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Anglia Square, Norwich

Proposed Surface Water Drainage Strategy Rev A

Dated July 2022

Weston Homes

Proposed Surface Water Drainage Strategy

July 2022

EAS

Anglia Square Regeneration Norwich Norfolk

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1 Introduction

1.1 A hybrid planning application (Ref. 22/00434/F) (the Application) was submitted by Weston Homes (the Applicant) to Norwich City Council (NCC) on 1st April 2022 for the comprehensive redevelopment of Anglia Square and various parcels of mostly open surrounding land, (the Site), as shown within a red line on drawing 'ZZ-00-DR-A-01-0200'. The Application comprised a full set of technical documents to assess the potential impacts of the proposals, including an EIA which covered a number of topics. In respect of SuDS Drainage Strategy, this was described and explained in the Surface Water Drainage Strategy Report (Rev B dated 01.04.2022). Please refer to the original documents for further details.

1.2 Application Ref. 22/00434/F follows a previous application on a somewhat smaller development parcel, (NCC Ref. 18/00330/F) made jointly by Weston Homes Plc as development partner and Columbia Threadneedle Investments, (CTI), the Site's owner, for a residential-led mixed use scheme consisting of up to 1,250 dwellings with decked parking, and 11,000 sqm GEA flexible ground floor retail/commercial/non-residential institution floorspace, hotel, cinema, multi-storey public car park, place of worship, and associated public realm and highway works. This was subject to a Call-in by the Secretary of State (PINS Ref. APP/G2625/V/19/3225505) who refused planning permission on 12th November 2020, (the 'Call in Scheme').

1.3 Following submission of the Application Ref. 22/00434/F, and completion of the statutory consultation exercise, the Applicant has worked with NCC to review the consultation responses received from the local community, statutory consultees and other key stakeholders, so as to identify an appropriate response where considered relevant. As a result of consideration of these comments, as well as ongoing discussions with NCC, a number of changes to the Application as originally submitted are now proposed, including the reduction in height by 1 storey of Blocks A and D; realignment of basement and ground level car park accesses to Block A; repositioning of houses and apartments forming Block B; amendments to the housing mix; raising of Block C ground level to above 100year (+climate change) flood levels; distance between Block C and 4-10 Beckham place increased; elevational changes and repositioning of Block L (Stump Cross building); roof ridge and eaves on east side of Block M reduced in height; introduction of 2 storey podium between Blocks E and EF to provide larger car park; proposed crossings on Edward Street (opposite Beckham Place) and Pitt Street (by Tooley Lane removed; and landscape amendments. These changes comprise the Amended Application submitted in July 2022. Overall, the Amended Application continues to seek consent for up to 1,100 dwellings and up to 8,000 Sqm (NIA) non-residential floorspace and associated development. However, since the amendments result in minor changes to the full development description, an updated version of the full Amended Application description is contained in **Appendix A**.

1.4 The update to the Surface Water Drainage Strategy Report (Rev A Submission) sets out where necessary a response to the drainage related comments received on the Application as originally submitted, then describes how the design has been developed and adapted as a result of these and other comments, and finally considers the implications of the changes to the scheme now proposed.

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1.5 A separate report, undertaken by Royal Haskoning DHV, deals with the flood risk assessment, hydraulic modelling study and impact assessment and should be read in conjunction with this report.

1.6 The Application Description and Location Plan are contained in **Appendix A**.

1.7 The proposed Outline/Full Planning Application Boundaries and Development Proposals are contained in **Appendix B.**

1.8 The changes in the Amended Application arising from the drainage related comments are summarised in the Table 1.0 below:

Consultee Comment	Response From Project Team
Norfolk County Council - Lead Local Flood Authority As per letter dated 26th may 2022 – LLFA Ref: FW2022_0423	
1. An updated Flood Risk Assessment (FRA), Drainage Strategy and Hydraulic Modelling Study that consistently provides information that interlinks each of the documents.	Cross-references have been added throughout this document where appropriate.
2. Within the FRA, Drainage Strategy, Hydraulic Modelling Study and yet to be developed detailed drainage design, we request these documents incorporates the evidence to address the issues identified in the Annex.	The issues identified in the Annex are, largely, included within the following itemised comments and are addressed as follows. Other items in the Annex raised include: - *The site is within the River Wensum area and is subject to requirements relating to maintenance of nutrient neutrality.* This is being addressed by Others and a report shall be submitted in Rev A Submission. - *LLFA notes there is reference to Table 3, yet there is no Table 3.* There is no reference to Table 3 in this Drainage Report. - *Calculate greenfield and brownfield run-off rates using the latest datasets and hydrological methods*. The modified rational method was used to calculate brownfield runoff rates to be updated to FEH. It should be noted that Anglian Water have accepted a proposed maximum outfall rate of 242 l/s and the proposed drainage strategy meets this requirement. - *LLFA disagree with the accuracy of the sewer catchments defined in Appendix F stating that permeable areas shown are unlikely to be permeable*. The assessment undertaken by the LLFA would likely result in the existing brownfield run-off from the site increasing in rate and volume. The calculation undertaken is therefore conservative as it considers gravels and green areas as permeable, whilst the LLFA assessment would consider these as generating runoff. - *NPPF in para 4.1 incorrect* – this has been updated - *Evidence to support infiltration is not viable due to contamination and high groundwater*. The Royal Haskoning FRA report refers to borehole data which describes a

	groundwater level of 3m bgl which was taken in May 2022. As this level was taken in drier months, it is considered likely that the water table will be elevated in the winter months Considering that the base of a soakaway is to be 1m above the highest groundwater level (in accordance with CIRIA SuDS Manual, it is not possible to achieve this whilst also achieving suitable cover above the soakaway. -*Residual risk of surface water pumps* – This has been addressed, see below. - *Inconsistencies with Landscaping layout vs SuDS Layout regarding Green Roofs* – Proposed green roofs for the Full Planning Application areas are clearly identified.
2.1 The assessment of the greenfield and brownfield rates and volumes are required to be calculated accurately using the FEH in accordance with the LLFA Developer Guidance requirements and presented clearly and consistently within the technical reports.	The hydraulic model prepared for the Surface Water Drainage networks serving each catchment area now include FEH rainfall data as requested. See hydraulic model outputs in Appendix J of this report.
2.2 Provide evidence to support the justification of increasing the greenfield discharge rate is required in accordance with the LLFA Developer Guidance.	The site is Brownfield and currently drains unrestricted and untreated into the existing Anglian Water surface water sewers which cross the site. As the site is Brownfield and practically 100% impermeable, it is not considered reasonable or appropriate to apply greenfield run-off rates for this Application. Anglian Water state that where this is not practical they will assess capacity based on the 1:1 year calculated rate. They therefore permit a maximum discharge rate of 242 l/s to manage all storms up to and including the 1:100yr + Climate Change Event. A Pre-Development Enquiry and Capacity Check from Anglian Water confirming this is contained in Appendix I of this report.
2.3 Apply the latest (May 2022) Climate change guidance, which would require the application of a 45% climate change allowance to the 1% AEP and to apply the appropriate climate change allowance of 40% to the 3.3% AEP calculations.	The hydraulic models prepared for the Surface Water Drainage networks serving each catchment area now include the up-to-date Climate Change Allowances as requested. See hydraulic model outputs in Appendix J of this report.
2.4 Evidence that recent liaison with Anglian Water relevant to this new planning application that provides: 2.4.1 confirmation from Anglian Water that no changes have occurred in the public network since 2017. 2.4.2 Obtain recent drainage assessment from Anglian Water that relates to the current proposed development. 2.4.3 Provide current set of DG5 records from Anglian Water. 2.4.4 provide evidence of an "agreement in principle" with any third parties taking on surface water drainage management and maintenance responsibility.	2.4 Up-to-date sewer records have been obtained and an up-to-date pre-development enquiry has been received. Sewer records are contained in Appendix D and Pre-dev enquiry is contained in Appendix I. 2.4.1 Up-to-date sewer records are contained in Appendix D. 2.4.2 Up-to-date pre-development enquiry is contained in Appendix I. 2.4.3 Anglian Water were able to confirm that there have been cases of sewer flooding in the vicinity of the site, but for data protection were unable to specify any locations. See email dated 22.06.2022 in Appendix M. 2.4.4 Surface water drainage serving private catchments will be the responsibility of an elected Management and Management

