0	0.0	0.0	1.01	71.7	19.1
14.001	50.00	5.16	27.910	0.295	0.0	0.0	0.0	1.43	101.0	44.7

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
11.003	55.971	1.768	31.7	0.086	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.000	34.355	0.206	166.8	0.107	4.00	0.0	0.600	o	225	Pipe/Conduit	
15.001	53.787	0.322	167.0	0.081	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.004	70.353	1.271	55.4	0.257	0.00	0.0	0.600	o	450	Pipe/Conduit	
11.005	6.271	0.094	66.7	0.143	0.00	0.0	0.600	o	450	Pipe/Conduit	
11.006	45.738	1.116	41.0	0.077	0.00	0.0	0.600	o	525	Pipe/Conduit	
16.000	35.211	0.149	236.3	0.162	4.00	0.0	0.600	o	300	Pipe/Conduit	
17.000	30.643	0.129	238.0	0.078	4.00	0.0	0.600	o	300	Pipe/Conduit	
16.001	34.614	0.835	41.5	0.053	0.00	0.0	0.600	o	300	Pipe/Conduit	
18.000	44.935	0.189	237.8	0.105	4.00	0.0	0.600	o	300	Pipe/Conduit	
16.002	26.120	1.489	17.5	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.003	32.211	0.911	35.4	0.093	0.00	0.0	0.600	o	450	Pipe/Conduit	
19.000	35.000	0.103	339.8	0.088	4.00	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)
11.003	44.56	6.81	27.639	0.843	0.0	0.0	0.0	2.80	198.2	113.9
15.000	50.00	4.57	26.475	0.107	0.0	0.0	0.0	1.01	40.1	16.2
15.001	50.00	5.46	26.269	0.188	0.0	0.0	0.0	1.01	40.1	28.5
11.004	42.96	7.24	25.721	1.288	0.0	0.0	0.0	2.74	435.3	167.8
11.005	42.81	7.28	24.450	1.431	0.0	0.0	0.0	2.49	396.3	185.8
11.006	42.07	7.49	24.281	1.508	0.0	0.0	0.0	3.51	759.0	192.4
16.000	50.00	4.58	30.020	0.162	0.0	0.0	0.0	1.02	72.0	24.6
17.000	50.00	4.50	30.000	0.078	0.0	0.0	0.0	1.01	71.7	11.8
16.001	50.00	4.81	29.871	0.293	0.0	0.0	0.0	2.45	173.1	44.4
18.000	50.00	4.74	29.225	0.105	0.0	0.0	0.0	1.02	71.8	15.9
16.002	50.00	4.93	29.036	0.461	0.0	0.0	0.0	3.77	266.6	69.9
16.003	50.00	5.08	27.397	0.554	0.0	0.0	0.0	3.43	545.2	84.0
19.000	50.00	4.69	26.841	0.088	0.0	0.0	0.0	0.85	59.9	13.3

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
19.001	35.000	0.103	339.8	0.061	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.004	34.206	0.636	53.8	0.075	0.00	0.0	0.600	o	450	Pipe/Conduit	
20.000	24.152	0.150	161.0	0.032	4.00	0.0	0.600	o	225	Pipe/Conduit	
16.005	69.886	2.150	32.5	0.215	0.00	0.0	0.600	o	525	Pipe/Conduit	
16.006	52.269	0.460	113.6	0.215	0.00	0.0	0.600	o	600	Pipe/Conduit	
21.000	16.784	0.045	373.0	0.109	4.00	0.0	0.600	o	600	Pipe/Conduit	
11.007	49.971	0.499	100.1	0.119	0.00	0.0	0.600	o	600	Pipe/Conduit	
22.000	33.820	0.235	143.9	0.050	4.00	0.0	0.600	o	225	Pipe/Conduit	
11.008	34.900	0.296	117.9	0.080	0.00	0.0	0.600	o	675	Pipe/Conduit	
11.009	14.171#	0.119	119.1	0.128	0.00	0.0	0.600	o	675	Pipe/Conduit	
23.000	29.849	0.179	166.8	0.082	4.00	0.0	0.600	o	225	Pipe/Conduit	
23.001	15.684	0.094	166.9	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
24.000	38.537	1.948	19.8	0.095	4.00	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)
19.001	50.00	5.38	26.738	0.149	0.0	0.0	0.0	0.85	59.9	22.6
16.004	50.00	5.58	26.486	0.778	0.0	0.0	0.0	2.78	441.7	118.0
20.000	50.00	4.39	26.225	0.032	0.0	0.0	0.0	1.03	40.9	4.9
16.005	48.63	5.88	25.775	1.025	0.0	0.0	0.0	3.94	852.6	151.2
16.006	46.84	6.26	23.550	1.240	0.0	0.0	0.0	2.28	645.7	176.2
21.000	50.00	4.22	23.135	0.109	0.0	0.0	0.0	1.25	354.8	16.5
11.007	40.96	7.84	23.090	2.976	0.0	0.0	0.0	2.43	688.1	369.8
22.000	50.00	4.52	23.200	0.050	0.0	0.0	0.0	1.09	43.3	7.6
11.008	40.23	8.08	22.515	3.106	0.0	0.0	0.0	2.41	863.4	379.0
11.009	39.94	8.18	22.219	3.234	0.0	0.0	0.0	2.40	859.1	391.8
23.000	50.00	4.49	27.750	0.082	0.0	0.0	0.0	1.01	40.1	12.4
23.001	50.00	4.75	27.571	0.101	0.0	0.0	0.0	1.01	40.1	15.3
24.000	50.00	4.22	29.425	0.095	0.0	0.0	0.0	2.96	117.5	14.4

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
23.002	21.625	0.129	167.6	0.091	0.00	0.0	0.600	o	225	Pipe/Conduit	
23.003	46.973	0.271	173.3	0.031	0.00	0.0	0.600	o	300	Pipe/Conduit	
25.000	27.549	0.865	31.8	0.058	4.00	0.0	0.600	o	225	Pipe/Conduit	
23.004	18.104	0.081	223.5	0.009	0.00	0.0	0.600	o	300	Pipe/Conduit	
23.005	53.408	1.616	33.0	0.016	0.00	0.0	0.600	o	300	Pipe/Conduit	
26.000	44.005	0.263	167.3	0.089	4.00	0.0	0.600	o	225	Pipe/Conduit	
23.006	46.758	2.675	17.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
27.000	33.967	0.088	385.0	0.062	4.00	0.0	0.600	o	450	Pipe/Conduit	
23.007	39.670	0.227	174.8	0.049	0.00	0.0	0.600	o	450	Pipe/Conduit	
23.008	25.363	0.066	384.3	0.130	0.00	0.0	0.600	o	450	Pipe/Conduit	
23.009	11.019	0.029	380.0	0.046	0.00	0.0	0.600	o	450	Pipe/Conduit	
28.000	30.545	0.128	238.6	0.028	4.00	0.0	0.600	o	300	Pipe/Conduit	
28.001	16.443	0.069	238.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
23.002	50.00	5.11	27.447	0.287	0.0	0.0	0.0	1.01	40.0«	43.5
23.003	49.19	5.77	27.243	0.318	0.0	0.0	0.0	1.19	84.2	47.4
25.000	50.00	4.20	27.912	0.058	0.0	0.0	0.0	2.33	92.5	8.8
23.004	47.78	6.05	26.972	0.385	0.0	0.0	0.0	1.05	74.0	55.8
23.005	46.31	6.38	26.891	0.401	0.0	0.0	0.0	2.74	194.0	56.3
26.000	50.00	4.73	25.613	0.089	0.0	0.0	0.0	1.01	40.1	13.5
23.006	45.64	6.54	25.125	0.490	0.0	0.0	0.0	4.88	776.3	67.8
27.000	50.00	4.55	22.538	0.062	0.0	0.0	0.0	1.03	163.8	9.4
23.007	43.93	6.97	22.450	0.601	0.0	0.0	0.0	1.53	244.1	80.1
23.008	42.46	7.38	22.223	0.731	0.0	0.0	0.0	1.03	164.0	94.1
23.009	41.86	7.56	22.157	0.777	0.0	0.0	0.0	1.04	164.9	98.7
28.000	50.00	4.50	22.475	0.028	0.0	0.0	0.0	1.01	71.6	4.2
28.001	50.00	4.77	22.347	0.028	0.0	0.0	0.0	1.01	71.7	4.2

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
23.010	11.000#	0.028	392.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
29.000	33.581	0.620	54.2	0.028	4.00	0.0	0.600	o	150	Pipe/Conduit	
29.001	8.479	0.057	148.8	0.059	0.00	0.0	0.600	o	150	Pipe/Conduit	
29.002	12.963	0.087	149.0	0.029	0.00	0.0	0.600	o	150	Pipe/Conduit	
30.000	13.610	0.090	151.2	0.061	4.00	0.0	0.600	o	150	Pipe/Conduit	
29.003	38.810	0.253	153.4	0.056	0.00	0.0	0.600	o	150	Pipe/Conduit	
29.004	20.353#	0.227	89.7	0.042	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.018	24.754#	0.600	41.3	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)
23.010	41.28	7.74	22.128	0.805	0.0	0.0	0.0	1.02	162.2	100.8
29.000	50.00	4.41	23.350	0.028	0.0	0.0	0.0	1.37	24.2	4.2
29.001	50.00	4.58	22.730	0.087	0.0	0.0	0.0	0.82	14.5	13.2
29.002	50.00	4.84	22.673	0.116	0.0	0.0	0.0	0.82	14.5«	17.6
30.000	50.00	4.28	22.676	0.061	0.0	0.0	0.0	0.81	14.4	9.3
29.003	49.83	5.64	22.586	0.233	0.0	0.0	0.0	0.81	14.3«	35.2
29.004	48.22	5.96	22.327	0.275	0.0	0.0	0.0	1.06	18.8«	40.2
1.018	34.36	10.52	21.700	6.596	0.0	0.0	0.0	3.17	504.6«	687.5

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW1	30.107	1.125	Open Manhole	1200	1.000	28.982	225				
SW2	29.417	1.126	Open Manhole	1200	1.001	28.291	225	1.000	28.291	225	
SW3	29.549	1.564	Open Manhole	1200	1.002	27.985	225	1.001	27.986	225	1
SW4	30.354	2.109	Open Manhole	1200	2.000	28.245	225				
SW5	29.916	1.983	Open Manhole	1200	2.001	27.933	225	2.000	27.933	225	
SW6	29.893	2.193	Open Manhole	1200	2.002	27.700	300	2.001	27.775	225	
SW7	29.001	1.651	Open Manhole	1350	1.003	27.350	450	1.002	27.575	225	
								2.002	27.500	300	
SW8	30.000	1.425	Open Manhole	1200	3.000	28.575	225				
SW9	29.302	2.449	Open Manhole	1200	3.001	26.853	300	3.000	26.928	225	
SW10	29.043	1.870	Open Manhole	1200	4.000	27.173	225				
SW11	28.272	1.372	Open Manhole	1200	4.001	26.900	225	4.000	26.900	225	
SW12	28.669	2.139	Open Manhole	1350	1.004	26.530	450	1.003	26.530	450	
								3.001	26.680	300	
								4.001	26.755	225	
SW13	28.600	2.112	Open Manhole	1350	1.005	26.488	450	1.004	26.488	450	
SW14	28.612	2.148	Open Manhole	1350	1.006	26.464	450	1.005	26.464	450	
SW15	27.550	1.349	Open Manhole	1350	1.007	26.201	450	1.006	26.201	450	
SW16	28.616	1.060	Open Manhole	1200	5.000	27.556	150				
SW17	28.251	2.194	Open Manhole	1350	1.008	26.057	450	1.007	26.057	450	
								5.000	26.358	150	1
SW18	26.948	1.348	Open Manhole	1200	6.000	25.600	150				
SW19	26.842	1.636	Open Manhole	1200	6.001	25.206	150	6.000	25.206	150	
SW20	26.848	2.048	Open Manhole	1350	1.009	24.800	450	1.008	24.800	450	
								6.001	25.100	150	
SW21	25.855	1.730	Open Manhole	1500	1.010	24.125	525	1.009	24.200	450	
SW22	26.189	1.468	Open Manhole	1200	7.000	24.721	150				
SW23	26.114	2.054	Open Manhole	1500	1.011	24.060	525	1.010	24.060	525	
								7.000	24.440	150	5
SW24	25.397	1.723	Open Manhole	1500	1.012	23.675	525	1.011	23.675	525	
SW25	25.072	1.722	Open Manhole	1500	1.013	23.350	525	1.012	23.350	525	
SW26	25.717	1.067	Open Manhole	1200	8.000	24.650	150				
SW27	24.782	1.519	Open Manhole	1500	1.014	23.263	525	1.013	23.263	525	
								8.000	23.638	150	
SW28	24.307	1.120	Open Manhole	1500	1.015	23.187	525	1.014	23.187	525	
SW29	26.645	2.525	Open Manhole	1200	9.000	24.120	225				
SW30	25.940	1.700	Open Manhole	1200	10.000	24.240	225				

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW31	25.940	1.802	Open Manhole	1200	10.001	24.138	225	10.000	24.138	225	
SW32	25.700	1.775	Open Manhole	1200	9.001	23.925	300	9.000	24.000	225	
								10.001	24.000	225	
SW33	25.102	1.357	Open Manhole	1200	9.002	23.745	300	9.001	23.745	300	
SW34	24.701	1.063	Open Manhole	1200	9.003	23.638	300	9.002	23.638	300	
SW35	25.000	1.660	Junction		9.004	23.340	-1	9.003	23.340	300	
SW36	25.000	1.916	Junction		1.016	23.084	-1	1.015	23.159	525	
								9.004	23.158	-1	74
SW37	25.000	2.200	Junction		1.017	22.800	525	1.016	22.800	-1	
SW38	30.035	1.500	Open Manhole	1200	11.000	28.535	300				
SW39	32.290	3.154	Open Manhole	1200	12.000	29.136	225				
SW40	31.213	2.338	Open Manhole	1200	12.001	28.875	225	12.000	28.875	225	
SW41	30.350	1.880	Open Manhole	1200	11.001	28.470	300	11.000	28.470	300	
								12.001	28.545	225	
SW42	31.165	2.175	Open Manhole	1200	13.000	28.990	225				
SW43	30.315	1.620	Open Manhole	1200	13.001	28.695	225	13.000	28.695	225	
SW44	30.353	2.017	Open Manhole	1200	11.002	28.336	300	11.001	28.336	300	
								13.001	28.411	225	
SW45	29.645	1.537	Open Manhole	1200	14.000	28.108	300				
SW46	30.259	2.349	Open Manhole	1200	14.001	27.910	300	14.000	27.910	300	
SW47	30.354	2.715	Open Manhole	1200	11.003	27.639	300	11.002	27.639	300	
								14.001	27.639	300	
SW48	27.825	1.350	Open Manhole	1200	15.000	26.475	225				
SW49	28.551	2.282	Open Manhole	1200	15.001	26.269	225	15.000	26.269	225	
SW50	28.840	3.119	Open Manhole	1350	11.004	25.721	450	11.003	25.871	300	
								15.001	25.947	225	1
SW51	26.187	1.737	Open Manhole	1350	11.005	24.450	450	11.004	24.450	450	
SW52	26.093	1.812	Open Manhole	1500	11.006	24.281	525	11.005	24.356	450	
SW53	32.581	2.561	Open Manhole	1200	16.000	30.020	300				
SW54	31.498	1.498	Open Manhole	1200	17.000	30.000	300				
SW55	31.900	2.029	Open Manhole	1200	16.001	29.871	300	16.000	29.871	300	
								17.000	29.871	300	
SW56	30.725	1.500	Open Manhole	1200	18.000	29.225	300				
SW57	30.721	1.685	Open Manhole	1200	16.002	29.036	300	16.001	29.036	300	
								18.000	29.036	300	
SW58	29.799	2.402	Open Manhole	1350	16.003	27.397	450	16.002	27.547	300	
SW59	28.341	1.500	Open Manhole	1200	19.000	26.841	300				