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	Company, whom shall be appointed by the Site Owner. Any adopted sewer or diverted adopted sewers within the red-line boundary shall be the responsibility of Anglian Water.
2.5 Provide a more in-depth consideration and assessment of rainwater harvesting and re-use opportunities.	See Section 4 para. 4.6 and 4.7.
2.6 Provide a more in-depth consideration and assessment of groundwater flood risk.	Addressed in Royal Haskoning DHV FRA Report.
2.7 Provide a more in-depth consideration and assessment of sewer flood risk.	Addressed in Royal Haskoning DHV FRA Report.
2.8 Provide clarification on the retention of surface water runoff on the site and whether this is actually the provision of either blue or green roofs not previously included in the surface water drainage calculations.	No blue-roofs are proposed on site. Green-roofs are to be provided. In terms of drainage calculations. It is considered robust to assume green-roofs are saturated and will not provide any attenuation for large storm events. As such, the 1:100yr + Climate Change hydraulic modelling assumes all roof areas are impermeable. This provides a conservative assessment of required attenuation volumes.
2.9 Provide clarification on the water depth for the return periods given at Edward Street Service Yard as there are significant discrepancies.	Addressed in Royal Haskoning DHV FRA Report.
2.10 Prepare and provide a full detailed drainage design that includes all the proposed elements of the surface water management system. This includes clarification of the design details (including plans, modelling, calculations and supporting information in accordance with the LLFA's Developer Guidance) of suitable drainage featured, such as green/blue roofs, bio-retention features and tree-pits.	See Appendix K.
2.11 Provide the proposed discreet drainage catchment areas and supporting information on a plan for each of the proposed systems in accordance with the LLFA Developer Guidance.	See Appendix K.
2.12 Undertake an assessment that demonstrates how the proposed SuDS systems meets the four pillars of SuDS in accordance with the LLFA Developer guidance and in relation to Policy E9 of the Local Flood Risk Management Plan.	See paragraphs 5.4, 5.9, 5.13 and 5.16.
2.13 Undertake a further assessment and consideration of the carbon impact of additional pumps operating on this site is recommended in accordance with Policy E8 of the Local Flood Risk Management Plan.	A further assessment of the carbon impact of pumps has been undertaken by the M&E Engineer and is included within their report.
2.14 Prepare a surface water drainage phasing plan for the development.	Weston Homes have provided a Draft Phasing Strategy document which is included in the Rev A Submission. This shows the following blocks to be delivered in each phase. Phase 1 = Block A, B, C, D and M Phase 2 = Block K/L and J3 Phase 3 = Block H, G and J Phase 4 = Block E and F

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	The proposed drainage strategy allows for Blocks B, C, D, E, F, G, J and H to be managed by stand-alone drainage systems that do not rely on other phases to be built. System 4 managing Blocks A, M, J3 and K/L shall be delivered in Phases 1 and 2 and as such it is anticipated that a temporary drainage network, comprising as much of the designed drainage for Block A and M shall be installed in Phase 1 and shall be linked with Block K/L and J3 in Phase 2. As these phases follow each-other, it is considered suitable to allow for one drainage system to cover two phases.
2.15 Provide updated water quality assessment information that acknowledge the inclusion of all elements of the SuDS system.	See Section 4 showing water quality treatment features for each catchment.
2.16 Provide further information regarding the water quality management approaches required for the construction of the proposed development	See Section 7
2.17 Identify and assess the residual risk and provide suitable mitigation associated with the management of pumps and the attenuation tanks.	See paragraphs 4.75 to 4.77.
2.18 provide a site layout plan that demonstrates all surface water drainage features sized appropriately and to ensure suitable space is available within the proposed development The design should be in accordance with both the LLFA Developer Guidance, the Ciria Suds manual, the building regulations and other relevant local and national guidance, practices and policies.	See Appendix K.
2.19 Provide detailed information of the design and operation of the flood barrier for inclusion within the hydraulic model as part of the full application.	Addressed in Royal Haskoning DHV FRA Report.
2.20 Update the hydraulic model and the drainage strategy to ensure they are consistent with other technical disciplines' submissions.	See Appendix J and K.
2.21 An assessment of the surface water treatment required for all elements of the proposed development to determine whether the SuDS system is providing an appropriate amount of water quality treatment.	See updated Section 4.
2.22 A surface water drainage design that includes a site plan with appropriately sized SuDS Features and conveyance with both the LLFA Developer Guidance and the Ciria SuDS Manual.	See Appendix K.
2.23 Identification of the structures to be placed below ground and an assessment of the risk of groundwater flooding and specific mitigation measures to manage the groundwater flood risk to those structures where required.	Addressed in Royal Haskoning DHV FRA Report.
2.24 A Maintenance and Management Plan detailing the activities required to manage the proposed SuDS including confirmation of ownership, maintenance responsibilities and in principle agreements.	See updated Section 6.

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2.25 Provide an updated assessment of the suitability of the different types of SuDS components on the site.	See Table 4.1.
2.26 Provide further evidence to support the viability of the Edward Street Service Yard residual risk mitigation and provide clarification on whether an automated flood barrier could be installed.	Addressed in Royal Haskoning DHV FRA Report.
2.27 The Emergency Flood Plan should be prepared in accordance with the ADEPT guidance (2019), available at https://adeptnet.org.uk/floodriskemergencyplan and demonstrate ongoing liaison with the relevant Emergency Planning Team	Addressed in Royal Haskoning DHV FRA Report. It is understood that The Emergency Planning Team (Teresa Cannon) has confirmed that this can be Conditioned.
2.28 An assessment of the potential to install some flow and level monitoring gauges to enable the site manager to monitor and manage the flood risk on site.	Addressed in Royal Haskoning DHV FRA Report.
2.29 Update the assessment of the residual flood risks within the FRA for the proposed development and its components.	Addressed in Royal Haskoning DHV FRA Report.
2.30 Inclusion of an updated Exceedance Flow Routes Plan for the site with proposed finished floor levels marked on.	Figure 1 in Section 4 updated to show levels as requested.
2.31 Both the FRA and the Drainage Strategy require updating to address the large number of statements and conjecture that are not supported by evidence. These statements and assessment need to be evidence based for the statements to validated.	Noted and actioned.
2.32 Provide a proposed drainage design with supporting evidence (plans, calculations, modelling and detailed design) that provide evidence of inclusion and support the proposed offsite drainage of surface water for the car park entrance and the service yard entrance on Edward Street. The evidence should demonstrate that the mitigation is appropriate, operable and “agreed in principle” by Anglian Water along with identifying who will be responsible for the maintenance and management.	Addressed in Royal Haskoning DHV FRA Report.
2.33 Provide clarifications from the applicant on whether the inclusion of flood doors have been considered on the proposed development.	Addressed in Royal Haskoning DHV FRA Report.
2.34 Provide discussion on whether an alternative design approach and location was considered before placing the car park entrance ramp on Edward Street.	Addressed in Royal Haskoning DHV FRA Report.
2.35 Provide an assessment of flow entering the basement car park should mitigation not be installed or the failure of mitigation measures.	Addressed in Royal Haskoning DHV FRA Report.
2.36 Provide evidence the proposed development scheme that in accordance with NPPF where “the development should be made safe for its lifetime without increasing flood risk elsewhere.”	Addressed in Royal Haskoning DHV FRA Report.
2.37 Address all LLFA queries given in the attached Annex.	See point 2. above.
3. The hydraulic modelling report and model requires updating to include.	

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3.1 confirmation that the key parameters (URBEXT, Catchment area, etc.) have been checked and the parameters where appropriate adjusted accordingly.	Addressed in Royal Haskoning DHV FRA Report.
3.2.1 Includes sewers in the hydraulic model for the sewer network affecting the parts of the site included in this application to support the full application that demonstrates there is no increase in flood risk elsewhere.	Addressed in Royal Haskoning DHV FRA Report.
3.2.2 Is extended to cover the full catchment to ensure the inflows are calculated correctly, or includes sensitivity testing showing that these inflows do not impact flood risk at the site.	Addressed in Royal Haskoning DHV FRA Report.
3.3 Provide clarification on whether Anglian Water has been contacted to supply sewer data. This should be requested and included where interactions with the sewer system are likely to impact flooding.	Addressed in Royal Haskoning DHV FRA Report.
3.4 The inclusion of information regarding the onset of flooding and its associated duration for vulnerable locations across the site including the basement car park entrance and the service yard and loading facilities.	Addressed in Royal Haskoning DHV FRA Report.

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2 Policy Framework and Pre-Application Comments

Local Policy

Greater Norwich Local Plan

"We are working with Broadland District Council, Norfolk County Council and South Norfolk District Council to prepare the Greater Norwich Local Plan (GNLP).

The GNLP will build on the long-established joint working arrangements for Greater Norwich which have delivered the current Joint Core Strategy (JCS) for the area. The JCS plans for the housing and job needs of the area to 2026 and the GNLP will ensure that these needs continue to be met to 2036.

The GNLP will include strategic planning policies and will also allocate individual sites for development. It will aim to ensure that new homes and jobs are delivered and the environment is protected and enhanced, promoting sustainability and the effective functioning of the area."

2.1 The GNLP was submitted to the Secretary of Stage for independent examination on 30th July 2021. The emerging plan allocates the Anglia Square site (GNLP0506) for Mixed Use Allocation.

2.2 Emerging Policy: *GNLP Policy 2 would be anticipated to reduce the risk of fluvial flooding that may arise as a result of development, through the requirement to carry out flood risk assessments, and incorporate sustainable drainage measures.*

2.3 Emerging Policy : *GNLP Policy 2 would be anticipated to mitigate the risk of surface water flooding that may arise as a result of development, through the requirement for development to incorporate sustainable drainage measures and contribute to the green infrastructure cover.*

2.4 An indicative drainage plan incorporating sustainable drainage (SuDS) is included in Section 7, detailing how surface water will be managed on the site and the rationale for the approaches used. Surface water runoff from the site will be restricted as far as possible to ensure that the risk of flooding both to the site and elsewhere is minimised, taking into account the effects of climate change.

Development Management Policies Local Plan

2.5 The Development Management Policies Plan (DM policies) sets out policies which will apply across the whole city, as well as policies which apply in designated areas.

Policy DM5 – Planning effectively for flood resilience' details the policy for flooding, sustainable drainage and surface water flooding and surface treatment. The policy states:

"*Developers will be required to show that the proposed development:*

- *would not increase the vulnerability of the site, or the wider catchment, to flooding from surface water run-off from existing or predicted water flows; and*
- *would, wherever practicable, have a positive impact on the risk of surface water flooding in the wider area.*

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Development must, as appropriate, incorporate mitigation measures to reduce surface water runoff, manage surface water flood risk to the development itself and to others, maximise the use of permeable materials to increase infiltration capacity, incorporate on-site water storage and make use of green roofs and walls wherever reasonably practicable.

The use of permeable materials, on-site rainwater storage, green roofs and walls will be required unless the developer can provide justification to demonstrate that this would not be practicable or feasible within the constraints or configuration of the site, or would compromise wider regeneration objectives."

2.6 The landscaping of the development in terms of surface water management is also considered in Policy DM5. This states:

"Development proposals will be required to maximise the use of soft landscaping and permeable surfacing materials unless the developer can provide justification to demonstrate that this is not feasible.

Where permission is required, proposals involving the provision of new or replacement paved and other impermeable surfaced areas will only be permitted:

- *in areas of impermeable soils as identified in Appendix 1;*
- *in other areas where it can be demonstrated that permeable surfaces are not practicable due to poor soil infiltration capacity, high groundwater levels or risk of subsidence; and*
- *in areas with soils with average or good infiltration capacity, where it can be demonstrated that there is an exceptional and overriding justification for such surfaces.*

In cases where poor soil infiltration capacity or other factors preclude the use of permeable surfacing materials, development proposals should seek to manage and minimise the impact of surface water run-off by suitable measures for water storage on-site."

2.7 An indicative drainage plan incorporating sustainable drainage (SuDS) is included in Section 7, detailing how surface water will be managed on the site and the rationale for the approaches used. Surface water runoff from the site will be restricted as far as possible to ensure that the risk of flooding both to the site and elsewhere is minimised, taking into account the effects of climate change.

Natural England and Nutrient Neutrality Assessments

2.8 In March 2022, Natural England issued a letter to Local Planning Authorities, Environment Agency and all Heads of Planning and Chief Executives to give advice for development proposals with the potential to affect water quality resulting in adverse nutrient impacts on habitats and sites. The letter provides advice on the assessment of new plans and projects under Regulation 63 of the Habitats Regulations. The purpose of that assessment is to avoid adverse effects occurring on habitats sites as a result of the nutrients released by those plans and projects. This advice does not address the positive measures that will need to be implemented to reduce nutrient impacts from existing sources, such as existing developments, agriculture, and the treatment and disposal of wastewater. It proposes that nutrient neutrality might be an approach that planning authorities wish to explore.

2.9 The following background is given:

"In freshwater habitats and estuaries, poor water quality due to nutrient enrichment from elevated nitrogen and phosphorus levels is one of the primary reasons for habitats sites being in unfavourable condition. Excessive levels of nutrients can cause the rapid growth of certain plants through the process of eutrophication. The effects of this look different depending on the habitat, however in each case, there is a loss of biodiversity, leading to sites being in 'unfavourable condition'. To achieve the necessary improvements in water quality, it is becoming increasingly evident that in many cases substantial reductions in nutrients are needed. In addition, for habitats sites that are unfavourable due to nutrients, and where there is considerable development pressure, mitigation solutions are likely to be needed to enable new development to proceed without causing further harm.

In light of this serious nutrient issue, Natural England has recently reviewed its advice on the impact of nutrients on habitats sites which are already in unfavourable condition. Natural England is now advising that there is a risk of significant effects in more cases where habitats sites are in unfavourable condition due to exceeded nutrient thresholds. More plans and projects are therefore likely to proceed to appropriate assessment.

The principles underpinning HRAs are well established. At the screening stage, plans and projects should only be granted consent where it is possible to exclude, on the basis of objective information, that the plan or project will have significant effects on the sites concerned. Where it is not possible to rule out likely significant effects, plans and projects should be subject to an appropriate assessment. That appropriate assessment must contain complete, precise and definitive findings which are capable of removing all reasonable scientific doubt as to the absence of adverse effects on the integrity of the site.

Appropriate assessments should be made in light of the characteristics and specific environmental conditions of the habitats site. Where sites are already in unfavourable condition due to elevated nutrient levels, Natural England considers that competent authorities will need to carefully justify how further inputs from new plans or projects, either alone or in combination, will not adversely affect the integrity of the site in view of the conservation objectives. This should be assessed on a case-by-case basis through appropriate assessment of the effects of the plan or project. In Natural England's view, the circumstances in which a Competent Authority can allow such plans or projects may be limited. Developments that contribute water quality effects at habitats sites may not meet the no adverse effect on site integrity test without mitigation.

Mitigation through nutrient neutrality offers a potential solution. Nutrient neutrality is an approach which enables decision makers to assess and quantify mitigation requirements of new developments. It allows new developments to be approved with no net increase in nutrient loading within the catchments of the affected habitats site.

Where properly applied, Natural England considers that nutrient neutrality is an acceptable means of counterbalancing nutrient impacts from development to demonstrate no adverse effect on the integrity of habitats sites and we have provided guidance and tools to enable you to do this."

2.10 A Nutrient Neutrality Assessment is to be undertaken by others and will be submitted as part of this planning application.

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3 Existing Site Description and Drainage Features

Existing Site Description

3.1 The site is located at Anglia Square, Norwich and consists of a shopping precinct including stores such as Iceland and Boots and a former cinema. Large office blocks are also present at the site; the disused seven-storey Sovereign House which runs north-south along Boltoph Street previously housed Her Majesty's Stationary Office (HMSO) and the under-utilised six-storey Gildengate House, built over shops underneath.

3.2 The existing site is almost entirely impermeable and is served by both private and adopted foul and surface water sewers. Surface water run-off is unrestricted and untreated and ultimately outfalls to the adopted sewer network to the south-east of the site.

Site Levels

3.3 A site-specific topographical survey is included in **Appendix C**. For the main Anglia Square site, levels vary between 5.09m AOD in the north west corner to 2.40m AOD at the existing access road from St Crispin's Road to the south of the site. Away from this low spot, levels in the south east corner of the site are in the region of 3.08m AOD. For the existing Anglia Square shopping centre, levels are around 3.51m AOD. The site slopes in a generally south easterly direction at a gradient of approximately 1:125

3.4 The parcel north west of New Boltoph Street slopes in a southerly direction, at a gradient of approximately 1:185 with the highest level to the north west of the site at 5.40m AOD and the lowest level at 5.11m AOD at the southern extent of the parcel. The site is approximately 0.35-0.4m higher than the carriageway of New Boltoph Street/ Edward Street.

3.5 North of Edward Street the site slopes towards the north, at a gradient of approximately 1:100, with the highest point in the south west corner at a level of 4.27m AOD and the lowest point in the north at 3.87m AOD.

Sewer Network

3.6 Sewer records, obtained from Anglian Water and included in **Appendix D,** show there to be a 675mm surface water sewer and 300mm foul sewer flowing in a south westerly direction through the site.

3.7 A 300mm surface water sewer and 225mm foul sewer also run west to east with Edward Street, to the north of the main portion of the site. Both sewers connect to the respective foul and surface water sewers in Magdalen Street before flowing southwards and discharging into the River between Fye Bridge Street and Whitefriars Bridge.

3.8 A further 525mm combined sewer flows southwards along Magdalen Street. It is highly likely that surface water flows from the Dalymond Dyke flow within this sewer, given the location of the sewer and the available information on the Dalymond Dyke.

3.9 The sewer locations and sizes within the site boundary are shown in more detail on the topographical survey contained in **Appendix C.**

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Pre-Development Runoff Rate

3.10 The total site area covers 4.65ha and is entirely brownfield comprising a shopping a shopping centre, office block, paved open spaces and car parks. The existing impermeable area has been measured at 4.24ha. Surface water run-off from 3.96ha is unrestricted and untreated and ultimately outfalls to the adopted sewer network within Edward Street, Magdalan Street, Botolph Street and the sewers crossing the centre of the site from west-to-east. A section of car park covering 0.28ha looks to outfall to soakaways. As such, it is not suitable to consider the runoff from the site as though it is an undeveloped greenfield site. It is therefore appropriate to use a 'like for like' approach, i.e. quantify the runoff from the existing developed brownfield site and assess it against the proposed developed site whilst providing a betterment in terms of run-off rates and water quality.

3.11 Using the Modified Rational Method detailed in Butler, D and Davies, J. (2006), Urban Drainage, 2nd ed., SPON, the surface water runoff for the existing site has been calculated as follows: -

$Q = CiA$ where Q = maximum flow rate (l/s)

$C = PIMP/PR$

i = rainfall intensity (mm/hr),

A = area (ha)

3.12 WINDES MicroDrainage was used to assess rainfall intensities for each storm event by running each storm event and noting the peak rainfall intensity for each storm, then using the above formula, the following existing run-off rates were calculated:

- 1 in 1 year 30.99mm/hr = 350.47 l/s
- 1 in 30 year 76.03mm/hr = 859.87 l/s
- 1 in 100 year 98.68mm/hr = 1115.97 l/s

3.13 Existing run-off rates calculations are contained in **Appendix E**.

3.14 An analysis was undertaken to review the areas of the existing site which drain to the adopted sewer network. For information, this is included in **Appendix F**.