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW60	28.513	1.775	Open Manhole	1200	19.001	26.738	300	19.000	26.738	300	
SW61	28.685	2.199	Open Manhole	1350	16.004	26.486	450	16.003	26.486	450	
								19.001	26.635	300	
SW62	27.722	1.497	Open Manhole	1200	20.000	26.225	225				
SW63	27.505	1.730	Open Manhole	1500	16.005	25.775	525	16.004	25.850	450	
								20.000	26.075	225	
SW64	25.247	1.697	Open Manhole	1500	16.006	23.550	600	16.005	23.625	525	
SW65	26.297	3.162	Open Manhole	1500	21.000	23.135	600				
SW66	25.526	2.436	Open Manhole	1500	11.007	23.090	600	11.006	23.165	525	
								16.006	23.090	600	
								21.000	23.090	600	
SW67	24.642	1.442	Open Manhole	1200	22.000	23.200	225				
SW68	24.427	1.912	Open Manhole	1500	11.008	22.515	675	11.007	22.591	600	1
								22.000	22.965	225	
SW75	23.642	1.423	Open Manhole	1500	11.009	22.219	675	11.008	22.219	675	
SW76	29.500	1.750	Open Manhole	1200	23.000	27.750	225				
SW77	28.730	1.159	Open Manhole	1200	23.001	27.571	225	23.000	27.571	225	
SW78	30.850	1.425	Open Manhole	1200	24.000	29.425	225				
SW79	29.029	1.582	Open Manhole	1200	23.002	27.447	225	23.001	27.477	225	30
								24.000	27.477	225	30
SW80	29.509	2.266	Open Manhole	1200	23.003	27.243	300	23.002	27.318	225	
SW81	29.212	1.300	Open Manhole	1200	25.000	27.912	225				
SW82	29.025	2.053	Open Manhole	1200	23.004	26.972	300	23.003	26.972	300	
								25.000	27.047	225	
SW83	28.125	1.234	Open Manhole	1200	23.005	26.891	300	23.004	26.891	300	
SW84	27.542	1.929	Open Manhole	1200	26.000	25.613	225				
SW85	26.477	1.352	Open Manhole	1350	23.006	25.125	450	23.005	25.275	300	
								26.000	25.350	225	
SW86	25.407	2.869	Open Manhole	1350	27.000	22.538	450				
SW87	23.800	1.350	Open Manhole	1350	23.007	22.450	450	23.006	22.450	450	
								27.000	22.450	450	
SW88	23.700	1.477	Open Manhole	1350	23.008	22.223	450	23.007	22.223	450	
SW89	23.247	1.090	Open Manhole	1350	23.009	22.157	450	23.008	22.157	450	
SW90	23.426	0.951	Open Manhole	1200	28.000	22.475	300				
SW91	23.527	1.180	Open Manhole	1200	28.001	22.347	300	28.000	22.347	300	
SW92	23.183	1.055	Open Manhole	1350	23.010	22.128	450	23.009	22.128	450	
								28.001	22.278	300	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW69	24.684	1.334	Open Manhole	1200	29.000	23.350	150				
SW70	23.747	1.017	Open Manhole	1200	29.001	22.730	150	29.000	22.730	150	
SW71	23.803	1.130	Open Manhole	1200	29.002	22.673	150	29.001	22.673	150	
SW72	24.129	1.453	Open Manhole	1200	30.000	22.676	150				
SW73	23.933	1.347	Open Manhole	1200	29.003	22.586	150	29.002	22.586	150	
								30.000	22.586	150	
SW74	23.600	1.273	Open Manhole	1200	29.004	22.327	150	29.003	22.333	150	6
SW93	23.300	1.600	Open Manhole	1500	1.018	21.700	450	1.017	22.100	525	475
								11.009	22.100	675	625
								23.010	22.100	450	400
								29.004	22.100	150	100
	24.000	2.900	Open Manhole	0		OUTFALL		1.018	21.100	450	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW1	449048.036	117436.138	449048.036	117436.138	Required	
SW2	449097.388	117422.757	449097.388	117422.757	Required	
SW3	449146.741	117409.376	449146.741	117409.376	Required	
SW4	449053.838	117481.036	449053.838	117481.036	Required	
SW5	449104.028	117467.341	449104.028	117467.341	Required	
SW6	449109.753	117457.320	449109.753	117457.320	Required	
SW7	449156.234	117444.635	449156.234	117444.635	Required	
SW8	449070.221	117502.885	449070.221	117502.885	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW9	449114.115	117490.812	449114.115	117490.812	Required	
SW10	449116.487	117515.867	449116.487	117515.867	Required	
SW11	449160.275	117503.118	449160.275	117503.118	Required	
SW12	449153.929	117479.861	449153.929	117479.861	Required	
SW13	449169.501	117475.422	449169.501	117475.422	Required	
SW14	449178.721	117476.482	449178.721	117476.482	Required	
SW15	449178.532	117525.038	449178.532	117525.038	Required	
SW16	449095.440	117547.711	449095.440	117547.711	Required	
SW17	449126.143	117539.333	449126.143	117539.333	Required	
SW18	449091.136	117599.293	449091.136	117599.293	Required	
SW19	449129.113	117588.931	449129.113	117588.931	Required	
SW20	449138.945	117586.248	449138.945	117586.248	Required	
SW21	449146.656	117614.507	449146.656	117614.507	Required	
SW22	449096.732	117628.130	449096.732	117628.130	Required	
SW23	449122.859	117621.001	449122.859	117621.001	Required	
SW24	449132.163	117655.099	449132.163	117655.099	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW25	449129.808	117670.631	449129.808	117670.631	Required	
SW26	449089.332	117645.782	449089.332	117645.782	Required	
SW27	449098.448	117679.188	449098.448	117679.188	Required	
SW28	449107.582	117712.663	449107.582	117712.663	Required	
SW29	449171.966	117598.370	449171.966	117598.370	Required	
SW30	449194.653	117602.243	449194.653	117602.243	Required	
SW31	449192.166	117619.171	449192.166	117619.171	Required	
SW32	449169.309	117615.847	449169.309	117615.847	Required	
SW33	449162.836	117658.229	449162.836	117658.229	Required	
SW34	449159.193	117683.011	449159.193	117683.011	Required	
SW35	449130.347	117706.569			No Entry	
SW36	449109.916	117721.217			No Entry	
SW37	449069.430	117724.462			No Entry	
SW38	449022.260	117421.346	449022.260	117421.346	Required	
SW39	448933.697	117461.483	448933.697	117461.483	Required	
SW40	448975.789	117449.931	448975.789	117449.931	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW41	449028.972	117435.420	449028.972	117435.420	Required	
SW42	448952.338	117489.770	448952.338	117489.770	Required	
SW43	448999.808	117476.625	448999.808	117476.625	Required	
SW44	449038.850	117465.813	449038.850	117465.813	Required	
SW45	448973.123	117528.186	448973.123	117528.186	Required	
SW46	449017.792	117513.003	449017.792	117513.003	Required	
SW47	449049.305	117504.127	449049.305	117504.127	Required	
SW48	448979.005	117581.326	448979.005	117581.326	Required	
SW49	449012.149	117572.283	449012.149	117572.283	Required	
SW50	449064.038	117558.124	449064.038	117558.124	Required	
SW51	449082.558	117625.996	449082.558	117625.996	Required	
SW52	449079.538	117631.491	449079.538	117631.491	Required	
SW53	448909.197	117438.044	448909.197	117438.044	Required	
SW54	448894.685	117477.968	448894.685	117477.968	Required	
SW55	448924.242	117469.879	448924.242	117469.879	Required	
SW56	448894.424	117513.570	448894.424	117513.570	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW57	448937.773	117501.739	448937.773	117501.739	Required	
SW58	448946.991	117526.179	448946.991	117526.179	Required	
SW59	448889.587	117575.187	448889.587	117575.187	Required	
SW60	448923.352	117565.972	448923.352	117565.972	Required	
SW61	448957.117	117556.757	448957.117	117556.757	Required	
SW62	448943.228	117596.001	448943.228	117596.001	Required	
SW63	448966.529	117589.644	448966.529	117589.644	Required	
SW64	448984.926	117657.064	448984.926	117657.064	Required	
SW65	449031.046	117627.348	449031.046	117627.348	Required	
SW66	449035.418	117643.552	449035.418	117643.552	Required	
SW67	449081.336	117682.820	449081.336	117682.820	Required	
SW68	449048.709	117691.723	449048.709	117691.723	Required	
SW75	449056.795	117725.673	449056.795	117725.673	Required	
SW76	448826.778	117452.566	448826.778	117452.566	Required	
SW77	448827.512	117482.406	448827.512	117482.406	Required	
SW78	448875.498	117483.276	448875.498	117483.276	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW79	448838.396	117493.699	448838.396	117493.699	Required	
SW80	448855.619	117506.777	448855.619	117506.777	Required	
SW81	448879.969	117546.526	448879.969	117546.526	Required	
SW82	448853.370	117553.696	448853.370	117553.696	Required	
SW83	448854.590	117571.759	448854.590	117571.759	Required	
SW84	448934.307	117598.436	448934.307	117598.436	Required	
SW85	448891.854	117610.019	448891.854	117610.019	Required	
SW86	448941.591	117644.649	448941.591	117644.649	Required	
SW87	448908.823	117653.590	448908.823	117653.590	Required	
SW88	448930.089	117687.078	448930.089	117687.078	Required	
SW89	448939.011	117710.820	448939.011	117710.820	Required	
SW90	448982.301	117736.207	448982.301	117736.207	Required	
SW91	448954.020	117724.666	448954.020	117724.666	Required	
SW92	448937.833	117721.775	448937.833	117721.775	Required	
SW69	448967.410	117668.501	448967.410	117668.501	Required	
SW70	448976.250	117700.898	448976.250	117700.898	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW71	448984.430	117698.666	448984.430	117698.666	Required	
SW72	449010.066	117691.671	449010.066	117691.671	Required	
SW73	448996.936	117695.253	448996.936	117695.253	Required	
SW74	449007.131	117732.700	449007.131	117732.700	Required	
SW93	448911.729	117777.262	448911.729	117777.262	Required	
	448879.954	117736.702			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	SW1	30.107	28.982	0.900	Open Manhole	1200
1.001	o	225	SW2	29.417	28.291	0.901	Open Manhole	1200
1.002	o	225	SW3	29.549	27.985	1.339	Open Manhole	1200
2.000	o	225	SW4	30.354	28.245	1.884	Open Manhole	1200
2.001	o	225	SW5	29.916	27.933	1.758	Open Manhole	1200
2.002	o	300	SW6	29.893	27.700	1.893	Open Manhole	1200
1.003	o	450	SW7	29.001	27.350	1.201	Open Manhole	1350
3.000	o	225	SW8	30.000	28.575	1.200	Open Manhole	1200
3.001	o	300	SW9	29.302	26.853	2.149	Open Manhole	1200
4.000	o	225	SW10	29.043	27.173	1.645	Open Manhole	1200
4.001	o	225	SW11	28.272	26.900	1.147	Open Manhole	1200
1.004	o	450	SW12	28.669	26.530	1.689	Open Manhole	1350
1.005	o	450	SW13	28.600	26.488	1.662	Open Manhole	1350
1.006	o	450	SW14	28.612	26.464	1.698	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	51.134	74.0	SW2	29.417	28.291	0.901	Open Manhole	1200
1.001	51.134	167.7	SW3	29.549	27.986	1.338	Open Manhole	1200
1.002	36.515	89.1	SW7	29.001	27.575	1.201	Open Manhole	1350
2.000	52.025	167.0	SW5	29.916	27.933	1.758	Open Manhole	1200
2.001	11.541	73.0	SW6	29.893	27.775	1.893	Open Manhole	1200
2.002	48.181	240.9	SW7	29.001	27.500	1.201	Open Manhole	1350
1.003	35.301	43.1	SW12	28.669	26.530	1.689	Open Manhole	1350
3.000	45.524	27.6	SW9	29.302	26.928	2.149	Open Manhole	1200
3.001	41.292	238.7	SW12	28.669	26.680	1.689	Open Manhole	1350
4.000	45.606	167.1	SW11	28.272	26.900	1.147	Open Manhole	1200
4.001	24.107	166.0	SW12	28.669	26.755	1.689	Open Manhole	1350
1.004	16.192	385.5	SW13	28.600	26.488	1.662	Open Manhole	1350
1.005	9.281	386.7	SW14	28.612	26.464	1.698	Open Manhole	1350
1.006	48.556	185.0	SW15	27.550	26.201	0.899	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.007	o	450	SW15	27.550	26.201	0.899	Open Manhole	1350
5.000	o	150	SW16	28.616	27.556	0.910	Open Manhole	1200
1.008	o	450	SW17	28.251	26.057	1.744	Open Manhole	1350
6.000	o	150	SW18	26.948	25.600	1.198	Open Manhole	1200
6.001	o	150	SW19	26.842	25.206	1.486	Open Manhole	1200
1.009	o	450	SW20	26.848	24.800	1.598	Open Manhole	1350
1.010	o	525	SW21	25.855	24.125	1.205	Open Manhole	1500
7.000	o	150	SW22	26.189	24.721	1.318	Open Manhole	1200
1.011	o	525	SW23	26.114	24.060	1.529	Open Manhole	1500
1.012	o	525	SW24	25.397	23.675	1.198	Open Manhole	1500
1.013	o	525	SW25	25.072	23.350	1.197	Open Manhole	1500
8.000	o	150	SW26	25.717	24.650	0.917	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.007	54.304	375.7	SW17	28.251	26.057	1.744	Open Manhole	1350
5.000	31.825	26.6	SW17	28.251	26.358	1.743	Open Manhole	1350
1.008	48.630	38.7	SW20	26.848	24.800	1.598	Open Manhole	1350
6.000	39.365	100.0	SW19	26.842	25.206	1.486	Open Manhole	1200
6.001	10.191	96.0	SW20	26.848	25.100	1.598	Open Manhole	1350
1.009	29.292	48.8	SW21	25.855	24.200	1.205	Open Manhole	1500
1.010	24.667	379.5	SW23	26.114	24.060	1.529	Open Manhole	1500
7.000	27.082	96.4	SW23	26.114	24.440	1.524	Open Manhole	1500
1.011	35.345	91.8	SW24	25.397	23.675	1.198	Open Manhole	1500
1.012	15.709	48.3	SW25	25.072	23.350	1.197	Open Manhole	1500
1.013	32.507	373.6	SW27	24.782	23.263	0.994	Open Manhole	1500
8.000	34.627	34.2	SW27	24.782	23.638	0.994	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.014	o	525	SW27	24.782	23.263	0.994	Open Manhole	1500
1.015	o	525	SW28	24.307	23.187	0.595	Open Manhole	1500
9.000	o	225	SW29	26.645	24.120	2.300	Open Manhole	1200
10.000	o	225	SW30	25.940	24.240	1.475	Open Manhole	1200
10.001	o	225	SW31	25.940	24.138	1.577	Open Manhole	1200
9.001	o	300	SW32	25.700	23.925	1.475	Open Manhole	1200
9.002	o	300	SW33	25.102	23.745	1.057	Open Manhole	1200
9.003	o	300	SW34	24.701	23.638	0.763	Open Manhole	1200
9.004		-1	SW35	25.000	23.340	1.060	Junction	
1.016		-1	SW36	25.000	23.084	1.316	Junction	
1.017	o	525	SW37	25.000	22.800	1.675	Junction	
11.000	o	300	SW38	30.035	28.535	1.200	Open Manhole	1200
12.000	o	225	SW39	32.290	29.136	2.929	Open Manhole	1200
12.001	o	225	SW40	31.213	28.875	2.113	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.014	34.699	456.6	SW28	24.307	23.187	0.595	Open Manhole	1500
1.015	8.866	316.6	SW36	25.000	23.159	1.316	Junction	
9.000	17.678	147.3	SW32	25.700	24.000	1.475	Open Manhole	1200
10.000	17.110	167.7	SW31	25.940	24.138	1.577	Open Manhole	1200
10.001	23.097	167.4	SW32	25.700	24.000	1.475	Open Manhole	1200
9.001	42.874	238.0	SW33	25.102	23.745	1.057	Open Manhole	1200
9.002	25.048	234.0	SW34	24.701	23.638	0.763	Open Manhole	1200
9.003	37.243	125.0	SW35	25.000	23.340	1.360	Junction	
9.004	25.140	138.1	SW36	25.000	23.158	1.242	Junction	
1.016	40.615	143.0	SW37	25.000	22.800	1.600	Junction	
1.017	19.806#	28.3	SW93	23.300	22.100	0.675	Open Manhole	1500
11.000	15.593	239.9	SW41	30.350	28.470	1.580	Open Manhole	1200
12.000	43.648	167.0	SW40	31.213	28.875	2.113	Open Manhole	1200
12.001	55.128	167.1	SW41	30.350	28.545	1.580	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
11.001	o	300	SW41	30.350	28.470	1.580	Open Manhole	1200
13.000	o	225	SW42	31.165	28.990	1.950	Open Manhole	1200
13.001	o	225	SW43	30.315	28.695	1.395	Open Manhole	1200
11.002	o	300	SW44	30.353	28.336	1.717	Open Manhole	1200
14.000	o	300	SW45	29.645	28.108	1.237	Open Manhole	1200
14.001	o	300	SW46	30.259	27.910	2.049	Open Manhole	1200
11.003	o	300	SW47	30.354	27.639	2.415	Open Manhole	1200
15.000	o	225	SW48	27.825	26.475	1.125	Open Manhole	1200
15.001	o	225	SW49	28.551	26.269	2.057	Open Manhole	1200
11.004	o	450	SW50	28.840	25.721	2.669	Open Manhole	1350
11.005	o	450	SW51	26.187	24.450	1.287	Open Manhole	1350
11.006	o	525	SW52	26.093	24.281	1.287	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
11.001	31.959	238.5	SW44	30.353	28.336	1.717	Open Manhole	1200
13.000	49.256	167.0	SW43	30.315	28.695	1.395	Open Manhole	1200
13.001	40.512	142.6	SW44	30.353	28.411	1.717	Open Manhole	1200
11.002	39.715	57.0	SW47	30.354	27.639	2.415	Open Manhole	1200
14.000	47.178	238.0	SW46	30.259	27.910	2.049	Open Manhole	1200
14.001	32.739	120.8	SW47	30.354	27.639	2.415	Open Manhole	1200
11.003	55.971	31.7	SW50	28.840	25.871	2.669	Open Manhole	1350
15.000	34.355	166.8	SW49	28.551	26.269	2.057	Open Manhole	1200
15.001	53.787	167.0	SW50	28.840	25.947	2.668	Open Manhole	1350
11.004	70.353	55.4	SW51	26.187	24.450	1.287	Open Manhole	1350
11.005	6.271	66.7	SW52	26.093	24.356	1.287	Open Manhole	1500
11.006	45.738	41.0	SW66	25.526	23.165	1.836	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
16.000	o	300	SW53	32.581	30.020	2.261	Open Manhole	1200
17.000	o	300	SW54	31.498	30.000	1.198	Open Manhole	1200
16.001	o	300	SW55	31.900	29.871	1.729	Open Manhole	1200
18.000	o	300	SW56	30.725	29.225	1.200	Open Manhole	1200
16.002	o	300	SW57	30.721	29.036	1.385	Open Manhole	1200
16.003	o	450	SW58	29.799	27.397	1.952	Open Manhole	1350
19.000	o	300	SW59	28.341	26.841	1.200	Open Manhole	1200
19.001	o	300	SW60	28.513	26.738	1.475	Open Manhole	1200
16.004	o	450	SW61	28.685	26.486	1.749	Open Manhole	1350
20.000	o	225	SW62	27.722	26.225	1.272	Open Manhole	1200
16.005	o	525	SW63	27.505	25.775	1.205	Open Manhole	1500
16.006	o	600	SW64	25.247	23.550	1.097	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
16.000	35.211	236.3	SW55	31.900	29.871	1.729	Open Manhole	1200
17.000	30.643	238.0	SW55	31.900	29.871	1.729	Open Manhole	1200
16.001	34.614	41.5	SW57	30.721	29.036	1.385	Open Manhole	1200
18.000	44.935	237.8	SW57	30.721	29.036	1.385	Open Manhole	1200
16.002	26.120	17.5	SW58	29.799	27.547	1.952	Open Manhole	1350
16.003	32.211	35.4	SW61	28.685	26.486	1.749	Open Manhole	1350
19.000	35.000	339.8	SW60	28.513	26.738	1.475	Open Manhole	1200
19.001	35.000	339.8	SW61	28.685	26.635	1.750	Open Manhole	1350
16.004	34.206	53.8	SW63	27.505	25.850	1.205	Open Manhole	1500
20.000	24.152	161.0	SW63	27.505	26.075	1.205	Open Manhole	1500
16.005	69.886	32.5	SW64	25.247	23.625	1.097	Open Manhole	1500
16.006	52.269	113.6	SW66	25.526	23.090	1.836	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
21.000	o	600	SW65	26.297	23.135	2.562	Open Manhole	1500
11.007	o	600	SW66	25.526	23.090	1.836	Open Manhole	1500
22.000	o	225	SW67	24.642	23.200	1.217	Open Manhole	1200
11.008	o	675	SW68	24.427	22.515	1.237	Open Manhole	1500
11.009	o	675	SW75	23.642	22.219	0.748	Open Manhole	1500
23.000	o	225	SW76	29.500	27.750	1.525	Open Manhole	1200
23.001	o	225	SW77	28.730	27.571	0.934	Open Manhole	1200
24.000	o	225	SW78	30.850	29.425	1.200	Open Manhole	1200
23.002	o	225	SW79	29.029	27.447	1.357	Open Manhole	1200
23.003	o	300	SW80	29.509	27.243	1.966	Open Manhole	1200
25.000	o	225	SW81	29.212	27.912	1.075	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
21.000	16.784	373.0	SW66	25.526	23.090	1.836	Open Manhole	1500
11.007	49.971	100.1	SW68	24.427	22.591	1.236	Open Manhole	1500
22.000	33.820	143.9	SW68	24.427	22.965	1.237	Open Manhole	1500
11.008	34.900	117.9	SW75	23.642	22.219	0.748	Open Manhole	1500
11.009	14.171#	119.1	SW93	23.300	22.100	0.525	Open Manhole	1500
23.000	29.849	166.8	SW77	28.730	27.571	0.934	Open Manhole	1200
23.001	15.684	166.9	SW79	29.029	27.477	1.327	Open Manhole	1200
24.000	38.537	19.8	SW79	29.029	27.477	1.327	Open Manhole	1200
23.002	21.625	167.6	SW80	29.509	27.318	1.966	Open Manhole	1200
23.003	46.973	173.3	SW82	29.025	26.972	1.753	Open Manhole	1200
25.000	27.549	31.8	SW82	29.025	27.047	1.753	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
23.004	o	300	SW82	29.025	26.972	1.753	Open Manhole	1200
23.005	o	300	SW83	28.125	26.891	0.934	Open Manhole	1200
26.000	o	225	SW84	27.542	25.613	1.704	Open Manhole	1200
23.006	o	450	SW85	26.477	25.125	0.902	Open Manhole	1350
27.000	o	450	SW86	25.407	22.538	2.419	Open Manhole	1350
23.007	o	450	SW87	23.800	22.450	0.900	Open Manhole	1350
23.008	o	450	SW88	23.700	22.223	1.027	Open Manhole	1350
23.009	o	450	SW89	23.247	22.157	0.640	Open Manhole	1350
28.000	o	300	SW90	23.426	22.475	0.651	Open Manhole	1200
28.001	o	300	SW91	23.527	22.347	0.880	Open Manhole	1200
23.010	o	450	SW92	23.183	22.128	0.605	Open Manhole	1350
29.000	o	150	SW69	24.684	23.350	1.184	Open Manhole	1200
29.001	o	150	SW70	23.747	22.730	0.867	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
23.004	18.104	223.5	SW83	28.125	26.891	0.934	Open Manhole	1200
23.005	53.408	33.0	SW85	26.477	25.275	0.902	Open Manhole	1350
26.000	44.005	167.3	SW85	26.477	25.350	0.902	Open Manhole	1350
23.006	46.758	17.5	SW87	23.800	22.450	0.900	Open Manhole	1350
27.000	33.967	385.0	SW87	23.800	22.450	0.900	Open Manhole	1350
23.007	39.670	174.8	SW88	23.700	22.223	1.027	Open Manhole	1350
23.008	25.363	384.3	SW89	23.247	22.157	0.640	Open Manhole	1350
23.009	11.019	380.0	SW92	23.183	22.128	0.605	Open Manhole	1350
28.000	30.545	238.6	SW91	23.527	22.347	0.880	Open Manhole	1200
28.001	16.443	238.0	SW92	23.183	22.278	0.605	Open Manhole	1350
23.010	11.000#	392.9	SW93	23.300	22.100	0.750	Open Manhole	1500
29.000	33.581	54.2	SW70	23.747	22.730	0.867	Open Manhole	1200
29.001	8.479	148.8	SW71	23.803	22.673	0.980	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
29.002	o	150	SW71	23.803	22.673	0.980	Open Manhole	1200
30.000	o	150	SW72	24.129	22.676	1.303	Open Manhole	1200
29.003	o	150	SW73	23.933	22.586	1.197	Open Manhole	1200
29.004	o	150	SW74	23.600	22.327	1.123	Open Manhole	1200
1.018	o	450	SW93	23.300	21.700	1.150	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
29.002	12.963	149.0	SW73	23.933	22.586	1.197	Open Manhole	1200
30.000	13.610	151.2	SW73	23.933	22.586	1.197	Open Manhole	1200
29.003	38.810	153.4	SW74	23.600	22.333	1.117	Open Manhole	1200
29.004	20.353#	89.7	SW93	23.300	22.100	1.050	Open Manhole	1500
1.018	24.754#	41.3		24.000	21.100	2.450	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.018		24.000	21.100	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	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	18
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.840
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW93, DS/PN: 1.018, Volume (m³): 13.3