Pre-Development Storage Volumes

3.15 A simple analysis was carried out based on the topographical survey. The various sewers serving the existing site along with the diameters are shown on the topographic survey. These were measured and the available capacity in each sewer has been calculated. This analysis identified only the private sewers which outfall from the existing development to the adopted sewers but does not include the adopted sewers themselves or any outfall pipes from gullies or rainwater pipes. It is noted that there could be additional private sewers which haven't been picked up on the topographical survey so were not included in this analysis.

3.16 The storage volume available in the pipe network serving the existing brownfield site is as follows:

- 150dia – 335.4m = 6.04m3
- 225dia -296.4m = 11.86m3
- 300dia – 71.5m = 5.08m3

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- 375dia – 34.9m = 3.84m3
- Assume 1m3 volume for each manhole. 30 x manholes = 30m^3

3.17 The total 'storage' volume available in the surface water sewers on the existing site is therefore approximately **56.82m3**.

Existing Sewers, Diversions and Build-Overs

3.18 The proposals will require the adopted surface and foul water sewers which cross the site to be diverted. It is anticipated that a S185 Sewer diversion Application shall be made to Anglian Water which will preclude the need for any Build-Over Agreements. Further information on sewer diversions are contained in Section 4.

3.19 A number of private surface and foul water sewers serve the existing site. These sewers are not anticipated to be retained as part of the proposed surface water drainage strategy and will therefore be removed and new surface and foul water sewers provided.

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4 Proposed Drainage Strategy

Relevant SuDS Policy

4.1 The NPPF states that, "using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, (making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management)".

4.2 SuDS mimic the natural drainage system and provide a method of surface water drainage which can decrease the quantity of water discharged, and hence reduce the risk of flooding. In addition to reducing flood risk, these features can improve water quality and provide biodiversity and amenity benefits.

4.3 The SuDS management train incorporates a hierarchy of techniques and considers all three SuDS criteria of flood reduction, pollution reduction, and landscape and wildlife benefit. In decreasing order of preference, the preferred means of disposal of surface water runoff is:

- Discharge to ground.
- Discharge to a surface water body.
- Discharge to a surface water sewer.
- Discharge to a combined sewer.

4.4 The philosophy of SuDS is to replicate as closely as possible the natural drainage from a site pre-development and to treat runoff to remove pollutants, resulting in a reduced impact on the receiving watercourses. The benefits of this approach are as follows:

- Reducing runoff rates, thus reducing the flood risk downstream.
- Reducing pollutant concentrations, thus protecting the quality of the receiving water body.
- Groundwater recharge.
- Contributing to the enhanced amenity and aesthetic value of development areas.
- Providing habitats for wildlife in developed areas, and opportunity for biodiversity enhancement.

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Site-Specific SuDS

4.5 The various SuDS methods need to be considered in relation to site-specific constraints. Several SuDS options are available to reduce or temporarily hold back the discharge of surface water runoff. Table 4.1 outlines the constraints and opportunities to each of the SuDS devices in accordance with the hierarchical approach outlined in The SuDS Manual CIRIA C753. It also indicates what could and could not be incorporated within the development, based upon site-specific criteria.

Device	Description	Constraints / Comments	Appropriate
Living roofs (source control)	Provide soft landscaping at roof level which reduces surface water runoff.	Roof Terraces and Roof Gardens are proposed as part of this development.	Yes
Infiltration devices & Soakaways (source control)	Store runoff and allow water to percolate into the ground via natural infiltration.	Poten tial for high groundwater and contamination indicated due to brownfield site.	No
Pervious surfaces (source control)	Storm water is allowed to infiltrate through the surface into a storage layer, from which it can either infiltrate and/or slowly release to sewers.	Poten tial for high groundwater and contamination indicated due to brownfield site. Lined permeable paving is proposed in some pedestrian areas which are ou tside the main thoroughfares.	Yes
Rainwater harvesting (source control)	Reduces the annual average rate of runoff from the site by reusing water for non-potable uses e.g. toilet flushing, recycling processes.	Water bu tts are proposed for Block C and rainwater recycling for land-lord use to wash-down bin stores is also proposed.	Yes
Swales (permeable conveyance)	Broad shallow channels that convey / store runoff, and allow infiltration (ground conditions permitting).	Bioretention swales and tree-pits are proposed alongside Botolph Street as part of the highway drainage strategy. Further swales and bioretention swales are proposed within pedestrian areas across the site.	Yes
Filter drains & perforated pipes (permeable conveyance)	Trenches filled with granular materials (to take flows from adjacent impermeable areas) that convey runoff while allowing infiltration.	Some areas of the site may be suitable for u se of fil ter drains, however no infiltration is expected to be viable due to con tamination. Filter drains would therefore be lined and used for Water Quality purposes to fil ter waters prior to ou tfall.	Yes
Filter Strips (permeable conveyance)	Wide gently sloping areas of grass or dense vegetation that remove pollutants from run-off from adjacent areas.	Poten tial for high groundwater and contamination indicated due to brownfield site.	No
Infiltration basins (end of pipe treatment)	Depressions in the surface designed to store runoff and allow infiltration.	High density city centre site Poten tial for high groundwater and contamination indicated due to brownfield site.	No
Wet ponds & constructed wetlands (end of pipe treatment)	Provide water quality treatment & temporary storage above the permanent water level.	High density city centre site so no landscaped areas for ponds and wetlands.	No
Attenuation Underground (end of pipe treatment)	Oversized pipes or geo-cellular tanks designed to store water below ground level.	These are proposed as the SuDS l isted above will n ot achieve sufficien t volumes to restrict to the required rate. This is likely to be used alongside other means of attenuation at the site to provide the required storage volume.	Yes

Table 4.1: Site Specific Sustainable Drainage

Rainwater Harvesting Opportunities Assessment

4.6 Where possible, rainwater harvesting features shall be incorporated in the proposals.

Device	Description	Constraints / Comments	Appropriate
Rainwater Harvesting – Internal	The use of filtered rainwater for reuse in toilets and washing machines.	Given the complex split of usages for the Blocks (residential vs commercial) the infrastructure needed to manage this and the possible risk/concern of maintenance and management of a system to serve private, communal and public use toilet water would be difficult to deliver effectively.	No
Rainwater Harvesting – External	The use of filtered rainwater for reuse at outside taps.	Rainwater harvesting tanks to be incorporated for land- lord bin wash-down, which shall be fed by rainwater downpipes and managed and maintained solely by the land-lord or elected Management and Maintenance Company Rainwater Water-Butts are to be incorporated at Block C for Garden Watering Use	Yes

Table 4.2: Site Specific Rainwater Harvesting

Post-Development Run-off Rate

4.7 Given the potentially high groundwater and contamination of the site, infiltration is not recommended. It is understood that groundwater monitoring undertaken in May 2022 found groundwater to be around 3.4m bgl, which precludes the use of infiltration devices. There are no nearby watercourses to which a connection could be made, and therefore it is proposed that the development will drain to the existing Anglian Water surface water network in the vicinity of the site at a restricted discharge rate.

4.8 As discussed in Section 3, the existing site outfalls unrestricted and untreated into the adopted sewer network. Para. 3.13 summarises the existing outfall rates for each storm event.

4.9 For information only, the greenfield run-off rates were calculated using WINDES MicroDrainage software, these are based on a total proposed impermeable area of 4.24ha and are summarised below and included in **Appendix H**.

- QBAR – 0.3 l/s/ha = 1.272 l/s
- 1:1yr – 0.3 l/s/ha = 1.272 l/s
- 1:30yr – 0.8 l/s/ha = 3.392 l/s
- 1:100yr – 1.2 l/s/ha = 5.088 l/s

4.10 The greenfield runoff rates are very low due to the local geology of chalk. However, in reality the site is almost 100% impermeable, historical mapping shows the site has been developed since at least 1885 and has been a shopping/town centre for many years. The site is Brownfield and it is therefore considered appropriate to review the existing run-off rates with a view to provide a betterment. Using greenfield run-off rates for a site which has been browfield for over 137 years is inappropriate and would result in excessive attenuation volumes and therefore tank sizes, which could have impacts on other features such as the local archaeology, groundwater and geology.

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4.11 The site is in a sensitive location, being at the downstream end of a Critical Drainage Area (CDA). The CDA relates largely to offsite surface water flows being directed through the catchment, through the site and ultimately to the River Wensum. There also appears to be local flood issues relating to the capacity of the local sewer network.

4.12 As discussed in the separate FRA by Royal Haskoning DHV, measures will be in place to mitigate against the impact of these offsite flows within the site boundary. The proposed drainage system will not be designed to accept offsite flows, but it is considered that a significant improvement can still be made by designing an effective drainage system at the site, which will benefit those downstream of the site by attenuating rainfall within the site boundary. The proposed drainage system will install drainage features which are much smaller and will have less of an impact on other aspects (such as archaeology, sewers and geology).

4.13 A pre-development enquiry with Anglian Water has been submitted, to update the enquiry received for the previous scheme. Anglian Water were able to confirm that an outfall rate of 242 l/s to manage all storms up to and including the 1 in100yr + Climate Change Event would be acceptable – this is based on their calculation of an equivalent 1:1yr discharge rate applied to the existing impermeable area. Surface water should be discharged to the same sewers as the existing site, which are in Edward Street, Pitt Street and St Crispins Road. The proposed discharge rate of 242 l/s would provide a significant bettement to the existing situation.

4.14 The Anglian Water Pre-Development Assessment report, confirming an agreeable maximum discharge rate of 242 l/s and the recommended connection points to the existing Anglian Water network is included in **Appendix I**.