Unit Reference	MD-SHE-0297-5360-1550-5360
Design Head (m)	1.550
Design Flow (l/s)	53.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	297
Invert Level (m)	21.700
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.550	53.5	Kick-Flo®	1.104	45.5
Flush-Flo™	0.524	53.4	Mean Flow over Head Range	-	45.2

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	9.1	1.200	47.3	3.000	73.6	7.000	111.2
0.200	30.5	1.400	50.9	3.500	79.4	7.500	115.0
0.300	50.8	1.600	54.3	4.000	84.7	8.000	118.7
0.400	52.8	1.800	57.5	4.500	89.7	8.500	122.3
0.500	53.4	2.000	60.5	5.000	94.4	9.000	125.7
0.600	53.3	2.200	63.4	5.500	98.9	9.500	129.1
0.800	52.0	2.400	66.1	6.000	103.2		
1.000	49.0	2.600	68.7	6.500	107.3		

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	18
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
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, 240, 360, 480, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	45

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	SW1	15 Summer	100	+45%	100/15 Summer				30.072
1.001	SW2	30 Summer	100	+45%	100/15 Summer				28.776
1.002	SW3	15 Summer	100	+45%	100/15 Summer				28.880
2.000	SW4	15 Summer	100	+45%	100/15 Summer				29.396
2.001	SW5	15 Summer	100	+45%	100/15 Summer				28.842
2.002	SW6	15 Summer	100	+45%	100/15 Summer				28.405
1.003	SW7	15 Summer	100	+45%	100/15 Summer				28.035
3.000	SW8	15 Summer	100	+45%					28.673
3.001	SW9	15 Summer	100	+45%	100/15 Summer				28.389
4.000	SW10	30 Summer	100	+45%	100/15 Summer				27.615

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1	0.865	0.000	1.42			82.3	FLOOD RISK	
1.001	SW2	0.260	0.000	1.22		18	46.7	SURCHARGED	
1.002	SW3	0.670	0.000	1.61			83.8	SURCHARGED	
2.000	SW4	0.926	0.000	1.28			49.5	SURCHARGED	
2.001	SW5	0.684	0.000	1.65			85.2	SURCHARGED	
2.002	SW6	0.405	0.000	1.63			109.5	SURCHARGED	
1.003	SW7	0.235	0.000	0.38		11	166.4	SURCHARGED	
3.000	SW8	-0.127	0.000	0.39			37.3	OK	
3.001	SW9	1.236	0.000	1.68			112.2	SURCHARGED	
4.000	SW10	0.217	0.000	0.74		13	28.5	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
4.001	SW11	15 Summer	100	+45%	100/15 Summer				27.912
1.004	SW12	15 Summer	100	+45%	100/15 Summer				27.823
1.005	SW13	15 Summer	100	+45%	100/15 Summer				27.733
1.006	SW14	15 Summer	100	+45%	100/15 Summer				27.591
1.007	SW15	15 Summer	100	+45%	100/15 Summer				27.243
5.000	SW16	15 Summer	100	+45%	100/15 Summer				27.712
1.008	SW17	15 Summer	100	+45%					26.385
6.000	SW18	15 Summer	100	+45%					25.735
6.001	SW19	30 Summer	100	+45%	100/15 Summer				25.651
1.009	SW20	30 Summer	100	+45%	100/15 Summer				25.638
1.010	SW21	30 Summer	100	+45%	100/15 Summer				25.214
7.000	SW22	15 Summer	100	+45%	100/15 Summer				25.073
1.011	SW23	30 Summer	100	+45%	100/15 Summer				25.004
1.012	SW24	30 Summer	100	+45%	100/15 Summer				24.731
1.013	SW25	30 Summer	100	+45%	100/15 Summer				24.521
8.000	SW26	15 Summer	100	+45%					24.767
1.014	SW27	30 Summer	100	+45%	100/15 Summer				24.296
1.015	SW28	30 Summer	100	+45%	100/15 Summer				23.959
9.000	SW29	15 Summer	100	+45%	100/15 Summer				24.402
10.000	SW30	15 Summer	100	+45%	100/15 Summer				25.865
10.001	SW31	15 Summer	100	+45%	100/15 Summer				25.693
9.001	SW32	15 Summer	100	+45%	100/15 Summer				24.978
9.002	SW33	15 Summer	100	+45%	100/15 Summer				24.889
9.003	SW34	15 Summer	100	+45%	100/15 Summer				24.554
9.004	SW35	15 Summer	100	+45%					23.448
1.016	SW36	30 Summer	100	+45%					23.302
1.017	SW37	30 Summer	100	+45%					23.169
11.000	SW38	15 Summer	100	+45%	100/15 Summer				29.327
12.000	SW39	15 Summer	100	+45%	100/15 Summer				30.943
12.001	SW40	15 Summer	100	+45%	100/15 Summer				30.550
11.001	SW41	15 Summer	100	+45%	100/15 Summer				29.251
13.000	SW42	15 Summer	100	+45%	100/15 Summer				30.886
13.001	SW43	15 Summer	100	+45%	100/15 Summer				30.293
11.002	SW44	15 Summer	100	+45%	100/15 Summer				28.802
14.000	SW45	15 Summer	100	+45%	100/15 Summer				28.672
14.001	SW46	30 Summer	100	+45%	100/15 Summer				28.324
11.003	SW47	15 Summer	100	+45%	100/15 Summer				28.279
15.000	SW48	15 Summer	100	+45%	100/15 Summer				27.561
15.001	SW49	15 Summer	100	+45%	100/15 Summer				26.887
11.004	SW50	15 Summer	100	+45%	100/15 Summer				26.693
11.005	SW51	15 Summer	100	+45%	100/15 Summer				25.546
11.006	SW52	15 Summer	100	+45%	100/15 Summer				24.853
16.000	SW53	15 Summer	100	+45%	100/15 Summer				31.363
17.000	SW54	15 Summer	100	+45%	100/15 Summer				31.010
16.001	SW55	15 Summer	100	+45%	100/15 Summer				30.919
18.000	SW56	15 Summer	100	+45%	100/15 Summer				29.638
16.002	SW57	15 Summer	100	+45%	100/15 Summer				29.602

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
4.001	SW11	0.787	0.000	0.96			35.7	SURCHARGED	
1.004	SW12	0.843	0.000	2.07			241.9	SURCHARGED	
1.005	SW13	0.795	0.000	2.53			249.0	SURCHARGED	
1.006	SW14	0.677	0.000	1.20			258.9	SURCHARGED	
1.007	SW15	0.592	0.000	2.09			317.2	SURCHARGED	
5.000	SW16	0.006	0.000	1.00			33.3	SURCHARGED	
1.008	SW17	-0.121	0.000	0.86			405.8	OK	
6.000	SW18	-0.015	0.000	0.97			16.7	OK	
6.001	SW19	0.295	0.000	0.85			13.8	SURCHARGED	
1.009	SW20	0.388	0.000	0.88		16	348.6	SURCHARGED	
1.010	SW21	0.564	0.000	1.77			355.2	SURCHARGED	
7.000	SW22	0.202	0.000	1.24			21.4	SURCHARGED	
1.011	SW23	0.419	0.000	0.84			364.2	SURCHARGED	
1.012	SW24	0.532	0.000	0.84			369.1	SURCHARGED	
1.013	SW25	0.647	0.000	1.75			370.4	SURCHARGED	
8.000	SW26	-0.033	0.000	0.87			25.5	OK	
1.014	SW27	0.508	0.000	2.04			392.9	SURCHARGED	
1.015	SW28	0.247	0.000	2.45			413.0	SURCHARGED	
9.000	SW29	0.057	0.000	1.09		12	41.8	SURCHARGED	
10.000	SW30	1.400	0.000	1.29			46.2	FLOOD RISK	
10.001	SW31	1.330	0.000	2.33			85.6	FLOOD RISK	
9.001	SW32	0.753	0.000	1.03			68.9	SURCHARGED	
9.002	SW33	0.844	0.000	1.75			113.1	FLOOD RISK	
9.003	SW34	0.616	0.000	1.72			158.0	FLOOD RISK	
9.004	SW35	-0.492	0.000	0.06			157.7	OK	
1.016	SW36	-0.382	0.000	0.21			541.5	OK	
1.017	SW37	-0.156	0.000	0.84			537.1	OK*	
11.000	SW38	0.492	0.000	1.20			72.2	SURCHARGED	
12.000	SW39	1.582	0.000	1.20			46.0	SURCHARGED	
12.001	SW40	1.450	0.000	1.89			73.1	SURCHARGED	
11.001	SW41	0.481	0.000	2.01			131.9	SURCHARGED	
13.000	SW42	1.671	0.000	1.38			52.9	FLOOD RISK	
13.001	SW43	1.373	0.000	2.32			95.8	FLOOD RISK	
11.002	SW44	0.166	0.000	1.02		9	139.4	SURCHARGED	
14.000	SW45	0.264	0.000	1.45			97.7	SURCHARGED	
14.001	SW46	0.115	0.000	1.00		16	92.2	SURCHARGED	
11.003	SW47	0.340	0.000	1.07			201.4	SURCHARGED	
15.000	SW48	0.861	0.000	2.08			78.6	FLOOD RISK	
15.001	SW49	0.393	0.000	1.35		11	52.1	SURCHARGED	
11.004	SW50	0.522	0.000	0.93			377.5	SURCHARGED	
11.005	SW51	0.646	0.000	2.72			470.6	SURCHARGED	
11.006	SW52	0.047	0.000	0.78			521.7	SURCHARGED	
16.000	SW53	1.043	0.000	1.72			113.9	SURCHARGED	
17.000	SW54	0.710	0.000	0.81			52.8	SURCHARGED	
16.001	SW55	0.748	0.000	1.25			199.3	SURCHARGED	
18.000	SW56	0.113	0.000	0.95		6	63.6	SURCHARGED	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
16.002	SW57	0.266	0.000	1.08			258.1	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
16.003	SW58	15 Summer	100	+45%					27.676
19.000	SW59	15 Summer	100	+45%					27.129
19.001	SW60	15 Summer	100	+45%	100/15 Summer				27.124
16.004	SW61	15 Summer	100	+45%	100/15 Summer				27.058
20.000	SW62	15 Summer	100	+45%					26.365
16.005	SW63	15 Summer	100	+45%					26.157
16.006	SW64	15 Summer	100	+45%	100/15 Summer				24.938
21.000	SW65	30 Summer	100	+45%	100/15 Summer				24.384
11.007	SW66	30 Summer	100	+45%	100/15 Summer				24.381
22.000	SW67	15 Summer	100	+45%	100/15 Summer				23.765
11.008	SW68	30 Summer	100	+45%	100/15 Summer				23.555
11.009	SW75	15 Summer	100	+45%	100/15 Summer				23.196
23.000	SW76	15 Summer	100	+45%	100/15 Summer				28.634
23.001	SW77	15 Summer	100	+45%	100/15 Summer				28.590
24.000	SW78	15 Summer	100	+45%					29.565
23.002	SW79	15 Summer	100	+45%	100/15 Summer				28.521
23.003	SW80	15 Summer	100	+45%	100/15 Summer				27.968
25.000	SW81	15 Summer	100	+45%					28.032
23.004	SW82	15 Summer	100	+45%	100/15 Summer				27.593
23.005	SW83	15 Summer	100	+45%					27.102
26.000	SW84	15 Summer	100	+45%	100/15 Summer				26.496
23.006	SW85	15 Summer	100	+45%					25.298
27.000	SW86	960 Winter	100	+45%	100/360 Summer				23.096
23.007	SW87	960 Winter	100	+45%	100/240 Summer				23.097
23.008	SW88	960 Winter	100	+45%	100/15 Summer				23.094
23.009	SW89	960 Winter	100	+45%	100/15 Summer				23.092
28.000	SW90	960 Winter	100	+45%	100/120 Summer				23.090
28.001	SW91	960 Winter	100	+45%	100/15 Summer				23.090
23.010	SW92	960 Winter	100	+45%	100/15 Summer				23.090
29.000	SW69	15 Summer	100	+45%	100/15 Summer				23.576
29.001	SW70	60 Summer	100	+45%	100/15 Summer				23.227
29.002	SW71	60 Summer	100	+45%	100/15 Summer				23.205
30.000	SW72	60 Summer	100	+45%	100/15 Summer				23.178
29.003	SW73	15 Summer	100	+45%	100/15 Summer				23.196
29.004	SW74	15 Summer	100	+45%	100/15 Summer				23.179
1.018	SW93	960 Winter	100	+45%	100/15 Summer				23.089