Proposed Drainage Strategy

4.15 In accordance with the Environment Agency's May 2022 published Climate Change Allowances, all surface water drainage is to be designed to a 1:100yr + 45% Climate Change Event. As per LLFA's Developer Guidance, FEH Rainfall Data shall be used within the hydraulic models. As requested by the LLFA, the hydraulic model assumes that adopted sewers are running at full bore and will be surcharged to the top of pipe.

4.16 As described in Section 1, it is proposed to make a Hybrid planning application: Full Planning for Blocks, A, B, C, D, J3, K/L and M and Outline Planning for Blocks E, F, G, H and J.

4.17 The Hybrid site layout precludes the option for completely separating drainage for Outline areas from Full-Planning areas however, largely, the drainage systems serve only Outline or only Full-Planning areas.

4.18 The development parcels have been split into 9no. drainage catchments:

- System 1 – Serves Block B (Full-Planning)
- System 2 – Serves Block C (Full-Planning)
- System 3 – Serves Block D (Full-Planning)
- System 4 - Serves Block A, M J3 and K/L (Full Planning)
- System 5 – Serves Botolph Street/Public Realm Area (Full Planning)
- System 6 – Serves Block E (Outline Planning)

- System 7 – Serves Block F (Outline Planning)
- System 8 – Serves Blocks G and J (Outline Planning)
- System 9 – Serves Block H (Outline Planning)

System 1 – Block B – Full Planning

4.19 SuDS Feature Selection – This catchment comprises residential dwellings, footpaths, patios and parking areas. Residential units facing New Botolph St will have green roofs covering an area of 290m². It is proposed to utilise lined permeable paving to manage run-off from the trafficked areas, whilst a surface water drainage network shall collect run-off from roof, patios and other hardstanding areas. All flows shall be directed to a geo-cellular storage device via a Downstream Defender (proprietary treatment unit). The impermeable area for this catchment has been calculated as: 1651m². The maximum outfall rate for this catchment has been set at 5 l/s to manage all storms up to and including the 1 in 100yr + 45% Climate Change Event. The proposed Surface Water Drainage Layouts are contained in **Appendix K** and shows the network serving Block B on drawing DR-001.

4.20 There are two sections of permeable paving attenuation, PP1 covers an area of 476m² and PP2 covers an area of 150m². Surface water attenuation volume is provided within the sub-base voids (usually 30% voids and no-fines). Flows from these permeable paving systems are restricted using orifice-plate flow control chambers – flows are then directed to/cascade to the geo-cellular attenuation device which also collects surface water run-off from 806m² of roof area (noting that 290m² is green roof and assumed to be saturated/impermeable) and 219m² of patio and hardstanding areas. Outfall flows from the geo-cellular attenuation device are restricted using a hydrobrake (flow control device) and are directed to the 225dia adopted surface water sewer in Edward Street via a new section of sewer.

4.21 WINDES MicroDrainage modelling software has been used to calculate the required attenuation volume for the permeable paving areas and the geo-cellular storage device whilst restricting flows to a maximum of 5 l/s to manage a 1 in 100 year + 45% Climate Change event. The hydraulic output data shows an attenuation volume of 35.176m³ in PP1, a volume of 7.765m² in PP2 and a volume of 42.909m³ in the geo-cellular storage device. This can be contained within the sub-base of the permeable paving areas and within a geo-cellular storage device sized 35.2m² x 1.32m deep with 95% voids – this provides a maximum attenuation volume of 44.14m³. The hydraulic model output for Block B is contained in **Appendix J** as well as the drainage long-sections.

4.22 Half Drain Times – The hydraulic model demonstrates that Permeable Paving Area 1 has a half-drain time of 545mins, Permeable Paving Area 2 is 184mins and the Geo-cellular storage device half-drains in 131mins. All well within 24hrs.

4.23 Water Quality Assessment – This catchment comprises residential roofs and low-traffic roads only.

4.24 CIRIA 763 SuDS Manual Table 26.2 shows Low-Traffic Roads have a Pollution Hazard Level of LOW. All low-traffic roads in this catchment are anticipated to comprise lined permeable paving construction with outfall directed to the adopted sewer via the geo-cellular attenuation device. Table 26.2 shows Low-Traffic Roads have TSS of 0.5 Metals, 0.4 and Hydrocarbons 0.4. Table 26.3, SuDS mitigation indices for discharges to surface waters, shows that Permeable Paving alone provides mitigation for TSS at 0.7; Metals at 0.6 and Hydrocarbons at 0.7. Surface water run-off from low-traffic-road areas is more than sufficiently mitigated by use of Permeable Paving.

4.25 CIRIA 763 SuDS Manual Table 26.2 shows Residential Roofs have a Pollution Hazard Level of LOW. Residential Roofs will discharge directly to the adopted sewer via a Downstream Defender (proprietary treatment unit) and the geo-cellular attenuation device. Table 26.2 shows Residential Roofs have TSS of 0.2 Metals 0.2 and Hydrocarbons 0.05. Table 26.3, SuDS mitigation indices for discharges to surface waters, states that proprietary treatment systems must demonstrate that they can address each contaminate type to an acceptable level. As this Downstream Defender is required solely to cleanse waters from residential roofs and footpaths, it is considered more than sufficient to provide water treatment.

System 2 – Block C – Full Planning

4.26 SuDS Feature Selection – This catchment comprises residential dwellings and hard and soft landscaping areas. A surface water drainage network shall collect run-off from all impermeable areas and with all flows are directed to a geo-cellular storage device with restricted flows passing through a Bioretention Swale. The contributing area for this catchment has been calculated as: 750m², comprising 435m² of Green Roof, 50m² of Roof area and 265 m² of pedestrian hardstanding. It is assumed that green-roofs will be saturated and therefore impermeable for the purpose of these hydraulic calculations. The maximum outfall rate for this catchment has been set at 5 l/s to manage all storms up to and including the 1 in 100yr + 45% Climate Change Event. The proposed Surface Water Drainage Layouts are contained in Appendix K and shows the network serving Block C on drawing DR-001.

4.27 Surface water run-off from the Green Roof areas is collected in a surface water drainage network which outfalls to a geo-cellular attenuation device via a Swale. Run-off from pedestrian/hard landscaping is directed to a Bio-retention Swale and directed to the surface water drainage network via a perforated pipe. Flows from the geo-cellular attenuation device are restricted using a pump which pumps flows into the filter medium within the Bio-retention Swale. A perforated pipe at the base of the bioretention swale then outfalls to a demarcation chamber prior to discharge to the 225dia adopted surface water sewer in Edward Street via a new connection.

4.28 WINDES MicroDrainage modelling software has been used to calculate the required attenuation volume for the geo-cellular storage device whilst restricting flows to a maximum of 5 l/s to manage a 1 in 100 year + 45% Climate Change event. The hydraulic output data shows an attenuation volume of 28.327m³ in the geo-cellular storage device. This can be contained within a geo-cellular storage device sized 23.0m² x 1.32m deep with 95% voids – this provides a maximum attenuation volume of 28.842m³. The hydraulic model output for Block C is contained in **Appendix J** as well as the drainage long-sections.

4.29 Half Drain Times – The hydraulic model demonstrates the Geo-cellular storage device half- drains in 78mins. Well within 24hrs.

4.30 Water Quality Assessment – This catchment comprises footpaths and residential roofs only.

4.31 CIRIA 763 SuDS Manual Table 26.2 shows Residential Roofs have a Pollution Hazard Level of LOW. Residential Roofs will discharge directly to the adopted sewer via a Filter Drain and the geo-celluar attenuation device. Table 26.2 shows Residential Roofs have TSS of 0.2 Metals 0.2 and Hydrocarbons 0.05. Table 26.3, SuDS mitigation indices for discharges to surface waters, shows that a Bioretention system provides mitigation for TSS at 0.8; Metals at 0.8 and Hydrocarbons at 0.8. Surface water run-off from residential roof areas is more than sufficiently mitigated by use of a Bio-Retention Swale

System 3 – Block D – Full Planning

4.32 SuDS Feature Selection – This catchment comprises a commercial unit block with residential dwellings above, with 570m² of green roof. The catchment also includes public realm area with bio-retention tree-pits and bioretention swales within pedestrian walkways. To be conservative, the hydraulic models shall assume green-roofs are saturated and will not allow for any impermeable areas, as such will be considered 100% impermeable with a contributing area of 2580m². The maximum outfall rate for this catchment has been set at 12.5 l/s to manage all storms up to and including the 1 in 100yr + 45% Climate Change Event. The proposed Surface Water Drainage Layouts are contained in **Appendix K** and shows the network serving Block D on drawing DR-001.

4.33 Surface water run-off from roof areas is collected in a surface water drainage network. This surface water drainage network also collects from the bioretention tree pits and swales which collect run-off from the pedestrian walkways. All flows are directed to a geo-cellular storage device with restricted flows passing through a Bioretention Swale prior to outfall to the 675dia diverted Anglian Water Sewer crossing the site.

4.34 WINDES MicroDrainage modelling software has been used to calculate the required attenuation volume for the geo-cellular storage device whilst restricting flows to a maximum of 12.5 l/s to manage a 1 in 100 year + 45% Climate Change event. The hydraulic output data shows an attenuation volume of 94.235m³ in the geo-cellular storage device. This can be contained within a geo-cellular storage device sized 71.0m² x 1.32m deep with 95% voids – this provides a maximum attenuation volume of 89.034m³ (NB: some storage volume is contained within the drainage network itself). The hydraulic model output for Block D is contained in **Appendix J** as well as the drainage long-sections.

4.35 Half Drain Times – The hydraulic model demonstrates the Geo-cellular storage device half- drains in 112mins. All well within 24hrs.

4.36 Water Quality Assessment – This catchment comprises commercial/residential roofs and pedestrian walkways only.

4.37 CIRIA 763 SuDS Manual Table 26.2 shows Other Roofs (commercial/industrial) have a Pollution Hazard Level of LOW. Roofs and pedestrian walkways will discharge directly to the adopted sewer via a Bioretention Swale. Table 26.2 shows Other Roofs have TSS of 0.3 Metals 0.2 and Hydrocarbons 0.05. Table 26.3, SuDS mitigation indices for discharges to surface waters, shows that bioretention systems provide mitigation for TSS at 0.8; Metals at 0.8 and Hydrocarbons at 0.8. Surface water run-off from this catchment is more than sufficiently mitigated by use of a Bioretention Swale.

System 4 – Blocks A, M, J3 and K/L – Full Planning

4.38 SuDS Feature Selection – This catchment comprises commercial blocks with residential dwellings above, with 1750m² of green roof. The catchment also includes public realm area with bio-retention tree-pits and bioretention swales within pedestrian walkways. To be conservative, the hydraulic models shall assume green-roofs are saturated and will not allow for any impermeable areas, as such will be considered 100% impermeable with a contributing area of 14,850m². The maximum outfall rate for this catchment has been set at 65.0 l/s to manage all storms up to and including the 1 in 100yr + 45% Climate Change Event. All flows shall be directed to a Geo-cellular attenuation device. Some run-off from pedestrian walkway areas will benefit from bioretention tree-pit and bioretention swales however as described

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above, to be conservative, it is assumed that 'green' SuDS features will be saturated and will not contribute to attenuation volumes. The proposed Surface Water Drainage Layouts are contained in **Appendix K** and shows the network serving this catchment on drawings DR-001, DR-002, DR-003 and DR-004.

4.39 WINDES MicroDrainage modelling software has been used to calculate the required attenuation volume for the geo-cellular storage device whilst restricting flows to 65.0 l/s. Any attenuation volume that may be provided in green roofs and bio-retention areas has not been allowed for to ensure a robust estimation of the required attenuation volumes to serve this catchment are made. The hydraulic output data is contained in **Appendix J** and shows an attenuation volume of 500.184m^3 in the geo-cellular storage device with a maximum outfall rate of **65.0 l/s** is required to manage a 1 in 100 year + 40% Climate Change event. This can be contained within a geo-cellular storage device sized 307.2m^2 x 1.67m with 95% voids – this provides a maximum attenuation volume of 487.37m^3 (NB: some storage volume is contained within the drainage network itself). The hydraulic model output for Block D is contained in **Appendix J** as well as the drainage long-sections.

4.40 Half Drain Times – The hydraulic model demonstrates the Geo-cellular storage device half- drains in 133mins. All well within 24hrs.

4.41 Water Quality Assessment – This catchment comprises commercial/residential roofs and pedestrian walkways only.

4.42 CIRIA 763 SuDS Manual Table 26.2 shows Other Roofs (commercial/industrial) have a Pollution Hazard Level of LOW. Roofs and pedestrian walkways will discharge directly to the adopted sewer via a Downstream Defender (proprietary treatment unit). Table 26.3, SuDS mitigation indices for discharges to surface waters, states that proprietary treatment systems must demonstrate that they can address each contaminate type to an acceptable level. As this Downstream Defender is required solely to cleanse waters from roof areas and pedestrian walkways (noting that some run-off would have already been cleansed by green roofs and bioretention systems), it is considered more than sufficient to provide water treatment.

System 5 – Botolph Street/Public Realm Area – Full Planning

4.43 SuDS Feature Selection – This catchment comprises a large public realm with pedestrian walkways and bioretention swales. Some areas to the south of Botolph Street shall be trafficked. Surface water runoff shall be directed into Bioretention Swales and where this is not possible into channel drains. To be conservative, the hydraulic models shall assume 100% impermeable area (with no allowance for the bioretention swales) as such the contributing area is 1630m^2. The maximum outfall rate for this catchment has been set at 10.0 l/s to manage all storms up to and including the 1 in 100yr + 45% Climate Change Event. All flows shall be directed to an oversized pipe system with outfall restricted via a hydrobrake flow control device. The proposed Surface Water Drainage Layouts are contained in **Appendix K** and shows the network serving this catchment on drawings DR-002.

4.44 WINDES MicroDrainage modelling software has been used to calculate the required attenuation volume for the over-size pipe system whilst restricting flows to 10.0 l/s. Any attenuation volume that may be provided in bio-retention areas has not been allowed for to ensure a robust estimation of the required attenuation volumes to serve this catchment are made. The hydraulic output data is contained in **Appendix J** and shows an attenuation

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volume of 58.648m³ (which is the sum of the maximum volume within each pipe-run) is required to manage a 1 in 100 year + 40% Climate Change event with flow restricted to 10 l/s. The hydraulic model output for Botolph Street is contained in **Appendix J** as well as the drainage long-sections.

4.45 Water Quality Assessment – This catchment comprises pedestrian walkways only.

4.46 CIRIA 763 SuDS Manual Table 26.2 shows Low-Trafficked Roads have a Pollution Hazard Level of LOW. Run-off will discharge directly to the adopted sewer via a Downstream Defender (proprietary treatment unit). Table 26.3, SuDS mitigation indices for discharges to surface waters, states that proprietary treatment systems must demonstrate that they can address each contaminate type to an acceptable level. As this Downstream Defender is required solely to cleanse waters mainly form pedestrian areas with some small areas of trafficked hardstanding, (noting that some run-off would have already been cleansed by bioretention systems), it is considered more than sufficient to provide water treatment.

System 6 – Block E – Outline Planning

4.47 SuDS Feature Selection – This catchment comprises commercial units with residential dwellings above and some public realm/pedestrian walkways. Green roof shall cover some roof area. Some bioretention swales shall collect run-off from highway areas to the west, which has been agreed in principle with the Highway Authority. Details of the split between private and highway catchments and the drainage features which serve these areas shall be confirmed during detailed design stage. For now, and to be conservative, the hydraulic models shall assume all areas within the catchment boundary shall be collected within a private drainage network. The catchment shall be considered 100% impermeable with a contributing area of 6420m².

4.48 At this Outline stage the surface water drainage strategy shall allow for all waters to be collected within a Geocellular attenuation device with a restricted outfall directed to the diverted adopted 675dia surface water sewer crossing the site. Flows shall be cleansed via a Downstream Defender (proprietary treatment unit) prior to outfall. The maximum outfall rate for this catchment has been set at 30.0 l/s to manage all storms up to and including the 1 in 100yr + 45% Climate Change Event. The proposed Surface Water Drainage Layouts are contained in **Appendix K** and shows the network serving Block E on drawing DR-003.

4.49 WINDES MicroDrainage modelling software has been used to calculate the required attenuation volume for the geo-cellular storage device whilst restricting flows to 30.0 l/s. Any attenuation volume that may be provided in green roofs and bio-retention areas has not been allowed for to ensure a robust estimation of the required attenuation volumes to serve this catchment are made. The hydraulic output data is contained in **Appendix J** and shows an attenuation volume of 310.8m³ in the geo-cellular storage device with a maximum outfall rate of **30.0 l/s** is required to manage a 1 in 100 year + 40% Climate Change event. This can be contained within a geo-cellular storage device sized 166.4m² x 1.98m with 95% voids – this provides a maximum attenuation volume of 312.99m³. The hydraulic model output for Block E is contained in **Appendix J**.

4.50 Half Drain Times – The hydraulic model demonstrates the Geo-cellular storage device half- drains in 102mins. All well within 24hrs.

4.51 Water Quality – This catchment comprises Other Roofs as well as Pedestrian Walkways.

4.52 CIRIA 763 SuDS Manual Table 26.2 shows Other Roofs (commercial/industrial) have a Pollution Hazard Level of LOW. Roofs and pedestrian walkways will discharge directly to the adopted sewer via a Downstream Defender (proprietary treatment unit). Table 26.3, SuDS mitigation indices for discharges to surface waters, states that proprietary treatment systems must demonstrate that they can address each contaminate type to an acceptable level. As this Downstream Defender is required solely to cleanse waters from roof areas and pedestrian walkways (noting that some run-off would have already been cleansed by green roofs and bioretention systems), it is considered more than sufficient to provide water treatment.

System 7 – Block F – Outline Planning

4.53 SuDS Feature Selection – This catchment comprises commercial units with residential dwellings above and some public realm/pedestrian walkways. Green roof shall cover some roof area whilst a section of permeable paving system shall form the external parking area (approx.265 m^2). Bioretention swales shall collect run-off from pedestrian walkways where possible. For now, and to be conservative, the hydraulic models shall assume all areas within the catchment boundary shall be collected within a private drainage network. The catchment shall be considered 100% impermeable with a contributing area of 4460m^2.