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
16.003	SW58	-0.171	0.000	0.68			322.9	OK	
19.000	SW59	-0.012	0.000	0.70		8	38.4	OK	
19.001	SW60	0.086	0.000	0.93			51.5	SURCHARGED	
16.004	SW61	0.122	0.000	1.09			420.9	SURCHARGED	
20.000	SW62	-0.085	0.000	0.70			26.5	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
16.005	SW63	-0.143	0.000	0.76			592.4	OK	
16.006	SW64	0.788	0.000	1.29			732.5	SURCHARGED	
21.000	SW65	0.649	0.000	0.39		34	94.4	SURCHARGED	
11.007	SW66	0.691	0.000	1.30			783.3	SURCHARGED	
22.000	SW67	0.340	0.000	0.90			36.7	SURCHARGED	
11.008	SW68	0.365	0.000	1.15			790.9	SURCHARGED	
11.009	SW75	0.302	0.000	1.80			838.6	SURCHARGED	
23.000	SW76	0.659	0.000	1.65			61.9	SURCHARGED	
23.001	SW77	0.794	0.000	1.16		14	41.3	FLOOD RISK	
24.000	SW78	-0.085	0.000	0.71			78.8	OK	
23.002	SW79	0.849	0.000	2.30			83.9	SURCHARGED	
23.003	SW80	0.425	0.000	1.15			90.8	SURCHARGED	
25.000	SW81	-0.105	0.000	0.56			48.1	OK	
23.004	SW82	0.321	0.000	2.22			141.6	SURCHARGED	
23.005	SW83	-0.089	0.000	0.83			153.0	OK	
26.000	SW84	0.658	0.000	1.85			70.9	SURCHARGED	
23.006	SW85	-0.277	0.000	0.32			222.7	OK	
27.000	SW86	0.108	0.000	0.02		649	2.9	SURCHARGED	
23.007	SW87	0.197	0.000	0.11		678	24.3	SURCHARGED	
23.008	SW88	0.421	0.000	0.21			28.6	SURCHARGED	
23.009	SW89	0.485	0.000	0.28			29.7	FLOOD RISK	
28.000	SW90	0.315	0.000	0.02			1.3	SURCHARGED	
28.001	SW91	0.443	0.000	0.02			1.3	SURCHARGED	
23.010	SW92	0.512	0.000	0.30			30.2	FLOOD RISK	
29.000	SW69	0.076	0.000	0.92			21.5	SURCHARGED	
29.001	SW70	0.347	0.000	0.94		53	12.0	SURCHARGED	
29.002	SW71	0.382	0.000	0.72		65	9.6	SURCHARGED	
30.000	SW72	0.352	0.000	0.44		59	5.8	SURCHARGED	
29.003	SW73	0.460	0.000	1.43			19.7	SURCHARGED	
29.004	SW74	0.702	0.000	2.02			35.7	SURCHARGED	
1.018	SW93	0.939	0.000	0.12			52.5	FLOOD RISK	

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Appendix F MicroDrainage Calculations Southern Network

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.840
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

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	25.869	0.175	147.8	0.037	4.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	22.203	0.133	167.0	0.080	4.00	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	50.00	4.40	28.975	0.037	0.0	0.0	0.0	1.07	42.7	5.6
2.000	50.00	4.37	28.933	0.080	0.0	0.0	0.0	1.01	40.1	12.1

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.001	26.533	0.163	162.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	25.136	0.385	65.3	0.053	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	54.798	1.865	29.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	35.498	0.150	236.7	0.111	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	11.512	0.030	383.7	0.054	4.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	12.387	0.040	309.7	0.012	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	17.580	0.705	24.9	0.117	4.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	26.119	0.180	145.1	0.023	4.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	30.036	1.165	25.8	0.045	0.00	0.0	0.600	o	225	Pipe/Conduit	
7.000	21.634	0.145	149.2	0.013	4.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	46.010	2.445	18.8	0.101	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	39.839	0.103	385.0	0.125	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)
1.001	50.00	4.83	28.800	0.117	0.0	0.0	0.0	1.02	40.6	17.7
3.000	50.00	4.34	29.100	0.053	0.0	0.0	0.0	1.25	22.0	8.0
1.002	50.00	5.21	28.640	0.170	0.0	0.0	0.0	2.42	96.3	25.8
1.003	49.74	5.66	26.550	0.281	0.0	0.0	0.0	1.32	209.5	42.4
4.000	50.00	4.19	26.430	0.054	0.0	0.0	0.0	1.03	164.1	8.2
1.004	48.82	5.84	26.400	0.347	0.0	0.0	0.0	1.15	182.9	51.4
5.000	50.00	4.11	30.900	0.117	0.0	0.0	0.0	2.63	104.6	17.7
6.000	50.00	4.52	30.450	0.023	0.0	0.0	0.0	0.83	14.7	3.5
5.001	50.00	4.72	30.195	0.185	0.0	0.0	0.0	2.59	102.9	28.1
7.000	50.00	4.34	29.175	0.013	0.0	0.0	0.0	1.07	42.5	2.0
5.002	50.00	4.93	28.955	0.299	0.0	0.0	0.0	3.64	257.4	45.3
1.005	45.86	6.48	26.360	0.771	0.0	0.0	0.0	1.03	163.8	107.3

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.006	62.307	0.162	384.6	0.091	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.000	21.046	0.870	24.2	0.000	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	82.326	0.207	397.7	0.077	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.008	35.743#	0.124	288.3	0.107	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.000	39.642	0.350	113.3	0.026	4.00	0.0	0.600	o	150	Pipe/Conduit	
9.001	39.073	1.300	30.1	0.037	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.002	16.837	1.042	16.2	0.055	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.000	27.482	1.050	26.2	0.020	4.00	0.0	0.600	o	150	Pipe/Conduit	
10.001	37.696	1.500	25.1	0.057	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.002	15.780	1.668	9.5	0.143	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.000	42.959	0.258	166.5	0.154	4.00	0.0	0.600	o	225	Pipe/Conduit	
10.003	13.105	0.056	234.0	0.107	0.00	0.0	0.600	o	450	Pipe/Conduit	
12.000	44.449	0.910	48.8	0.016	4.00	0.0	0.600	o	150	Pipe/Conduit	
12.001	44.442	2.874	15.5	0.093	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)
1.006	42.08	7.49	26.257	0.862	0.0	0.0	0.0	1.03	163.9	110.0
8.000	50.00	4.17	27.250	0.000	0.0	0.0	0.0	2.06	36.3	0.0
1.007	38.11	8.85	26.080	0.939	0.0	0.0	0.0	1.01	161.2	110.0
1.008	36.88	9.35	25.874	1.046	0.0	0.0	0.0	1.19	189.6	117.0
9.000	50.00	4.70	29.400	0.026	0.0	0.0	0.0	0.94	16.7	3.9
9.001	50.00	4.97	28.975	0.063	0.0	0.0	0.0	2.40	95.2	9.6
9.002	50.00	5.06	27.675	0.118	0.0	0.0	0.0	3.27	130.1	17.9
10.000	50.00	4.23	31.050	0.020	0.0	0.0	0.0	1.98	34.9	3.0
10.001	50.00	4.47	29.925	0.077	0.0	0.0	0.0	2.62	104.2	11.7
10.002	50.00	4.53	28.425	0.220	0.0	0.0	0.0	4.28	170.2	33.4
11.000	50.00	4.71	27.015	0.154	0.0	0.0	0.0	1.01	40.2	23.4
10.003	50.00	4.87	26.532	0.481	0.0	0.0	0.0	1.32	210.7	72.9
12.000	50.00	4.51	30.560	0.016	0.0	0.0	0.0	1.44	25.5	2.4
12.001	50.00	4.73	29.575	0.109	0.0	0.0	0.0	3.34	133.0	16.5

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
13.000	13.067	0.034	384.3	0.000	4.00	0.0	0.600	o	450	Pipe/Conduit	
10.004	17.035	0.045	378.6	0.073	0.00	0.0	0.600	o	450	Pipe/Conduit	
10.005	9.012	0.023	391.8	0.035	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.003	56.320	0.193	291.8	0.038	0.00	0.0	0.600	o	450	Pipe/Conduit	
14.000	8.237	0.008	1029.6	0.000	4.00	0.0	0.600	o	450	Pipe/Conduit	
9.004	15.500	0.040	387.5	0.111	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.005	14.556	0.038	383.1	0.036	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.006	28.585#	0.387	73.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	12.633	0.053	238.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
13.000	50.00	4.21	26.510	0.000	0.0	0.0	0.0	1.03	164.0	0.0
10.004	50.00	5.15	26.476	0.663	0.0	0.0	0.0	1.04	165.2	100.6
10.005	50.00	5.29	26.431	0.698	0.0	0.0	0.0	1.02	162.4	105.9
9.003	47.63	6.09	26.408	0.854	0.0	0.0	0.0	1.18	188.5	123.4
14.000	50.00	4.22	26.223	0.000	0.0	0.0	0.0	0.63	99.4	0.0
9.004	46.50	6.34	26.215	0.965	0.0	0.0	0.0	1.03	163.3	136.1
9.005	45.50	6.57	26.175	1.001	0.0	0.0	0.0	1.03	164.2	138.1
9.006	44.69	6.77	26.137	1.001	0.0	0.0	0.0	2.37	376.6	138.1
1.009	36.40	9.55	25.750	2.047	0.0	0.0	0.0	1.01	71.7«	226.0

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW1	30.100	1.125	Open Manhole	1200	1.000	28.975	225				
SW2	31.400	2.467	Open Manhole	1200	2.000	28.933	225				
SW3	30.675	1.875	Open Manhole	1200	1.001	28.800	225	1.000	28.800	225	
								2.000	28.800	225	
SW4	30.450	1.350	Open Manhole	1200	3.000	29.100	150				
SW5	30.425	1.788	Open Manhole	1200	1.002	28.640	225	1.001	28.637	225	
								3.000	28.715	150	
SW6	27.900	1.350	Open Manhole	1350	1.003	26.550	450	1.002	26.775	225	
SW7	29.000	2.570	Open Manhole	1350	4.000	26.430	450				
SW8	28.300	1.900	Open Manhole	1350	1.004	26.400	450	1.003	26.400	450	
								4.000	26.400	450	
SW9	32.325	1.425	Open Manhole	1200	5.000	30.900	225				
SW10	31.800	1.350	Open Manhole	1200	6.000	30.450	150				
SW11	31.800	1.605	Open Manhole	1200	5.001	30.195	225	5.000	30.195	225	
								6.000	30.270	150	
SW12	30.600	1.425	Open Manhole	1200	7.000	29.175	225				
SW13	30.650	1.695	Open Manhole	1200	5.002	28.955	300	5.001	29.030	225	
								7.000	29.030	225	
SW14	27.900	1.540	Open Manhole	1350	1.005	26.360	450	1.004	26.360	450	
								5.002	26.510	300	
SW15	28.900	2.643	Open Manhole	1350	1.006	26.257	450	1.005	26.257	450	
SW16	28.700	1.450	Open Manhole	1200	8.000	27.250	150				
SW17	27.650	1.570	Open Manhole	1350	1.007	26.080	450	1.006	26.095	450	15
								8.000	26.380	150	
SW18	26.950	1.077	Open Manhole	1350	1.008	25.874	450	1.007	25.873	450	
SW20	30.750	1.350	Open Manhole	1200	9.000	29.400	150				
SW21	30.400	1.425	Open Manhole	1200	9.001	28.975	225	9.000	29.050	150	
SW22	29.100	1.425	Open Manhole	1200	9.002	27.675	225	9.001	27.675	225	
SW23	32.400	1.350	Open Manhole	1200	10.000	31.050	150				
SW24	31.350	1.425	Open Manhole	1200	10.001	29.925	225	10.000	30.000	150	
SW25	29.850	1.425	Open Manhole	1200	10.002	28.425	225	10.001	28.425	225	
SW26	28.440	1.425	Open Manhole	1200	11.000	27.015	225				
SW27	29.750	3.218	Open Manhole	1350	10.003	26.532	450	10.002	26.757	225	
								11.000	26.757	225	
SW28	31.910	1.350	Open Manhole	1200	12.000	30.560	150				
SW29	31.000	1.425	Open Manhole	1200	12.001	29.575	225	12.000	29.650	150	
SW30	29.900	3.390	Open Manhole	1350	13.000	26.510	450				
SW31	29.625	3.149	Open Manhole	1350	10.004	26.476	450	10.003	26.476	450	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								12.001	26.701	225	
								13.000	26.476	450	
SW32	29.300	2.869	Open Manhole	1350	10.005	26.431	450	10.004	26.431	450	
SW33	29.000	2.592	Open Manhole	1350	9.003	26.408	450	9.002	26.633	225	
								10.005	26.408	450	
SW34	27.700	1.477	Open Manhole	1350	14.000	26.223	450				
SW35	27.500	1.285	Open Manhole	1350	9.004	26.215	450	9.003	26.215	450	
								14.000	26.215	450	
SW36	27.300	1.125	Open Manhole	1350	9.005	26.175	450	9.004	26.175	450	
SW37	27.400	1.263	Open Manhole	1350	9.006	26.137	450	9.005	26.137	450	
SW38	27.100	1.350	Open Manhole	1350	1.009	25.750	300	1.008	25.750	450	
								9.006	25.750	450	
	27.100	1.403	Open Manhole	525		OUTFALL		1.009	25.697	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW1	448826.681	117436.010	448826.681	117436.010	Required	
SW2	448848.591	117410.221	448848.591	117410.221	Required	
SW3	448826.388	117410.143	448826.388	117410.143	Required	
SW4	448851.373	117383.865	448851.373	117383.865	Required	
SW5	448826.238	117383.610	448826.238	117383.610	Required	
SW6	448825.638	117328.815	448825.638	117328.815	Required	
SW7	448861.131	117339.761	448861.131	117339.761	Required	
SW8	448861.131	117328.250	448861.131	117328.250	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW9	448898.992	117416.338	448898.992	117416.338	Required	
SW10	448866.853	117407.821	448866.853	117407.821	Required	
SW11	448891.857	117400.271	448891.857	117400.271	Required	
SW12	448860.887	117379.543	448860.887	117379.543	Required	
SW13	448881.229	117372.178	448881.229	117372.178	Required	
SW14	448873.437	117326.833	448873.437	117326.833	Required	
SW15	448913.148	117323.650	448913.148	117323.650	Required	
SW16	448976.121	117339.571	448976.121	117339.571	Required	
SW17	448975.245	117318.543	448975.245	117318.543	Required	
SW18	449057.166	117310.383	449057.166	117310.383	Required	
SW20	448900.060	117369.353	448900.060	117369.353	Required	
SW21	448938.287	117358.855	448938.287	117358.855	Required	
SW22	448976.273	117349.704	448976.273	117349.704	Required	
SW23	448949.991	117425.723	448949.991	117425.723	Required	
SW24	448976.501	117418.479	448976.501	117418.479	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW25	449008.958	117399.307	449008.958	117399.307	Required	
SW26	449039.705	117365.390	449039.705	117365.390	Required	
SW27	449001.650	117385.321	449001.650	117385.321	Required	
SW28	448909.825	117397.106	448909.825	117397.106	Required	
SW29	448952.707	117385.405	448952.707	117385.405	Required	
SW30	449007.235	117367.796	449007.235	117367.796	Required	
SW31	448995.581	117373.707	448995.581	117373.707	Required	
SW32	448989.178	117357.921	448989.178	117357.921	Required	
SW33	448993.110	117349.812	448993.110	117349.812	Required	
SW34	449041.972	117347.927	449041.972	117347.927	Required	
SW35	449049.110	117343.815	449049.110	117343.815	Required	
SW36	449064.507	117342.032	449064.507	117342.032	Required	
SW37	449073.527	117330.607	449073.527	117330.607	Required	
SW38	449097.677	117300.024	449097.677	117300.024	Required	
	449094.292	117287.853			No Entry	