4.54 At this Outline stage the surface water drainage strategy shall allow for all waters to be collected within a Geocellular attenuation device with a restricted outfall directed to the diverted adopted 675dia surface water sewer crossing the site. Flows shall be cleansed via a Downstream Defender (proprietary treatment unit) prior to outfall. The maximum outfall rate for this catchment has been set at 20.0 l/s to manage all storms up to and including the 1 in 100yr + 45% Climate Change Event. The proposed Surface Water Drainage Layouts are contained in **Appendix K** and shows the network serving Block F on drawing DR-003.

4.55 WINDES MicroDrainage modelling software has been used to calculate the required attenuation volume for the geo-cellular storage device whilst restricting flows to 20.0 l/s. Any attenuation volume that may be provided in green roofs and bio-retention areas has not been allowed for to ensure a robust estimation of the required attenuation volumes to serve this catchment are made. The hydraulic output data is contained in **Appendix J** and shows an attenuation volume of 209.1m^3 in the geo-cellular storage device with a maximum outfall rate of **20.0 l/s** is required to manage a 1 in 100 year + 40% Climate Change event. This can be contained within a geo-cellular storage device sized 112.6m^2 x 1.98m with 95% voids – this provides a maximum attenuation volume of 211.8m^3. The hydraulic model output for Block F is contained in **Appendix J**.

4.56 Half Drain Times – The hydraulic model demonstrates the Geo-cellular storage device half- drains in 90mins. All well within 24hrs.

4.57 Water Quality Assessment – This catchment comprises commercial/residential roofs, pedestrian walkways and low-traffic roads only.

4.58 CIRIA 763 SuDS Manual Table 26.2 shows Low-Traffic Roads have a Pollution Hazard Level of LOW. All low-traffic roads in this catchment are anticipated to comprise lined permeable paving construction with outfall directed to the adopted sewer via the geo-cellular attenuation device. Table 26.2 shows Low-Traffic Roads have TSS of 0.5 Metals, 0.4 and Hydrocarbons 0.4. Table 26.3, SuDS mitigation indices for discharges to surface waters, shows that Permeable Paving alone provides mitigation for TSS at 0.7; Metals at 0.6 and Hydrocarbons at 0.7. Surface water run-off from low-traffic-road areas is more than sufficiently mitigated by use of Permeable Paving.

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4.59 CIRIA 763 SuDS Manual Table 26.2 shows Other Roofs (commercial/industrial) have a Pollution Hazard Level of LOW. Roofs and pedestrian walkways will discharge directly to the adopted sewer via a Downstream Defender (proprietary treatment unit). Table 26.3, SuDS mitigation indices for discharges to surface waters, states that proprietary treatment systems must demonstrate that they can address each contaminate type to an acceptable level. As this Downstream Defender is required solely to cleanse waters from roof areas and pedestrian walkways (noting that some run-off would have already been cleansed by green roofs and bioretention systems), it is considered more than sufficient to provide water treatment.

System 8 – Blocks G and J – Outline Planning

4.60 "SuDS Feature Selection – This catchment comprises residential units, commercial units with residential dwellings above as well as some public realm/pedestrian walkways and access vehicular access. Green roof shall cover some roof area. Permeable paving covering an area of approx. 614 m² shall collect surface water run-off from areas that will be trafficked. Bioretention swales shall collect run-off from pedestrian walkways where possible. For now, and to be conservative, the hydraulic models shall assume all areas within the catchment boundary shall be collected within a private drainage network. The catchment shall be considered 100% impermeable with a contributing area of 9640m².

4.61 At this Outline stage the surface water drainage strategy shall allow for all waters to be collected within a Geocellular attenuation device with a restricted outfall directed to the diverted adopted 675dia surface water sewer crossing the site. Flows shall be cleansed via a Downstream Defender (proprietary treatment unit) prior to outfall. The maximum outfall rate for this catchment has been set at 70.0 l/s to manage all storms up to and including the 1 in 100yr + 45% Climate Change Event. The proposed Surface Water Drainage Layouts are contained in **Appendix K** and shows the network serving Block F on drawing DR-003 and DR-004.

4.62 WINDES MicroDrainage modelling software has been used to calculate the required attenuation volume for the geo-cellular storage device whilst restricting flows to 70.0 l/s. Any attenuation volume that may be provided in green roofs and bio-retention areas has not been allowed for to ensure a robust estimation of the required attenuation volumes to serve this catchment are made. The hydraulic output data is contained in **Appendix J** and shows an attenuation volume of 370.4m³ in the geo-cellular storage device with a maximum outfall rate of **70.0 l/s** is required to manage a 1 in 100 year + 40% Climate Change event. This can be contained within a geo-cellular storage device sized 195.8m² x 1.67m with 95% voids – this provides a maximum attenuation volume of 310.63m³. The hydraulic model output for Block G and J is contained in **Appendix J**.

4.63 Half Drain Times – The hydraulic model demonstrates the Geo-cellular storage device half- drains in 53mins. All well within 24hrs.

4.64 Water Quality Assessment – This catchment comprises commercial/residential roofs, pedestrian walkways and low-traffic roads only.

4.65 CIRIA 763 SuDS Manual Table 26.2 shows Low-Traffic Roads have a Pollution Hazard Level of LOW. All low-traffic roads in this catchment are anticipated to comprise lined permeable paving construction with outfall directed to the adopted sewer via the geo-cellular attenuation device. Table 26.2 shows Low-Traffic Roads have TSS of 0.5 Metals, 0.4 and Hydrocarbons 0.4. Table 26.3, SuDS mitigation indices for discharges to surface waters, shows that Permeable Paving alone provides mitigation for TSS at 0.7; Metals at 0.6 and Hydrocarbons at 0.7. Surface water run-off from low-traffic-road areas is more than sufficiently mitigated by

use of Permeable Paving.

4.66 CIRIA 763 SuDS Manual Table 26.2 shows Other Roofs (commercial/industrial) have a Pollution Hazard Level of LOW. Roofs and pedestrian walkways will discharge directly to the adopted sewer via a Downstream Defender (proprietary treatment unit). Table 26.3, SuDS mitigation indices for discharges to surface waters, states that proprietary treatment systems must demonstrate that they can address each contaminate type to an acceptable level. As this Downstream Defender is required solely to cleanse waters from roof areas and pedestrian walkways (noting that some run-off would have already been cleansed by green roofs and bioretention systems), it is considered more than sufficient to provide water treatment.

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System 9 – Block H – Outline Planning

4.67 SuDS Feature Selection – This catchment comprises commercial units with residential dwellings above and some public realm/pedestrian walkways. Green roof shall cover some roof area. Bioretention swales shall collect run-off from pedestrian walkways where possible. For now, and to be conservative, the hydraulic models shall assume all areas within the catchment boundary shall be collected within a private drainage network. The catchment shall be considered 100% impermeable with a contributing area of 3460m².

4.68 At this Outline stage the surface water drainage strategy shall allow for all waters to be collected within a Geocellular attenuation device with a restricted outfall directed to the diverted adopted 675dia surface water sewer crossing the site. Flows shall be cleansed via a Downstream Defender (proprietary treatment unit) prior to outfall. The maximum outfall rate for this catchment has been set at 24.5 l/s to manage all storms up to and including the 1 in 100yr + 45% Climate Change Event. The proposed Surface Water Drainage Layouts are contained in **Appendix K** and shows the network serving Block H on drawing DR-002.

4.69 WINDES MicroDrainage modelling software has been used to calculate the required attenuation volume for the geo-cellular storage device whilst restricting flows to 24.5 l/s. Any attenuation volume that may be provided in green roofs and bio-retention areas has not been allowed for to ensure a robust estimation of the required attenuation volumes to serve this catchment are made. The hydraulic output data is contained in **Appendix J** and shows an attenuation volume of 141.1m³ in the geo-cellular storage device with a maximum outfall rate of **24.5 l/s** is required to manage a 1 in 100 year + 40% Climate Change event. This can be contained within a geo-cellular storage device sized 112.0m² x 1.32m with 95% voids – this provides a maximum attenuation volume of 140.448m³. The hydraulic model output for Block H is contained in **Appendix J**.

4.70 Half Drain Times – The hydraulic model demonstrates the Geo-cellular storage device half- drains in 61mins. All well within 24hrs.

4.71 Water Quality – This catchment comprises Other Roofs as well as Pedestrian Walkways.

4.72 CIRIA 763 SuDS Manual Table 26.2 shows Other Roofs (commercial/industrial) have a Pollution Hazard Level of LOW. Roofs and pedestrian walkways will discharge directly to the adopted sewer via a Downstream Defender (proprietary treatment unit). Table 26.3, SuDS mitigation indices for discharges to surface waters, states that proprietary treatment systems must demonstrate that they can address each contaminate type to an acceptable level. As this Downstream Defender is required solely to cleanse waters from roof areas and pedestrian walkways (noting that some run-off would have already been cleansed by green roofs and bioretention systems), it is considered more than sufficient to provide water treatment.