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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	SW1	30.100	28.975	0.900	Open Manhole	1200
2.000	o	225	SW2	31.400	28.933	2.242	Open Manhole	1200
1.001	o	225	SW3	30.675	28.800	1.650	Open Manhole	1200
3.000	o	150	SW4	30.450	29.100	1.200	Open Manhole	1200
1.002	o	225	SW5	30.425	28.640	1.560	Open Manhole	1200
1.003	o	450	SW6	27.900	26.550	0.900	Open Manhole	1350
4.000	o	450	SW7	29.000	26.430	2.120	Open Manhole	1350
1.004	o	450	SW8	28.300	26.400	1.450	Open Manhole	1350
5.000	o	225	SW9	32.325	30.900	1.200	Open Manhole	1200
6.000	o	150	SW10	31.800	30.450	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	25.869	147.8	SW3	30.675	28.800	1.650	Open Manhole	1200
2.000	22.203	167.0	SW3	30.675	28.800	1.650	Open Manhole	1200
1.001	26.533	162.8	SW5	30.425	28.637	1.563	Open Manhole	1200
3.000	25.136	65.3	SW5	30.425	28.715	1.560	Open Manhole	1200
1.002	54.798	29.4	SW6	27.900	26.775	0.900	Open Manhole	1350
1.003	35.498	236.7	SW8	28.300	26.400	1.450	Open Manhole	1350
4.000	11.512	383.7	SW8	28.300	26.400	1.450	Open Manhole	1350
1.004	12.387	309.7	SW14	27.900	26.360	1.090	Open Manhole	1350
5.000	17.580	24.9	SW11	31.800	30.195	1.380	Open Manhole	1200
6.000	26.119	145.1	SW11	31.800	30.270	1.380	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.001	o	225	SW11	31.800	30.195	1.380	Open Manhole	1200
7.000	o	225	SW12	30.600	29.175	1.200	Open Manhole	1200
5.002	o	300	SW13	30.650	28.955	1.395	Open Manhole	1200
1.005	o	450	SW14	27.900	26.360	1.090	Open Manhole	1350
1.006	o	450	SW15	28.900	26.257	2.193	Open Manhole	1350
8.000	o	150	SW16	28.700	27.250	1.300	Open Manhole	1200
1.007	o	450	SW17	27.650	26.080	1.120	Open Manhole	1350
1.008	o	450	SW18	26.950	25.874	0.626	Open Manhole	1350
9.000	o	150	SW20	30.750	29.400	1.200	Open Manhole	1200
9.001	o	225	SW21	30.400	28.975	1.200	Open Manhole	1200
9.002	o	225	SW22	29.100	27.675	1.200	Open Manhole	1200
10.000	o	150	SW23	32.400	31.050	1.200	Open Manhole	1200
10.001	o	225	SW24	31.350	29.925	1.200	Open Manhole	1200
10.002	o	225	SW25	29.850	28.425	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.001	30.036	25.8	SW13	30.650	29.030	1.395	Open Manhole	1200
7.000	21.634	149.2	SW13	30.650	29.030	1.395	Open Manhole	1200
5.002	46.010	18.8	SW14	27.900	26.510	1.090	Open Manhole	1350
1.005	39.839	385.0	SW15	28.900	26.257	2.193	Open Manhole	1350
1.006	62.307	384.6	SW17	27.650	26.095	1.105	Open Manhole	1350
8.000	21.046	24.2	SW17	27.650	26.380	1.120	Open Manhole	1350
1.007	82.326	397.7	SW18	26.950	25.873	0.627	Open Manhole	1350
1.008	35.743#	288.3	SW38	27.100	25.750	0.900	Open Manhole	1350
9.000	39.642	113.3	SW21	30.400	29.050	1.200	Open Manhole	1200
9.001	39.073	30.1	SW22	29.100	27.675	1.200	Open Manhole	1200
9.002	16.837	16.2	SW33	29.000	26.633	2.142	Open Manhole	1350
10.000	27.482	26.2	SW24	31.350	30.000	1.200	Open Manhole	1200
10.001	37.696	25.1	SW25	29.850	28.425	1.200	Open Manhole	1200
10.002	15.780	9.5	SW27	29.750	26.757	2.768	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
11.000	o	225	SW26	28.440	27.015	1.200	Open Manhole	1200
10.003	o	450	SW27	29.750	26.532	2.768	Open Manhole	1350
12.000	o	150	SW28	31.910	30.560	1.200	Open Manhole	1200
12.001	o	225	SW29	31.000	29.575	1.200	Open Manhole	1200
13.000	o	450	SW30	29.900	26.510	2.940	Open Manhole	1350
10.004	o	450	SW31	29.625	26.476	2.699	Open Manhole	1350
10.005	o	450	SW32	29.300	26.431	2.419	Open Manhole	1350
9.003	o	450	SW33	29.000	26.408	2.142	Open Manhole	1350
14.000	o	450	SW34	27.700	26.223	1.027	Open Manhole	1350
9.004	o	450	SW35	27.500	26.215	0.835	Open Manhole	1350
9.005	o	450	SW36	27.300	26.175	0.675	Open Manhole	1350
9.006	o	450	SW37	27.400	26.137	0.813	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
11.000	42.959	166.5	SW27	29.750	26.757	2.768	Open Manhole	1350
10.003	13.105	234.0	SW31	29.625	26.476	2.699	Open Manhole	1350
12.000	44.449	48.8	SW29	31.000	29.650	1.200	Open Manhole	1200
12.001	44.442	15.5	SW31	29.625	26.701	2.699	Open Manhole	1350
13.000	13.067	384.3	SW31	29.625	26.476	2.699	Open Manhole	1350
10.004	17.035	378.6	SW32	29.300	26.431	2.419	Open Manhole	1350
10.005	9.012	391.8	SW33	29.000	26.408	2.142	Open Manhole	1350
9.003	56.320	291.8	SW35	27.500	26.215	0.835	Open Manhole	1350
14.000	8.237	1029.6	SW35	27.500	26.215	0.835	Open Manhole	1350
9.004	15.500	387.5	SW36	27.300	26.175	0.675	Open Manhole	1350
9.005	14.556	383.1	SW37	27.400	26.137	0.813	Open Manhole	1350
9.006	28.585#	73.9	SW38	27.100	25.750	0.900	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.009	o	300	SW38	27.100	25.750	1.050	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.009	12.633	238.0		27.100	25.697	1.103	Open Manhole	525

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	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	9
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.840
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW38, DS/PN: 1.009, Volume (m³): 11.7

Unit Reference	MD-SHE-0179-1600-1050-1600
Design Head (m)	1.050
Design Flow (l/s)	16.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	179
Invert Level (m)	25.750
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.050	16.0
Flush-Flo™	0.334	15.9
Kick-Flo®	0.730	13.5
Mean Flow over Head Range	-	13.6

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	6.3	1.200	17.0	3.000	26.4	7.000	39.7
0.200	15.2	1.400	18.3	3.500	28.4	7.500	41.1
0.300	15.9	1.600	19.5	4.000	30.3	8.000	42.4
0.400	15.8	1.800	20.7	4.500	32.1	8.500	43.6
0.500	15.6	2.000	21.7	5.000	33.8	9.000	44.9
0.600	15.1	2.200	22.7	5.500	35.3	9.500	46.0
0.800	14.1	2.400	23.7	6.000	36.9		
1.000	15.6	2.600	24.6	6.500	38.3		

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Storage Structures for Storm

Cellular Storage Manhole: SW5, DS/PN: 1.002

Invert Level (m) 28.637 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	30.0	0.0	0.501	0.0	0.0
0.500	30.0	0.0			

Cellular Storage Manhole: SW7, DS/PN: 4.000

Invert Level (m) 26.412 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	135.0	0.0	0.501	0.0	0.0
0.500	135.0	0.0			

Cellular Storage Manhole: SW15, DS/PN: 1.006

Invert Level (m) 26.257 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	225.0	0.0	0.501	0.0	0.0
0.500	225.0	0.0			

Cellular Storage Manhole: SW18, DS/PN: 1.008

Invert Level (m) 25.874 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	200.0	0.0	0.501	0.0	0.0
0.500	200.0	0.0			

Cellular Storage Manhole: SW26, DS/PN: 11.000

Invert Level (m) 27.015 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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Cellular Storage Manhole: SW26, DS/PN: 11.000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	90.0	0.0	0.501	0.0	0.0
0.500	90.0	0.0			

Cellular Storage Manhole: SW30, DS/PN: 13.000

Invert Level (m) 26.489 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	160.0	0.0	0.501	0.0	0.0
0.500	160.0	0.0			

Cellular Storage Manhole: SW34, DS/PN: 14.000

Invert Level (m) 26.223 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	160.0	0.0	0.501	0.0	0.0
0.500	160.0	0.0			

Cellular Storage Manhole: SW37, DS/PN: 9.006

Invert Level (m) 26.137 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	120.0	0.0	0.501	0.0	0.0
0.500	120.0	0.0			

Tank or Pond Manhole: SW38, DS/PN: 1.009

Invert Level (m) 25.750

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	624.0	0.250	747.0	0.750	1014.0	1.350	1371.0

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	9
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

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	SW1	15 Summer	1	+0%	100/15 Summer				29.025
2.000	SW2	15 Summer	1	+0%	100/15 Summer				29.010
1.001	SW3	15 Summer	1	+0%	30/15 Summer				28.894
3.000	SW4	15 Summer	1	+0%	100/15 Summer				29.156
1.002	SW5	15 Summer	1	+0%	100/15 Summer				28.706
1.003	SW6	15 Summer	1	+0%	100/15 Summer				26.663
4.000	SW7	360 Summer	1	+0%	100/15 Summer				26.478
1.004	SW8	15 Summer	1	+0%	30/15 Summer				26.562
5.000	SW9	15 Summer	1	+0%	100/15 Summer				30.957
6.000	SW10	15 Summer	1	+0%	100/15 Summer				30.495
5.001	SW11	15 Summer	1	+0%	100/15 Summer				30.265
7.000	SW12	15 Summer	1	+0%					29.204
5.002	SW13	15 Summer	1	+0%					29.026

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1	-0.175	0.000	0.11			4.3	OK	
2.000	SW2	-0.148	0.000	0.26			9.4	OK	
1.001	SW3	-0.131	0.000	0.36			13.4	OK	
3.000	SW4	-0.094	0.000	0.30			6.3	OK	
1.002	SW5	-0.159	0.000	0.19		8	17.6	OK	
1.003	SW6	-0.337	0.000	0.14			25.5	OK	
4.000	SW7	-0.402	0.000	0.01		132	1.3	OK	
1.004	SW8	-0.288	0.000	0.16			21.5	OK	
5.000	SW9	-0.168	0.000	0.15			13.8	OK	
6.000	SW10	-0.105	0.000	0.19			2.7	OK	
5.001	SW11	-0.155	0.000	0.21			20.6	OK	
7.000	SW12	-0.196	0.000	0.04			1.5	OK	
5.002	SW13	-0.229	0.000	0.13			31.0	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.005	SW14	15 Summer	1	+0%	30/15 Summer				26.552
1.006	SW15	60 Summer	1	+0%	100/15 Summer				26.392
8.000	SW16	15 Summer	1	+0%					27.250
1.007	SW17	120 Summer	1	+0%	100/15 Summer				26.219
1.008	SW18	480 Summer	1	+0%	30/360 Summer				26.001
9.000	SW20	15 Summer	1	+0%	100/15 Summer				29.444
9.001	SW21	15 Summer	1	+0%					29.014
9.002	SW22	15 Summer	1	+0%					27.722
10.000	SW23	15 Summer	1	+0%					31.076
10.001	SW24	15 Summer	1	+0%					29.966
10.002	SW25	15 Summer	1	+0%	100/15 Summer				28.480
11.000	SW26	60 Summer	1	+0%	100/15 Summer				27.081
10.003	SW27	30 Summer	1	+0%	30/15 Summer				26.693
12.000	SW28	15 Summer	1	+0%					30.587
12.001	SW29	15 Summer	1	+0%					29.617
13.000	SW30	240 Summer	1	+0%	100/15 Summer				26.542
10.004	SW31	15 Summer	1	+0%	30/15 Summer				26.668
10.005	SW32	15 Summer	1	+0%	30/15 Summer				26.633
9.003	SW33	15 Summer	1	+0%	30/15 Summer				26.580
14.000	SW34	360 Summer	1	+0%	100/30 Summer				26.327
9.004	SW35	30 Summer	1	+0%	30/15 Summer				26.419
9.005	SW36	30 Summer	1	+0%	30/15 Summer				26.376
9.006	SW37	30 Summer	1	+0%	100/120 Summer				26.240
1.009	SW38	480 Summer	1	+0%	30/30 Summer				25.993

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.005	SW14	-0.258	0.000	0.37			54.0	OK	
1.006	SW15	-0.314	0.000	0.20		34	29.8	OK	
8.000	SW16	-0.150	0.000	0.00			0.0	OK	
1.007	SW17	-0.311	0.000	0.21			31.3	OK	
1.008	SW18	-0.323	0.000	0.12		192	20.5	OK	
9.000	SW20	-0.106	0.000	0.19			3.0	OK	
9.001	SW21	-0.186	0.000	0.07			6.3	OK	
9.002	SW22	-0.178	0.000	0.10			11.0	OK	
10.000	SW23	-0.124	0.000	0.07			2.4	OK	
10.001	SW24	-0.184	0.000	0.08			7.5	OK	
10.002	SW25	-0.170	0.000	0.13			20.2	OK	
11.000	SW26	-0.159	0.000	0.19		30	7.2	OK	
10.003	SW27	-0.289	0.000	0.21			32.6	OK	
12.000	SW28	-0.123	0.000	0.08			1.9	OK	
12.001	SW29	-0.183	0.000	0.08			10.1	OK	
13.000	SW30	-0.418	0.000	0.01		160	0.7	OK	
10.004	SW31	-0.258	0.000	0.30			37.1	OK	
10.005	SW32	-0.248	0.000	0.41			39.5	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
9.003	SW33	-0.278	0.000	0.30			52.0	OK	
14.000	SW34	-0.346	0.000	0.02		114	2.1	OK	
9.004	SW35	-0.246	0.000	0.38			43.1	OK	
9.005	SW36	-0.249	0.000	0.41			45.7	OK	
9.006	SW37	-0.347	0.000	0.12		17	38.3	OK	
1.009	SW38	-0.057	0.000	0.27			15.7	OK	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	9
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

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	SW1	15 Summer	30	+0%	100/15 Summer				29.070
2.000	SW2	15 Summer	30	+0%	100/15 Summer				29.111
1.001	SW3	15 Summer	30	+0%	30/15 Summer				29.028
3.000	SW4	15 Summer	30	+0%	100/15 Summer				29.216
1.002	SW5	15 Summer	30	+0%	100/15 Summer				28.766
1.003	SW6	15 Summer	30	+0%	100/15 Summer				26.899
4.000	SW7	30 Summer	30	+0%	100/15 Summer				26.604
1.004	SW8	15 Summer	30	+0%	30/15 Summer				26.857
5.000	SW9	15 Summer	30	+0%	100/15 Summer				31.009
6.000	SW10	15 Summer	30	+0%	100/15 Summer				30.535
5.001	SW11	15 Summer	30	+0%	100/15 Summer				30.338
7.000	SW12	15 Summer	30	+0%					29.228
5.002	SW13	15 Summer	30	+0%					29.100

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1	-0.130	0.000	0.35			13.8	OK	
2.000	SW2	-0.047	0.000	0.81			29.6	OK	
1.001	SW3	0.003	0.000	1.03			38.8	SURCHARGED	
3.000	SW4	-0.034	0.000	0.95			19.9	OK	
1.002	SW5	-0.099	0.000	0.59		6	55.0	OK	
1.003	SW6	-0.101	0.000	0.46			85.0	OK	
4.000	SW7	-0.276	0.000	0.13		21	13.7	OK	
1.004	SW8	0.007	0.000	0.53			69.6	SURCHARGED	
5.000	SW9	-0.116	0.000	0.47			44.1	OK	
6.000	SW10	-0.065	0.000	0.61			8.5	OK	
5.001	SW11	-0.082	0.000	0.72			69.6	OK	
7.000	SW12	-0.172	0.000	0.13			4.9	OK	
5.002	SW13	-0.155	0.000	0.47			112.5	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.005	SW14	15 Summer	30	+0%	30/15 Summer				26.847
1.006	SW15	30 Summer	30	+0%	100/15 Summer				26.530
8.000	SW16	15 Summer	30	+0%					27.250
1.007	SW17	60 Summer	30	+0%	100/15 Summer				26.360
1.008	SW18	480 Summer	30	+0%	30/360 Summer				26.340
9.000	SW20	15 Summer	30	+0%	100/15 Summer				29.484
9.001	SW21	15 Summer	30	+0%					29.053
9.002	SW22	15 Summer	30	+0%					27.771
10.000	SW23	15 Summer	30	+0%					31.098
10.001	SW24	15 Summer	30	+0%					30.008
10.002	SW25	15 Summer	30	+0%	100/15 Summer				28.544
11.000	SW26	30 Summer	30	+0%	100/15 Summer				27.163
10.003	SW27	15 Summer	30	+0%	30/15 Summer				27.035
12.000	SW28	15 Summer	30	+0%					30.610
12.001	SW29	15 Summer	30	+0%					29.663
13.000	SW30	120 Summer	30	+0%	100/15 Summer				26.666
10.004	SW31	15 Summer	30	+0%	30/15 Summer				26.988
10.005	SW32	15 Summer	30	+0%	30/15 Summer				26.944
9.003	SW33	15 Summer	30	+0%	30/15 Summer				26.911
14.000	SW34	120 Summer	30	+0%	100/30 Summer				26.464
9.004	SW35	15 Summer	30	+0%	30/15 Summer				26.681
9.005	SW36	15 Summer	30	+0%	30/15 Summer				26.626
9.006	SW37	480 Summer	30	+0%	100/120 Summer				26.339
1.009	SW38	480 Summer	30	+0%	30/30 Summer				26.336

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.005	SW14	0.037	0.000	1.17			170.5	SURCHARGED	
1.006	SW15	-0.176	0.000	0.67		20	101.9	OK	
8.000	SW16	-0.150	0.000	0.00			0.0	OK	
1.007	SW17	-0.170	0.000	0.69			104.8	OK	
1.008	SW18	0.016	0.000	0.24		424	39.3	SURCHARGED	
9.000	SW20	-0.066	0.000	0.61			9.8	OK	
9.001	SW21	-0.147	0.000	0.26			23.4	OK	
9.002	SW22	-0.129	0.000	0.38			43.9	OK	
10.000	SW23	-0.102	0.000	0.23			7.5	OK	
10.001	SW24	-0.142	0.000	0.29			29.0	OK	
10.002	SW25	-0.106	0.000	0.55			83.0	OK	
11.000	SW26	-0.077	0.000	0.74		15	28.5	OK	
10.003	SW27	0.053	0.000	0.87			135.7	SURCHARGED	
12.000	SW28	-0.100	0.000	0.24			6.0	OK	
12.001	SW29	-0.137	0.000	0.32			41.1	OK	
13.000	SW30	-0.294	0.000	0.07		52	7.5	OK	
10.004	SW31	0.062	0.000	1.08			132.9	SURCHARGED	
10.005	SW32	0.063	0.000	1.48			142.0	SURCHARGED	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
9.003	SW33	0.053	0.000	1.06			183.2	SURCHARGED	
14.000	SW34	-0.209	0.000	0.10		52	9.1	OK	
9.004	SW35	0.016	0.000	1.27			143.1	SURCHARGED	
9.005	SW36	0.001	0.000	1.38			152.2	SURCHARGED	
9.006	SW37	-0.248	0.000	0.15		256	47.4	OK	
1.009	SW38	0.286	0.000	0.27			15.9	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	9
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

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	SW1	15 Summer	100	+40%	100/15 Summer				29.656
2.000	SW2	15 Summer	100	+40%	100/15 Summer				29.920
1.001	SW3	15 Summer	100	+40%	30/15 Summer				29.587
3.000	SW4	15 Summer	100	+40%	100/15 Summer				30.049
1.002	SW5	15 Summer	100	+40%	100/15 Summer				28.907
1.003	SW6	15 Winter	100	+40%	100/15 Summer				27.172
4.000	SW7	15 Winter	100	+40%	100/15 Summer				27.118
1.004	SW8	15 Winter	100	+40%	30/15 Summer				27.113
5.000	SW9	15 Summer	100	+40%	100/15 Summer				31.648
6.000	SW10	15 Summer	100	+40%	100/15 Summer				31.322

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1	0.456	0.000	0.61			24.1	SURCHARGED	
2.000	SW2	0.762	0.000	1.53			56.1	SURCHARGED	
1.001	SW3	0.562	0.000	2.07			78.0	SURCHARGED	
3.000	SW4	0.799	0.000	1.74			36.5	SURCHARGED	
1.002	SW5	0.042	0.000	0.99		4	91.7	SURCHARGED	
1.003	SW6	0.172	0.000	0.85			156.3	SURCHARGED	
4.000	SW7	0.238	0.000	0.71		14	74.4	SURCHARGED	
1.004	SW8	0.263	0.000	1.03			135.4	SURCHARGED	
5.000	SW9	0.523	0.000	0.85			79.6	SURCHARGED	
6.000	SW10	0.722	0.000	1.17			16.4	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	SW11	15 Summer	100	+40%	100/15 Summer				31.125
7.000	SW12	15 Summer	100	+40%					29.254
5.002	SW13	15 Summer	100	+40%					29.173
1.005	SW14	15 Winter	100	+40%	30/15 Summer				27.075
1.006	SW15	480 Winter	100	+40%	100/15 Summer				26.792
8.000	SW16	15 Summer	100	+40%					27.250
1.007	SW17	480 Winter	100	+40%	100/15 Summer				26.787
1.008	SW18	480 Winter	100	+40%	30/360 Summer				26.781
9.000	SW20	15 Summer	100	+40%	100/15 Summer				29.720
9.001	SW21	15 Summer	100	+40%					29.092
9.002	SW22	15 Summer	100	+40%					27.827
10.000	SW23	15 Summer	100	+40%					31.123
10.001	SW24	15 Summer	100	+40%					30.054
10.002	SW25	15 Summer	100	+40%	100/15 Summer				29.307
11.000	SW26	15 Summer	100	+40%	100/15 Summer				27.438
10.003	SW27	15 Summer	100	+40%	30/15 Summer				27.368
12.000	SW28	15 Summer	100	+40%					30.637
12.001	SW29	15 Summer	100	+40%					29.712
13.000	SW30	30 Summer	100	+40%	100/15 Summer				27.083
10.004	SW31	15 Summer	100	+40%	30/15 Summer				27.187
10.005	SW32	15 Summer	100	+40%	30/15 Summer				27.151
9.003	SW33	15 Summer	100	+40%	30/15 Summer				27.122
14.000	SW34	480 Winter	100	+40%	100/30 Summer				26.787
9.004	SW35	480 Winter	100	+40%	30/15 Summer				26.787
9.005	SW36	480 Winter	100	+40%	30/15 Summer				26.784
9.006	SW37	480 Winter	100	+40%	100/120 Summer				26.781
1.009	SW38	480 Winter	100	+40%	30/30 Summer				26.777

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	SW11	0.705	0.000	1.27			121.7	SURCHARGED	
7.000	SW12	-0.146	0.000	0.27			10.4	OK	
5.002	SW13	-0.082	0.000	0.85			205.4	OK	
1.005	SW14	0.265	0.000	1.76			256.4	SURCHARGED	
1.006	SW15	0.086	0.000	0.39			58.6	SURCHARGED	
8.000	SW16	-0.150	0.000	0.00			0.0	OK	
1.007	SW17	0.257	0.000	0.41			62.5	SURCHARGED	
1.008	SW18	0.457	0.000	0.36			60.3	FLOOD RISK	
9.000	SW20	0.170	0.000	1.19			19.1	SURCHARGED	
9.001	SW21	-0.108	0.000	0.52			47.1	OK	
9.002	SW22	-0.073	0.000	0.78			90.7	OK	
10.000	SW23	-0.077	0.000	0.48			16.0	OK	
10.001	SW24	-0.096	0.000	0.63			61.7	OK	
10.002	SW25	0.657	0.000	1.07			161.5	SURCHARGED	
11.000	SW26	0.198	0.000	1.24		11	47.6	SURCHARGED	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
10.003	SW27	0.386	0.000	1.52			238.4	SURCHARGED	
12.000	SW28	-0.073	0.000	0.51			12.6	OK	
12.001	SW29	-0.088	0.000	0.69			87.0	OK	
13.000	SW30	0.123	0.000	0.52		21	56.3	SURCHARGED	
10.004	SW31	0.261	0.000	1.20			147.6	SURCHARGED	
10.005	SW32	0.270	0.000	1.61			154.8	SURCHARGED	
9.003	SW33	0.264	0.000	1.37			236.7	SURCHARGED	
14.000	SW34	0.114	0.000	0.01			1.3	SURCHARGED	
9.004	SW35	0.122	0.000	0.59			66.8	SURCHARGED	
9.005	SW36	0.159	0.000	0.63			69.2	SURCHARGED	
9.006	SW37	0.194	0.000	0.18			57.1	SURCHARGED	
1.009	SW38	0.727	0.000	0.27			15.9	SURCHARGED	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.840
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

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	25.869	0.175	147.8	0.037	4.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	22.203	0.133	167.0	0.080	4.00	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	50.00	4.40	28.975	0.037	0.0	0.0	0.0	1.07	42.7	5.6
2.000	50.00	4.37	28.933	0.080	0.0	0.0	0.0	1.01	40.1	12.1

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.001	26.533	0.163	162.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	25.136	0.385	65.3	0.053	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	54.798	1.865	29.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	35.498	0.150	236.7	0.111	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	11.512	0.030	383.7	0.054	4.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	12.387	0.040	309.7	0.012	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	17.580	0.705	24.9	0.117	4.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	26.119	0.180	145.1	0.023	4.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	30.036	1.165	25.8	0.045	0.00	0.0	0.600	o	225	Pipe/Conduit	
7.000	21.634	0.145	149.2	0.013	4.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	46.010	2.445	18.8	0.101	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	39.839	0.103	385.0	0.125	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)
1.001	50.00	4.83	28.800	0.117	0.0	0.0	0.0	1.02	40.6	17.7
3.000	50.00	4.34	29.100	0.053	0.0	0.0	0.0	1.25	22.0	8.0
1.002	50.00	5.21	28.640	0.170	0.0	0.0	0.0	2.42	96.3	25.8
1.003	49.74	5.66	26.550	0.281	0.0	0.0	0.0	1.32	209.5	42.4
4.000	50.00	4.19	26.430	0.054	0.0	0.0	0.0	1.03	164.1	8.2
1.004	48.82	5.84	26.400	0.347	0.0	0.0	0.0	1.15	182.9	51.4
5.000	50.00	4.11	30.900	0.117	0.0	0.0	0.0	2.63	104.6	17.7
6.000	50.00	4.52	30.450	0.023	0.0	0.0	0.0	0.83	14.7	3.5
5.001	50.00	4.72	30.195	0.185	0.0	0.0	0.0	2.59	102.9	28.1
7.000	50.00	4.34	29.175	0.013	0.0	0.0	0.0	1.07	42.5	2.0
5.002	50.00	4.93	28.955	0.299	0.0	0.0	0.0	3.64	257.4	45.3
1.005	45.86	6.48	26.360	0.771	0.0	0.0	0.0	1.03	163.8	107.3

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.006	62.307	0.162	384.6	0.091	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.000	21.046	0.870	24.2	0.000	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	82.326	0.207	397.7	0.077	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.008	35.743#	0.124	288.3	0.107	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.000	39.642	0.350	113.3	0.026	4.00	0.0	0.600	o	150	Pipe/Conduit	
9.001	39.073	1.300	30.1	0.037	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.002	16.837	1.042	16.2	0.055	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.000	27.482	1.050	26.2	0.020	4.00	0.0	0.600	o	150	Pipe/Conduit	
10.001	37.696	1.500	25.1	0.057	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.002	15.780	1.668	9.5	0.143	0.00	0.0	0.600	o	225	Pipe/Conduit	
11.000	42.959	0.258	166.5	0.154	4.00	0.0	0.600	o	225	Pipe/Conduit	
10.003	13.105	0.056	234.0	0.107	0.00	0.0	0.600	o	450	Pipe/Conduit	
12.000	44.449	0.910	48.8	0.016	4.00	0.0	0.600	o	150	Pipe/Conduit	
12.001	44.442	2.874	15.5	0.093	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)
1.006	42.08	7.49	26.257	0.862	0.0	0.0	0.0	1.03	163.9	110.0
8.000	50.00	4.17	27.250	0.000	0.0	0.0	0.0	2.06	36.3	0.0
1.007	38.11	8.85	26.080	0.939	0.0	0.0	0.0	1.01	161.2	110.0
1.008	36.88	9.35	25.874	1.046	0.0	0.0	0.0	1.19	189.6	117.0
9.000	50.00	4.70	29.400	0.026	0.0	0.0	0.0	0.94	16.7	3.9
9.001	50.00	4.97	28.975	0.063	0.0	0.0	0.0	2.40	95.2	9.6
9.002	50.00	5.06	27.675	0.118	0.0	0.0	0.0	3.27	130.1	17.9
10.000	50.00	4.23	31.050	0.020	0.0	0.0	0.0	1.98	34.9	3.0
10.001	50.00	4.47	29.925	0.077	0.0	0.0	0.0	2.62	104.2	11.7
10.002	50.00	4.53	28.425	0.220	0.0	0.0	0.0	4.28	170.2	33.4
11.000	50.00	4.71	27.015	0.154	0.0	0.0	0.0	1.01	40.2	23.4
10.003	50.00	4.87	26.532	0.481	0.0	0.0	0.0	1.32	210.7	72.9
12.000	50.00	4.51	30.560	0.016	0.0	0.0	0.0	1.44	25.5	2.4
12.001	50.00	4.73	29.575	0.109	0.0	0.0	0.0	3.34	133.0	16.5

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
13.000	13.067	0.034	384.3	0.000	4.00	0.0	0.600	o	450	Pipe/Conduit	
10.004	17.035	0.045	378.6	0.073	0.00	0.0	0.600	o	450	Pipe/Conduit	
10.005	9.012	0.023	391.8	0.035	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.003	56.320	0.193	291.8	0.038	0.00	0.0	0.600	o	450	Pipe/Conduit	
14.000	8.237	0.008	1029.6	0.000	4.00	0.0	0.600	o	450	Pipe/Conduit	
9.004	15.500	0.040	387.5	0.111	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.005	14.556	0.038	383.1	0.036	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.006	28.585#	0.387	73.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	12.633	0.053	238.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
13.000	50.00	4.21	26.510	0.000	0.0	0.0	0.0	1.03	164.0	0.0
10.004	50.00	5.15	26.476	0.663	0.0	0.0	0.0	1.04	165.2	100.6
10.005	50.00	5.29	26.431	0.698	0.0	0.0	0.0	1.02	162.4	105.9
9.003	47.63	6.09	26.408	0.854	0.0	0.0	0.0	1.18	188.5	123.4
14.000	50.00	4.22	26.223	0.000	0.0	0.0	0.0	0.63	99.4	0.0
9.004	46.50	6.34	26.215	0.965	0.0	0.0	0.0	1.03	163.3	136.1
9.005	45.50	6.57	26.175	1.001	0.0	0.0	0.0	1.03	164.2	138.1
9.006	44.69	6.77	26.137	1.001	0.0	0.0	0.0	2.37	376.6	138.1
1.009	36.40	9.55	25.750	2.047	0.0	0.0	0.0	1.01	71.7«	226.0

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SW1	30.100	1.125	Open Manhole	1200	1.000	28.975	225				
SW2	31.400	2.467	Open Manhole	1200	2.000	28.933	225				
SW3	30.675	1.875	Open Manhole	1200	1.001	28.800	225	1.000	28.800	225	
								2.000	28.800	225	
SW4	30.450	1.350	Open Manhole	1200	3.000	29.100	150				
SW5	30.425	1.788	Open Manhole	1200	1.002	28.640	225	1.001	28.637	225	
								3.000	28.715	150	
SW6	27.900	1.350	Open Manhole	1350	1.003	26.550	450	1.002	26.775	225	
SW7	29.000	2.570	Open Manhole	1350	4.000	26.430	450				
SW8	28.300	1.900	Open Manhole	1350	1.004	26.400	450	1.003	26.400	450	
								4.000	26.400	450	
SW9	32.325	1.425	Open Manhole	1200	5.000	30.900	225				
SW10	31.800	1.350	Open Manhole	1200	6.000	30.450	150				
SW11	31.800	1.605	Open Manhole	1200	5.001	30.195	225	5.000	30.195	225	
								6.000	30.270	150	
SW12	30.600	1.425	Open Manhole	1200	7.000	29.175	225				
SW13	30.650	1.695	Open Manhole	1200	5.002	28.955	300	5.001	29.030	225	
								7.000	29.030	225	
SW14	27.900	1.540	Open Manhole	1350	1.005	26.360	450	1.004	26.360	450	
								5.002	26.510	300	
SW15	28.900	2.643	Open Manhole	1350	1.006	26.257	450	1.005	26.257	450	
SW16	28.700	1.450	Open Manhole	1200	8.000	27.250	150				
SW17	27.650	1.570	Open Manhole	1350	1.007	26.080	450	1.006	26.095	450	15
								8.000	26.380	150	
SW18	26.950	1.077	Open Manhole	1350	1.008	25.874	450	1.007	25.873	450	
SW20	30.750	1.350	Open Manhole	1200	9.000	29.400	150				
SW21	30.400	1.425	Open Manhole	1200	9.001	28.975	225	9.000	29.050	150	
SW22	29.100	1.425	Open Manhole	1200	9.002	27.675	225	9.001	27.675	225	
SW23	32.400	1.350	Open Manhole	1200	10.000	31.050	150				
SW24	31.350	1.425	Open Manhole	1200	10.001	29.925	225	10.000	30.000	150	
SW25	29.850	1.425	Open Manhole	1200	10.002	28.425	225	10.001	28.425	225	
SW26	28.440	1.425	Open Manhole	1200	11.000	27.015	225				
SW27	29.750	3.218	Open Manhole	1350	10.003	26.532	450	10.002	26.757	225	
								11.000	26.757	225	
SW28	31.910	1.350	Open Manhole	1200	12.000	30.560	150				
SW29	31.000	1.425	Open Manhole	1200	12.001	29.575	225	12.000	29.650	150	
SW30	29.900	3.390	Open Manhole	1350	13.000	26.510	450				
SW31	29.625	3.149	Open Manhole	1350	10.004	26.476	450	10.003	26.476	450	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								12.001	26.701	225	
								13.000	26.476	450	
SW32	29.300	2.869	Open Manhole	1350	10.005	26.431	450	10.004	26.431	450	
SW33	29.000	2.592	Open Manhole	1350	9.003	26.408	450	9.002	26.633	225	
								10.005	26.408	450	
SW34	27.700	1.477	Open Manhole	1350	14.000	26.223	450				
SW35	27.500	1.285	Open Manhole	1350	9.004	26.215	450	9.003	26.215	450	
								14.000	26.215	450	
SW36	27.300	1.125	Open Manhole	1350	9.005	26.175	450	9.004	26.175	450	
SW37	27.400	1.263	Open Manhole	1350	9.006	26.137	450	9.005	26.137	450	
SW38	27.100	1.350	Open Manhole	1350	1.009	25.750	300	1.008	25.750	450	
								9.006	25.750	450	
	27.100	1.403	Open Manhole	525		OUTFALL		1.009	25.697	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW1	448826.681	117436.010	448826.681	117436.010	Required	
SW2	448848.591	117410.221	448848.591	117410.221	Required	
SW3	448826.388	117410.143	448826.388	117410.143	Required	
SW4	448851.373	117383.865	448851.373	117383.865	Required	
SW5	448826.238	117383.610	448826.238	117383.610	Required	
SW6	448825.638	117328.815	448825.638	117328.815	Required	
SW7	448861.131	117339.761	448861.131	117339.761	Required	
SW8	448861.131	117328.250	448861.131	117328.250	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW9	448898.992	117416.338	448898.992	117416.338	Required	
SW10	448866.853	117407.821	448866.853	117407.821	Required	
SW11	448891.857	117400.271	448891.857	117400.271	Required	
SW12	448860.887	117379.543	448860.887	117379.543	Required	
SW13	448881.229	117372.178	448881.229	117372.178	Required	
SW14	448873.437	117326.833	448873.437	117326.833	Required	
SW15	448913.148	117323.650	448913.148	117323.650	Required	
SW16	448976.121	117339.571	448976.121	117339.571	Required	
SW17	448975.245	117318.543	448975.245	117318.543	Required	
SW18	449057.166	117310.383	449057.166	117310.383	Required	
SW20	448900.060	117369.353	448900.060	117369.353	Required	
SW21	448938.287	117358.855	448938.287	117358.855	Required	
SW22	448976.273	117349.704	448976.273	117349.704	Required	
SW23	448949.991	117425.723	448949.991	117425.723	Required	
SW24	448976.501	117418.479	448976.501	117418.479	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW25	449008.958	117399.307	449008.958	117399.307	Required	
SW26	449039.705	117365.390	449039.705	117365.390	Required	
SW27	449001.650	117385.321	449001.650	117385.321	Required	
SW28	448909.825	117397.106	448909.825	117397.106	Required	
SW29	448952.707	117385.405	448952.707	117385.405	Required	
SW30	449007.235	117367.796	449007.235	117367.796	Required	
SW31	448995.581	117373.707	448995.581	117373.707	Required	
SW32	448989.178	117357.921	448989.178	117357.921	Required	
SW33	448993.110	117349.812	448993.110	117349.812	Required	
SW34	449041.972	117347.927	449041.972	117347.927	Required	
SW35	449049.110	117343.815	449049.110	117343.815	Required	
SW36	449064.507	117342.032	449064.507	117342.032	Required	
SW37	449073.527	117330.607	449073.527	117330.607	Required	
SW38	449097.677	117300.024	449097.677	117300.024	Required	
	449094.292	117287.853			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	SW1	30.100	28.975	0.900	Open Manhole	1200
2.000	o	225	SW2	31.400	28.933	2.242	Open Manhole	1200
1.001	o	225	SW3	30.675	28.800	1.650	Open Manhole	1200
3.000	o	150	SW4	30.450	29.100	1.200	Open Manhole	1200
1.002	o	225	SW5	30.425	28.640	1.560	Open Manhole	1200
1.003	o	450	SW6	27.900	26.550	0.900	Open Manhole	1350
4.000	o	450	SW7	29.000	26.430	2.120	Open Manhole	1350
1.004	o	450	SW8	28.300	26.400	1.450	Open Manhole	1350
5.000	o	225	SW9	32.325	30.900	1.200	Open Manhole	1200
6.000	o	150	SW10	31.800	30.450	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	25.869	147.8	SW3	30.675	28.800	1.650	Open Manhole	1200
2.000	22.203	167.0	SW3	30.675	28.800	1.650	Open Manhole	1200
1.001	26.533	162.8	SW5	30.425	28.637	1.563	Open Manhole	1200
3.000	25.136	65.3	SW5	30.425	28.715	1.560	Open Manhole	1200
1.002	54.798	29.4	SW6	27.900	26.775	0.900	Open Manhole	1350
1.003	35.498	236.7	SW8	28.300	26.400	1.450	Open Manhole	1350
4.000	11.512	383.7	SW8	28.300	26.400	1.450	Open Manhole	1350
1.004	12.387	309.7	SW14	27.900	26.360	1.090	Open Manhole	1350
5.000	17.580	24.9	SW11	31.800	30.195	1.380	Open Manhole	1200
6.000	26.119	145.1	SW11	31.800	30.270	1.380	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.001	o	225	SW11	31.800	30.195	1.380	Open Manhole	1200
7.000	o	225	SW12	30.600	29.175	1.200	Open Manhole	1200
5.002	o	300	SW13	30.650	28.955	1.395	Open Manhole	1200
1.005	o	450	SW14	27.900	26.360	1.090	Open Manhole	1350
1.006	o	450	SW15	28.900	26.257	2.193	Open Manhole	1350
8.000	o	150	SW16	28.700	27.250	1.300	Open Manhole	1200
1.007	o	450	SW17	27.650	26.080	1.120	Open Manhole	1350
1.008	o	450	SW18	26.950	25.874	0.626	Open Manhole	1350
9.000	o	150	SW20	30.750	29.400	1.200	Open Manhole	1200
9.001	o	225	SW21	30.400	28.975	1.200	Open Manhole	1200
9.002	o	225	SW22	29.100	27.675	1.200	Open Manhole	1200
10.000	o	150	SW23	32.400	31.050	1.200	Open Manhole	1200
10.001	o	225	SW24	31.350	29.925	1.200	Open Manhole	1200
10.002	o	225	SW25	29.850	28.425	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.001	30.036	25.8	SW13	30.650	29.030	1.395	Open Manhole	1200
7.000	21.634	149.2	SW13	30.650	29.030	1.395	Open Manhole	1200
5.002	46.010	18.8	SW14	27.900	26.510	1.090	Open Manhole	1350
1.005	39.839	385.0	SW15	28.900	26.257	2.193	Open Manhole	1350
1.006	62.307	384.6	SW17	27.650	26.095	1.105	Open Manhole	1350
8.000	21.046	24.2	SW17	27.650	26.380	1.120	Open Manhole	1350
1.007	82.326	397.7	SW18	26.950	25.873	0.627	Open Manhole	1350
1.008	35.743#	288.3	SW38	27.100	25.750	0.900	Open Manhole	1350
9.000	39.642	113.3	SW21	30.400	29.050	1.200	Open Manhole	1200
9.001	39.073	30.1	SW22	29.100	27.675	1.200	Open Manhole	1200
9.002	16.837	16.2	SW33	29.000	26.633	2.142	Open Manhole	1350
10.000	27.482	26.2	SW24	31.350	30.000	1.200	Open Manhole	1200
10.001	37.696	25.1	SW25	29.850	28.425	1.200	Open Manhole	1200
10.002	15.780	9.5	SW27	29.750	26.757	2.768	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
11.000	o	225	SW26	28.440	27.015	1.200	Open Manhole	1200
10.003	o	450	SW27	29.750	26.532	2.768	Open Manhole	1350
12.000	o	150	SW28	31.910	30.560	1.200	Open Manhole	1200
12.001	o	225	SW29	31.000	29.575	1.200	Open Manhole	1200
13.000	o	450	SW30	29.900	26.510	2.940	Open Manhole	1350
10.004	o	450	SW31	29.625	26.476	2.699	Open Manhole	1350
10.005	o	450	SW32	29.300	26.431	2.419	Open Manhole	1350
9.003	o	450	SW33	29.000	26.408	2.142	Open Manhole	1350
14.000	o	450	SW34	27.700	26.223	1.027	Open Manhole	1350
9.004	o	450	SW35	27.500	26.215	0.835	Open Manhole	1350
9.005	o	450	SW36	27.300	26.175	0.675	Open Manhole	1350
9.006	o	450	SW37	27.400	26.137	0.813	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
11.000	42.959	166.5	SW27	29.750	26.757	2.768	Open Manhole	1350
10.003	13.105	234.0	SW31	29.625	26.476	2.699	Open Manhole	1350
12.000	44.449	48.8	SW29	31.000	29.650	1.200	Open Manhole	1200
12.001	44.442	15.5	SW31	29.625	26.701	2.699	Open Manhole	1350
13.000	13.067	384.3	SW31	29.625	26.476	2.699	Open Manhole	1350
10.004	17.035	378.6	SW32	29.300	26.431	2.419	Open Manhole	1350
10.005	9.012	391.8	SW33	29.000	26.408	2.142	Open Manhole	1350
9.003	56.320	291.8	SW35	27.500	26.215	0.835	Open Manhole	1350
14.000	8.237	1029.6	SW35	27.500	26.215	0.835	Open Manhole	1350
9.004	15.500	387.5	SW36	27.300	26.175	0.675	Open Manhole	1350
9.005	14.556	383.1	SW37	27.400	26.137	0.813	Open Manhole	1350
9.006	28.585#	73.9	SW38	27.100	25.750	0.900	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.009	o	300	SW38	27.100	25.750	1.050	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.009	12.633	238.0		27.100	25.697	1.103	Open Manhole	525

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	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	9
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 447800 117600 SU 47800 17600
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.840
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW38, DS/PN: 1.009, Volume (m³): 11.7

Unit Reference	MD-SHE-0179-1600-1050-1600
Design Head (m)	1.050
Design Flow (l/s)	16.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	179
Invert Level (m)	25.750
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.050	16.0
Flush-Flo™	0.334	15.9
Kick-Flo®	0.730	13.5
Mean Flow over Head Range	-	13.6

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	6.3	1.200	17.0	3.000	26.4	7.000	39.7
0.200	15.2	1.400	18.3	3.500	28.4	7.500	41.1
0.300	15.9	1.600	19.5	4.000	30.3	8.000	42.4
0.400	15.8	1.800	20.7	4.500	32.1	8.500	43.6
0.500	15.6	2.000	21.7	5.000	33.8	9.000	44.9
0.600	15.1	2.200	22.7	5.500	35.3	9.500	46.0
0.800	14.1	2.400	23.7	6.000	36.9		
1.000	15.6	2.600	24.6	6.500	38.3		

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Storage Structures for Storm

Cellular Storage Manhole: SW5, DS/PN: 1.002

Invert Level (m) 28.637 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	30.0	0.0	0.501	0.0	0.0
0.500	30.0	0.0			

Cellular Storage Manhole: SW7, DS/PN: 4.000

Invert Level (m) 26.412 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	135.0	0.0	0.501	0.0	0.0
0.500	135.0	0.0			

Cellular Storage Manhole: SW15, DS/PN: 1.006

Invert Level (m) 26.257 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	225.0	0.0	0.501	0.0	0.0
0.500	225.0	0.0			

Cellular Storage Manhole: SW18, DS/PN: 1.008

Invert Level (m) 25.874 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	200.0	0.0	0.501	0.0	0.0
0.500	200.0	0.0			

Cellular Storage Manhole: SW26, DS/PN: 11.000

Invert Level (m) 27.015 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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Cellular Storage Manhole: SW26, DS/PN: 11.000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	90.0	0.0	0.501	0.0	0.0
0.500	90.0	0.0			

Cellular Storage Manhole: SW30, DS/PN: 13.000

Invert Level (m) 26.489 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	160.0	0.0	0.501	0.0	0.0
0.500	160.0	0.0			

Cellular Storage Manhole: SW34, DS/PN: 14.000

Invert Level (m) 26.223 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	160.0	0.0	0.501	0.0	0.0
0.500	160.0	0.0			

Cellular Storage Manhole: SW37, DS/PN: 9.006

Invert Level (m) 26.137 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	120.0	0.0	0.501	0.0	0.0
0.500	120.0	0.0			

Tank or Pond Manhole: SW38, DS/PN: 1.009

Invert Level (m) 25.750

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	624.0	0.250	747.0	0.750	1014.0	1.350	1371.0

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	9
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location GB 447800 117600 SU 47800 17600	
C (1km)	-0.028
D1 (1km)	0.423
D2 (1km)	0.310
D3 (1km)	0.398
E (1km)	0.304
F (1km)	2.288
Cv (Summer)	0.840
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	45

WARNING: Half Drain Time has not been calculated as the structure is too full.

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	SW1	15 Summer	100	+45%	100/15 Summer				29.712
2.000	SW2	15 Summer	100	+45%	100/15 Summer				29.988
1.001	SW3	15 Summer	100	+45%	100/15 Summer				29.640
3.000	SW4	15 Summer	100	+45%	100/15 Summer				30.118
1.002	SW5	15 Summer	100	+45%	100/15 Summer				28.934
1.003	SW6	30 Summer	100	+45%	100/15 Summer				27.251
4.000	SW7	30 Summer	100	+45%	100/15 Summer				27.196
1.004	SW8	30 Summer	100	+45%	100/15 Summer				27.190
5.000	SW9	15 Summer	100	+45%	100/15 Summer				31.755
6.000	SW10	15 Summer	100	+45%	100/15 Summer				31.420

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1	0.512	0.000	0.63			24.7	SURCHARGED	
2.000	SW2	0.830	0.000	1.58			58.0	SURCHARGED	
1.001	SW3	0.615	0.000	2.14			80.4	SURCHARGED	
3.000	SW4	0.868	0.000	1.79			37.5	SURCHARGED	
1.002	SW5	0.069	0.000	0.99		4	91.7	SURCHARGED	
1.003	SW6	0.251	0.000	0.82			150.8	SURCHARGED	
4.000	SW7	0.316	0.000	0.47		19	48.7	SURCHARGED	
1.004	SW8	0.340	0.000	1.06			140.6	SURCHARGED	
5.000	SW9	0.630	0.000	0.87			81.5	SURCHARGED	
6.000	SW10	0.820	0.000	1.19			16.7	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	SW11	15 Summer	100	+45%	100/15 Summer				31.219
7.000	SW12	15 Summer	100	+45%					29.256
5.002	SW13	15 Summer	100	+45%					29.177
1.005	SW14	30 Summer	100	+45%	100/15 Summer				27.151
1.006	SW15	30 Summer	100	+45%	100/15 Summer				26.905
8.000	SW16	15 Summer	100	+45%					27.250
1.007	SW17	480 Winter	100	+45%	100/15 Summer				26.826
1.008	SW18	480 Winter	100	+45%	100/30 Summer				26.820
9.000	SW20	15 Summer	100	+45%	100/15 Summer				29.753
9.001	SW21	15 Summer	100	+45%					29.095
9.002	SW22	15 Summer	100	+45%					27.833
10.000	SW23	15 Summer	100	+45%					31.125
10.001	SW24	15 Summer	100	+45%					30.057
10.002	SW25	15 Summer	100	+45%	100/15 Summer				29.438
11.000	SW26	15 Summer	100	+45%	100/15 Summer				27.461
10.003	SW27	15 Summer	100	+45%	100/15 Summer				27.394
12.000	SW28	15 Summer	100	+45%					30.638
12.001	SW29	15 Summer	100	+45%					29.716
13.000	SW30	30 Summer	100	+45%	100/15 Summer				27.240
10.004	SW31	30 Summer	100	+45%	100/15 Summer				27.240
10.005	SW32	15 Summer	100	+45%	100/15 Summer				27.169
9.003	SW33	15 Summer	100	+45%	100/15 Summer				27.140
14.000	SW34	480 Winter	100	+45%	100/30 Summer				26.826
9.004	SW35	480 Winter	100	+45%	100/15 Summer				26.826
9.005	SW36	480 Winter	100	+45%	100/15 Summer				26.823
9.006	SW37	480 Winter	100	+45%	100/120 Summer				26.819
1.009	SW38	480 Winter	100	+45%	100/15 Summer				26.816

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	SW11	0.799	0.000	1.30			124.4	SURCHARGED	
7.000	SW12	-0.144	0.000	0.28			10.7	OK	
5.002	SW13	-0.078	0.000	0.87			210.5	OK	
1.005	SW14	0.341	0.000	1.91			278.4	SURCHARGED	
1.006	SW15	0.199	0.000	1.29		22	195.4	SURCHARGED	
8.000	SW16	-0.150	0.000	0.00			0.0	OK	
1.007	SW17	0.296	0.000	0.41			62.9	SURCHARGED	
1.008	SW18	0.496	0.000	0.36			60.6	FLOOD RISK	
9.000	SW20	0.203	0.000	1.22			19.7	SURCHARGED	
9.001	SW21	-0.105	0.000	0.54			48.6	OK	
9.002	SW22	-0.067	0.000	0.81			93.6	OK	
10.000	SW23	-0.075	0.000	0.50			16.6	OK	
10.001	SW24	-0.093	0.000	0.65			63.9	OK	
10.002	SW25	0.788	0.000	1.10			166.0	SURCHARGED	
11.000	SW26	0.221	0.000	1.28		11	48.9	SURCHARGED	

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

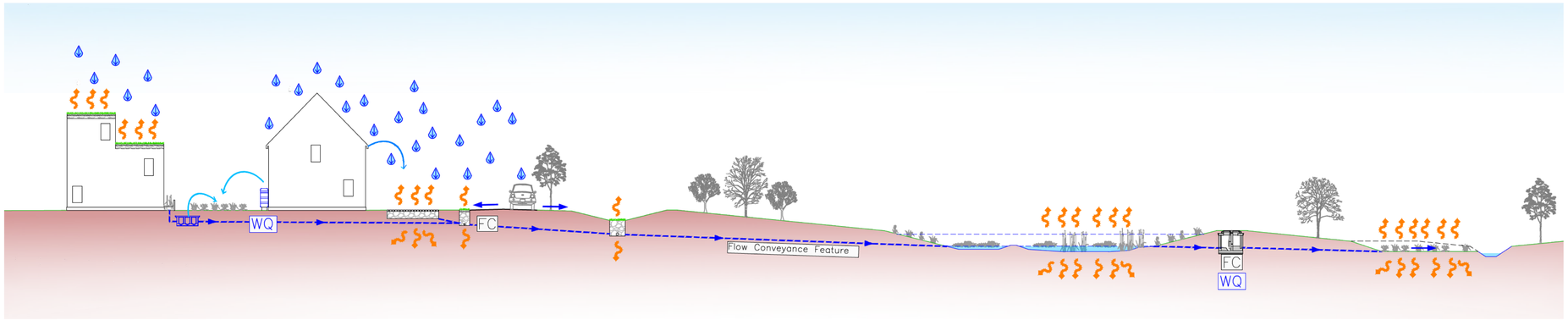
PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
10.003	SW27	0.412	0.000	1.56			243.5	SURCHARGED	
12.000	SW28	-0.072	0.000	0.53			13.1	OK	
12.001	SW29	-0.084	0.000	0.71			90.1	OK	
13.000	SW30	0.280	0.000	0.51		21	54.4	SURCHARGED	
10.004	SW31	0.314	0.000	1.42			174.7	SURCHARGED	
10.005	SW32	0.288	0.000	1.78			171.7	SURCHARGED	
9.003	SW33	0.282	0.000	1.39			241.2	SURCHARGED	
14.000	SW34	0.153	0.000	0.02			1.4	SURCHARGED	
9.004	SW35	0.161	0.000	0.61			68.8	SURCHARGED	
9.005	SW36	0.198	0.000	0.65			71.4	SURCHARGED	
9.006	SW37	0.232	0.000	0.18			58.5	SURCHARGED	
1.009	SW38	0.766	0.000	0.28			16.1	FLOOD RISK	

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Appendix G SuDS Management Train Drawing

KEY

- Rainfall
- Interception Losses (Evapotranspiration / Infiltration)
- Water Reuse
- WQ — Water Quality Device (Oil Separator / Vortex Separator)
- FC — Flow Control Device (Orifice / Vortex Flow Control)
- Overland Flow
- Surface Water Sewer (connecting SuDS Features)



DEVELOPMENT TYPE	Commercial / Public	Residential	Private / Shared Parking	Public Highway	Conveyance Features		Green Infrastructure / Public Open Space	Watercourse Corridor
MANAGEMENT TRAIN	PREVENTION → / SOURCE CONTROL → / SITE / REGIONAL CONTROL →							
SuDS FEATURE	Rainwater Harvesting (Reuse for irrigation e.g Rainwater Butts) Green Roofs Bioretention Areas / Rain Gardens Rills	Rainwater Harvesting (Reuse for irrigation e.g Rainwater Butts) Porous Paving Tanks Flow Control Devices		Swales Bioretention Areas Filter Strips Filter Drains			Strategic SuDS incorporating sediment forbays, wetland areas, micropools at the outlet Flow Control Devices Water Quality Devices	Outfall Swale
MAINTENANCE RESPONSIBILITY	Commercial or Public Tenants	Homeowners	Homeowners / Management Company	Highway Authority	Southern Water / Management Company		Southern Water / Management Company	Southern Water / Management Company

PFA consulting

Stratton Park House, Wanborough Road
Swindon, SN3 4HG

Telephone
01793 828000

Website
www.pfaplc.com

For Planning
This drawing is produced for the purposes of supporting a planning application and should not be relied upon for tender, pricing, or construction purposes.

NOTES

1. Drawing to be read in conjunction with Flood Risk Assessment and Water Management Strategy produced by PFA Consulting (Document Ref: G277-DOC01 Issue 2, Dated May 2021) and Preliminary Water Management Strategy Plan (Drawing No. G277/21 Rev C & G277/22 Rev C).
2. Future design of upstream Source Control & Site Control to take account of the principles established in in the Water Management Strategy and this drawing.

Rev	Date	Description	Drawn	Check
#	26.11.20	First Issue.	BF	MWS
A	21.05.21	Cross references updated	DAB	MWS

Status
FOR PLANNING

Client
Eastleigh Borough Council

Project
One Horton Heath
Hampshire

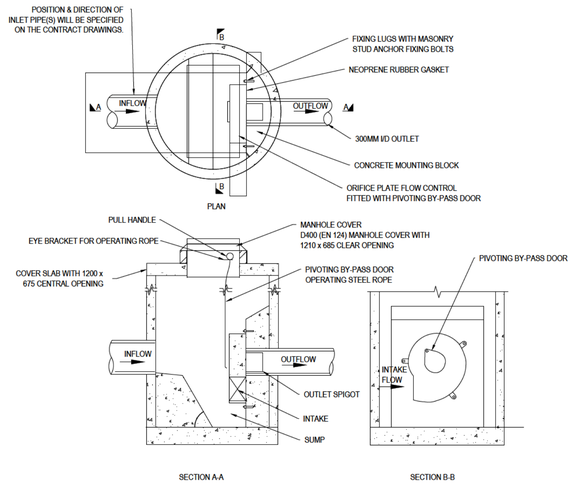
Drawing Title
SuDS Management Train

Drawing No.
G277/24 Rev A

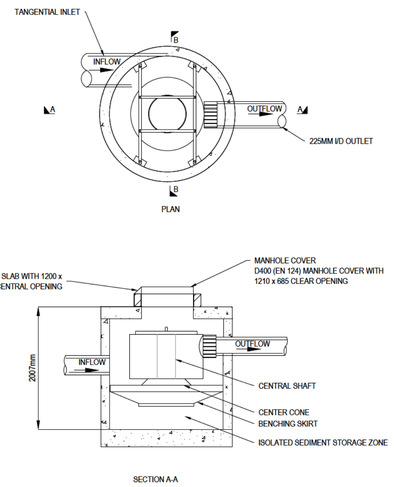
Date: November 2020 | Scale: NTS @ A1

E-Mail: bfox@pfaplc.com

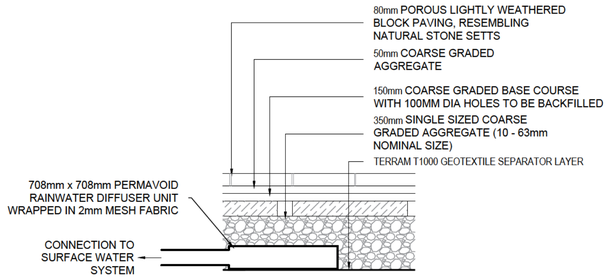
Appendix H Drainage Construction Details



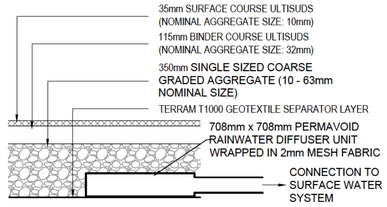
FLOW CONTROL CHAMBER HYDRO-BRAKE



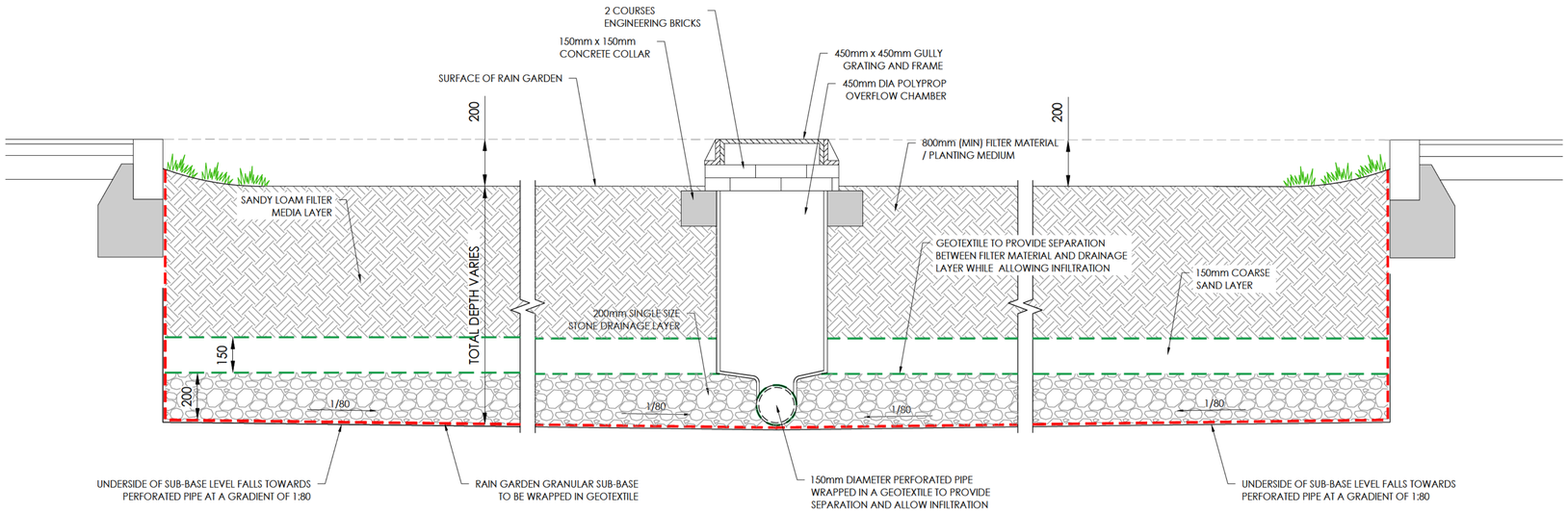
DOWNSTEAM DEFENDER



TYPICAL CONNECTION FROM PERMEABLE BLOCK PAVING TO SURFACE WATER SYSTEM



TYPICAL CONNECTION FROM PERMEABLE ASPHALT TO SURFACE WATER SYSTEM



TYPICAL SECTION THROUGH RAIN GARDEN

NOT TO SCALE

Stantec

Stantec UK Limited
Caversham Bridge House, Waterman Place
Reading
RG1 8DN
Tel. +44 1189 500 761
www.stantec.com/uk

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Notes

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEER'S AND LANDSCAPING DRAWINGS.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THIS DRAWING.
4. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM (AOD)
5. THE USE OF THIS DRAWING DOES NOT ABSOLVE THE CLIENT FROM THEIR RESPONSIBILITIES IN REGARDS TO HEALTH & SAFETY AND CDM REGULATIONS.

P01 FIRST ISSUE		LG	DH	2025.11.11
Issued/Revision		By	Appd	YYYY.MM.DD
		LG	JLW	DH	2025.11.11
		Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

S5 - FOR REVIEW AND ACCEPTANCE

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

EASTLEIGH BOROUGH COUNCIL

Client/Project

ONE HORTON HEATH

EASTLEIGH BOROUGH COUNCIL

Title

THE FOLDS (PLOT 11)
DRAINAGE CONSTRUCTION DETAILS

Project No.	A1 Scale
332612639	AS SHOWN
Revision	Drawing No.
P01	**332612639-STN-17-XX-DR-C-0531**

Plotted: 11.11.2025 2025.11.11 3:47:09 PM By: Wilson, Jude
DRAWING NAME: 4.DC4 - N:\Data\HOR\332612639\Engineering\332612639 - one horton heath\2000 - civils\01 design\cad\dwg\17 - the folds\xrefs\332612639-stn-17-xx-dr-c-0531

Appendix I Typical SuDS Basin Layouts

NORTHERN ATTENUATION BASIN
BED LEVEL = 22.100
BED AREA = 3,000m² WITH 1:3 SIDE SLOPES
LOWER BED LEVEL = 21.700
LOWER BED AREA = 1,750m²
COVER LEVEL = 23.300
AREA AT COVER LEVEL = 4,725m²
FREEBOARD = 300mm
TOP WATER LEVEL (1:100YR + 40% CLIMATE CHANGE) = 23.021

THREE RAIL, POST AND RAIL FENCE WITH WIRE MESH

+ 21.700m

+ 22.100m

HEADWALL
IL 21.700m

SW93
CL 22.500
IL 21.700
CONTROL: HYRDOBRAKE
MAXIMUM DISCHARGE RATE: 52.50l/s

HEADWALL
IL 21.100m

DOWNSTREAM DEFENDER

SW92
CL 23.406
IL 22.278 (300)
22.128 (450)

23.010
450Ø 1:385

HEADWALL
IL 22.100m

BERM
OVERFLOW

BERM
OVERFLOW

HEADWALL
IL 22.100m

DOWNSTREAM DEFENDER

SW74
CL 23.600
IL 22.327

BERM
OVERFLOW

DOWNSTREAM DEFENDER

HEADWALL
IL 22.100m

HEADWALL
SW37
IL 22.800m

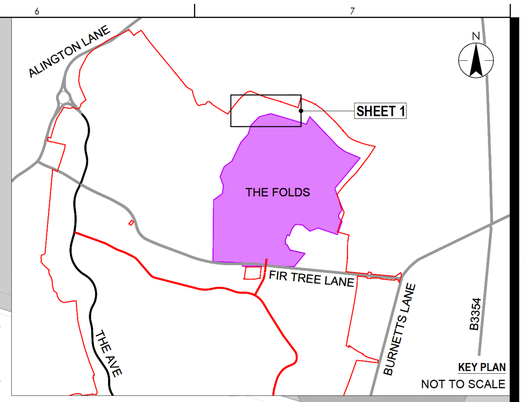
SW75
CL 23.750
IL 22.216

11.009
675Ø 1:118

1.017
525Ø 1:30

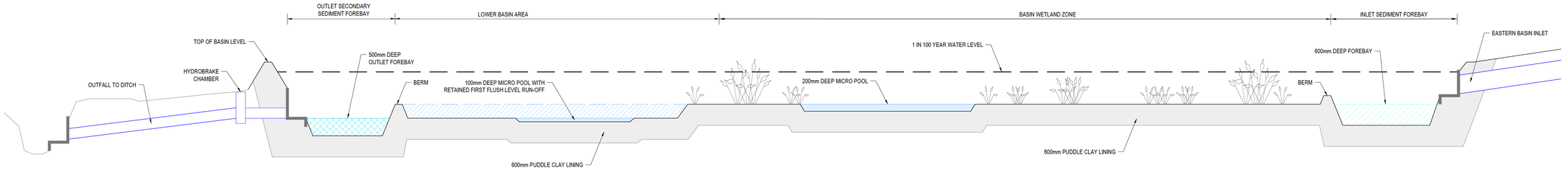
13.05 3B–5P
13.06 3B–5P
13.07 3B–6P
13.08 3B–6P
13.04 2B–4P
13.03 2B–4P
13.02 2B–4P
14.04 3B–6P
14.05 3B–6P
14.06 4B–7P
14.07 4B–8P
14.08 4B–8P

0 4 8 12 16 20m
SCALE 1:200



KEY PLAN
NOT TO SCALE

CROSS SECT ON THROUGH NORTHERN ATTENUATION BASIN
NOT TO SCALE



CROSS SECTION THROUGH SOUTHERN ATTENUATION BASIN
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Stantec

Stantec UK Limited
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Reading
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Tel. +44 1189 500 761
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7. TREE SURVEY BASED ON DRAWING 11705_P36 & 11705_P37 PROVIDED BY TYLER GRANGE UNDERTAKEN ON JUNE 2025.
8. THE HOLME AND HOMESTAL HOUSING LAYOUT BASED ON DRAWING 3423-PLB-ZZ-ZZ-M3-A-1020-ProposedSitePlan-P4 PROVIDED BY ARCHITECTURE PLB (RECEIVED 03.12.2025).
9. ALL DRAINAGE WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS OFFERED FOR ADOPTION (DCG).

KEY

- PROPOSED MIRCO POOL
- PROPOSED INLET SEDIMENT FOREBAY
- PROPOSED OUTLET SECONDARY SEDIMENT FOREBAY
- PROPOSED BERM
- PROPOSED WETLAND ZONE
- PROPOSED LOW FLOW CHANNEL
- PROPOSED MAJOR CONTOUR AT 0.500m INTERVAL
- PROPOSED MINOR CONTOUR AT 0.100m INTERVAL

PROPOSED [S104 ADOPTABLE]

- PROPOSED SURFACE WATER SEWER AND
- PROPOSED HEADWALL

P03 DISCHARGE RATE AMENDED	AB	DH	2026.02.19
P02 MASTERPLAN LAYOUT UPDATED AND BASIN DETAILS AMENDED TO SUIT	JLW	DH	2025.12.09
P01 FIRST ISSUE	JLW	DH	2025.11.13
Issued/Revision	By	Appd	YYYY.MM.DD
	WH	JLW	DH	2025.11.13
	Dwn	Dsgn	Chkd	YYYY.MM.DD

Issue Status

S5 - FOR REVIEW AND ACCEPTANCE

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Client/Project Logo

EASTLEIGH BOROUGH COUNCIL

Client/Project
ONE HORTON HEATH

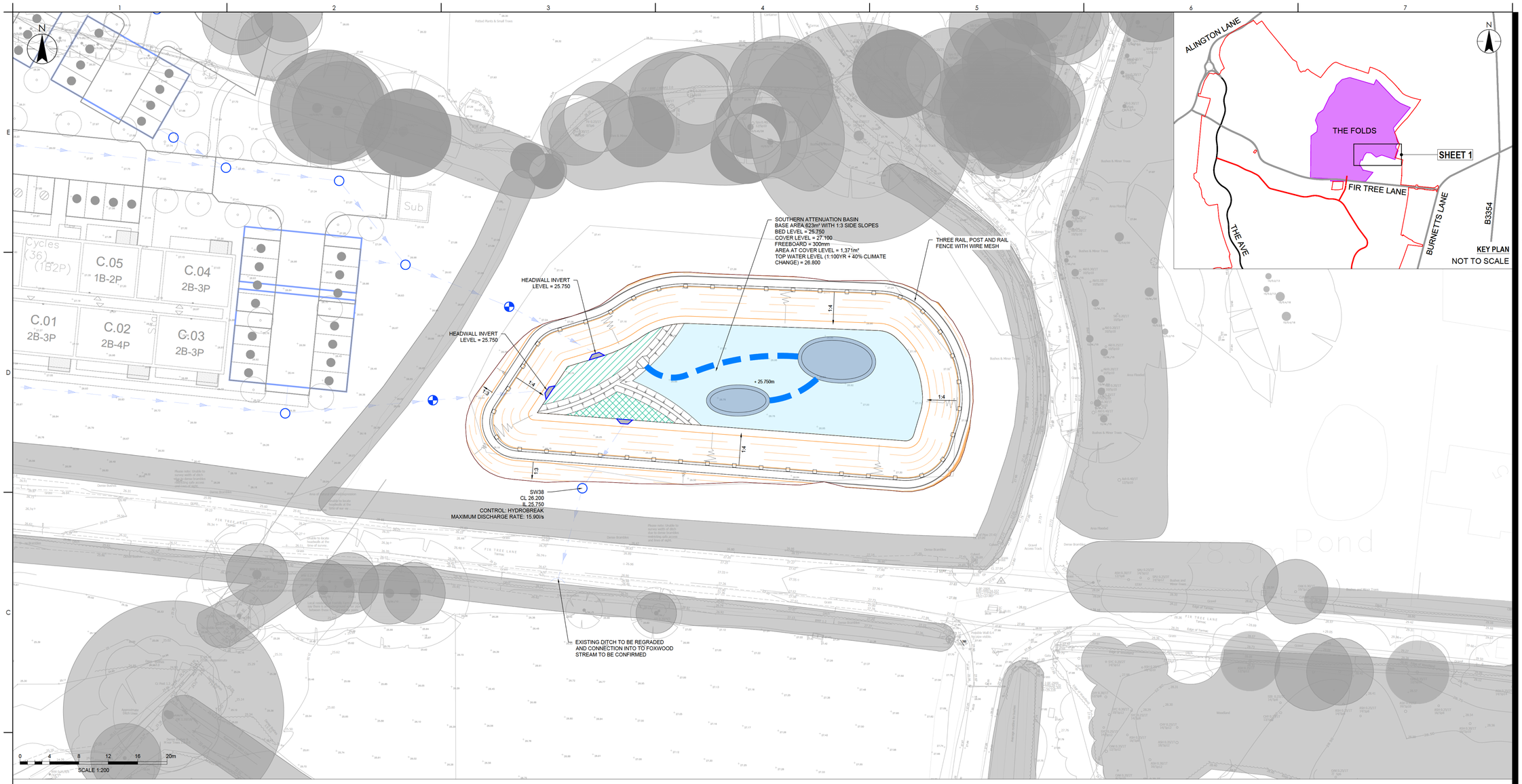
EASTLEIGH BOROUGH COUNCIL

Title
THE FOLDS (PLOT 11)

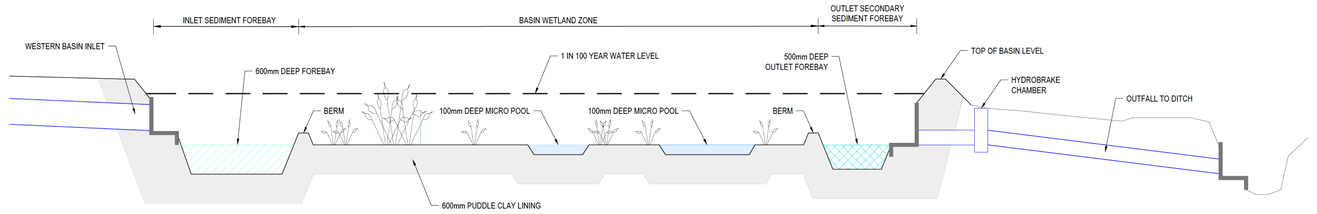
NORTHERN ATTENUATION BASIN DETAILS

Project No.	A0 Scale
332612639	1:200
Revision	Drawing No.
P03	332612639-STN-17-XX-DR-C-0521

Plotted: 19.02.2026 09:43:11 BY DAVID.HALE
Drawing path: C:\Users\david.hale\Stantec\Eastleigh - Horton Heath\332612639_civils\01 Design\Draft\Design\17 - the folds\dwg\332612639-STN-17-XX-DR-C-0521.dwg



CROSS SECTION THROUGH SOUTHERN ATTENUATION BASIN
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- PROPOSED MINOR CONTOUR AT 0.100m INTERVAL

PROPOSED (S104 ADOPTABLE)

- PROPOSED SURFACE WATER SEWER AND
- PROPOSED HEADWALL

P01 FIRST ISSUE	AB	DH	2026.02.19
Issued/Revision	By	Apprd	YYYY.MM.DD
	WH	JLW	DH	2026.02.19
	Dwn	Dsgn	Chkd	YYYY.MM.DD

Issue Status

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Title

THE FOLDS (PLOT 11)

SOUTHERN ATTENUATION BASIN DETAILS

Project No.	A0 Scale
332612639	1:200
Revision	**Drawing No.**
P01	**332612639-STN-17-XX-DR-C-0522**

Plotted: 26/02/2026 10:02:23 AM By: Ruth Andrew Amy
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