Summary of Catchments and Proposed Outfall Rates

4.73 As discussed in para. 4.13, the total allowable outfall rate for the Anglia Square Regeneration site has been set at 242 l/s, which is a 57% reduction against the existing situation – a significant betterment. Below is a breakdown of outfall rates for each catchment (System) and total:

- System 1 – Maximum surface water outfall rate of 5.0 l/s

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- System 2 – Maximum surface water outfall rate of 5.0 l/s
- System 3 – Maximum surface water outfall rate of 12.5 l/s
- System 4 - Maximum surface water outfall rate of 65.0 l/s
- System 5 – Maximum surface water outfall rate of 10.0 l/s
- System 6 – Maximum surface water outfall rate of 30.0 l/s
- System 7 – S Maximum surface water outfall rate of 20.0 l/s
- System 8 – Maximum surface water outfall rate of 70.0 l/s
- System 9 - Maximum surface water outfall rate of 24.5 l/s
- All Systems – Total 242.0 l/s maximum outfall rate to manage all storms up to and including the 1:100yr + 45% Climate Change Event. The equivalent of 43% of the existing 1:1yr surface water run-off rate. This is a significant improvement to the existing situation. In addition, the existing drainage system does not benefit from any water treatment stages, whilst the proposed drainage strategy allows for water quality and treatment stages to meet the guidance within CIRIA 753 SuDS Manual.

Attenuation Tank Alarm System

4.1 It is proposed that the attenuation tanks serving the external hardstanding areas/pedestrian walkways will have alarms fitted internally. As it is not possible to separate the offsite flows from the onsite runoff in these areas, it is recommended that alarm detection sensor is fitted at around the 75% capacity level of the tanks serving the hardstanding areas (Systems 03 to 08). The 75% capacity level was considered to be acceptable as it would ensure the alarms would not be triggered in the lower return period, every day events, but further analysis should be carried out to verify this. The specific level that the alarm sensors would be fitted within the tanks will be established during the preparation of the Flood Warning Plan, which it has been agreed with Norwich City Council Emergency Planning Team can be conditioned and prepared post-planning. The flood warning strategy has been discussed further in Section 8 of the Royal Haskoning DHV Flood Risk Assessment Report.

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Surface Water Pumps Alarm System

4.74 Wherever possible it is proposed to utilise an outfall to the adopted sewer network via a gravity connection using a hydrobrake or other suitable flow control device, such as orifice plates for permeable paving outlets. Where this is not possible, due to the receiving sewer being higher than the proposed drainage, surface water has to be pumped to a 'demarcation' chamber to allow waters to flow into the adopted sewer network by gravity connection.

4.75 Where surface water pumps are to be used, it is proposed to install a secondary back-up pump with a telemetry alarm system. The telemetry alarm system shall be linked to the elected Maintenance and Management Company to alert in case of primary pump failure, In the event of primary pump failure, the secondary pump shall manage flows until the primary pump is repaired or replaced. In the unlikely event that the secondary pump fails before the primary pump is repaired, the telemetry alarm system will alert the Management and Maintenance Company who shall install a temporary pump.

4.76 The risk of pump failure is low, however in the very unlikely event that primary, secondary and temporary pumps all fail, waters would fill the attenuation tanks and overspill into the public realm, following the overland flow paths. There is no risk to property as pumps and tanks are located externally.

Exceedance Routes

4.77 In the event of a greater than 1 in 100 year (+45%CC) rainfall event occurring, the exceedance routes would follow proposed and existing surface water flow paths as identified in Figure 1 below:

Figure 1 – Exceedance Routes

4.78 As discussed in the separate FRA, the hydraulic model assumes the public sewer system is almost at capacity and there is no drainage system within the site boundary. This would result in the overland flows collecting in the pedestrian walkways and passing through the site from north west to south east. The flows would leave the site at Magdalen Street on the western and south western boundary. It is noted that if the drainage system was at capacity,

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the site layout and sloping pedestrian walkways have been set out to ensure flowpaths are not blocked.

Sewer Diversions

4.79 As noted in Section 3, there are a number of Anglian Water sewers passing through the existing site. Anglian Water were consulted in 2018 for the previous scheme on the potential diversion of several of their sewers around the proposed development and it is understood that this will need to be considered in detail at a later stage through a diversion application, when information such as the foundation design is available. Anglian Water Drainage Engineer Darren Sewell provided some information on the requirements when diverting sewers within a new development site. This has been included at **Appendix L**. To summarise:

4.80 Any re-development areas falling within 3m of an existing public sewer but remaining only 'built near' an existing sewer, assuming the same clearance and access is available, would in principle be acceptable.

4.81 Any areas falling within 3m of the existing public sewer would need to comply with Part H4 Building Regulations in respect of 'building near' public sewers and Anglian Water criteria on the website.

4.82 Foundation design of the new buildings would need to be carefully considered to ensure that no loading would be transferred on a 45 degree 'angle of repose' onto the sewer.

4.83 The only area which would appear to require consideration of a formal diversion of a sewer would be the existing 675mm diameter surface water sewer and the existing 225mm foul sewer running immediately south of unit A1.01 (675mm surface water sewer close to MH 0453 to 0456 and 225mm foul sewer near to MH 0405 to 0408).

4.84 The above sewer may require a diversion, and the technicalities of this will be considered at a later stage. Anglian Water could consider formally devesting some sections of the existing public sewer which are no longer needed/fall beneath buildings (these need to be sewers serving only the existing site and no third parties). This means the Developer would apply to devest the sewer into their private ownership, and these sections of devested sewer could then be removed if no longer needed.

4.85 It would be necessary to consult Anglian Water further on the diverting and devesting of their public sewers across the site prior to any development taking place, to ensure that the issues raised in the email at **Appendix L** have been addressed.

4.86 It is expected that the advice provided by Anglian Water for the previous scheme is still relevant. It should be noted that Anglian Water have been contacted again to confirm this. Once their response has been received, this section of the report will be amended accordingly.

Foul Sewer Network

4.87 An Anglian Water capacity check was carried out for the previous scheme to determine whether there would be sufficient capacity within their existing foul network to accommodate the foul flows from the proposed development. This is in their pre-development enquiry in

Appendix I and confirms that there was sufficient capacity in the existing foul network and no improvements would be needed to the network.

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5 Proposed SuDS Features Information

SuDS Features and the "Four Pillars of SuDS"

5.1 The city center site gives opportunities for "urban types" of SuDS features to be incorporated. These features provide water quality and biodiversity betterments and it is proposed that wherever possible, these features will form the wider SuDS Drainage Strategy. The Full- Planning Application layout allows for numerous bioretention swales and tree-pits within the strategy as well as extensive and intensive green-roof areas. The Outline Planning Application layouts also allow for bioretention systems and green roofs which will be detailed at a later design stage.

5.2 The surface water drainage attenuation requirements for the site do not include any attenuation volumes that may be provided by the following features as such, at detailed design stage/post-planning, it is possible that overall storage volumes could be reduced.

5.3 For now, the robust surface water drainage strategy as described in Section 4 demonstrates that the proposals can provide a significant betterment to the existing situation in terms of reduced outfall rates and provision of attenuation features which manage all storm events up to and including the 1:100yr + Climate Change event.

Green Roofs

5.4 Green Roofs will provide Amenity, Biodiversity, Water Quality and Water Volume benefits in line with the Four Pillars of SuDS. Amenity space is formed by roof-top gardens and terraces for. Biodiversity is formed by use of extensive and intensive green-roofs. Water Quality, the green roof areas will provide a treatment stage for surface water runoff. Water Volume, green roofs provide attenuation volume and slow the rate of waters entering the main sewer system. Transpiration shall also reduce overall water volumes.

5.5 CIRIA SuDS Manual C753 Chapter 12 describes Green Roofs as follows:

5.6 "*Green roofs area areas of living vegetation, installed on the top of buildings, for a range of reasons including visual benefit, ecological value, enhanced building performance and the reduction of surface water runoff. Types of green roof can be divided into two main categories:*

-Extensive roofs, have low substrate depths (and therefore low loadings on the building structure), simple planting and low maintenance requirements; they tend not to be accessible.

-Intensive roofs (or roof gardens) have deeper substrated (and therefore highwe loadings on the building structure) that can support a wide variety of planting but which tend to require more intensive maintenance; they are usually accessible."

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5.7 The Full Planning proposals include for a number of garden roof terraces which comprise some areas of extensive and intensive type green roof as well as paved areas – these are currently detailed on Blocks A, D, M and K/L. Green roofs are also shown indicatively on Outline Application Blocks E, F, G, J, and H, it is expected that these will also comprise extensive and intensive green roof areas and paved areas. As described above, the drainage calculations in Section 4 do not account for any attenuation that may be available on green roof areas. However, as a general rule, it is assumed that green roofs are saturated when calculating a site's attenuation requirements anyhow.

5.8 Green roofs and Garden Roof Terraces will provide water quality and biodiversity benefits to the overall scheme.

Bio-Retention Swales

5.9 Bio-Retention Swales will provide Amenity, Biodiversity, Water Quality and Water Volume benefits in line with the Four Pillars of SuDS. Amenity space is formed by shallow swales with stepping stones and seating areas. Biodiversity is formed by use of suitable planting. In terms of Water Quality, the bioretention swales shall provide a treatment stage for surface water runoff. Water Volume – bioretention swales shall provide attenuation volume and slow the rate of waters entering the main sewer system. Transpiration shall also reduce overall water volumes.

5.10 CIRIA SuDS Manual C753 Chapter 18 describes Bio-Retention Systems as follows:

"*Bioretention systems (including rain gardens) are shallow landscaped depressions that can reduce run-off rates and vlumes, and treat pollution thrugh the use of engineered soils and vegetation. They are particularly effective in delivering interception and acan also provide: attractive landscape features that are self-irrigating and ertilising; habitat and biodiversity; and cooling of the micro-climate due to evapotranspiration.*"

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5.11 Bio-Retention Swales are proposed within the public realm of the Full Planning Application and Outline Planning Application areas. Where possible, surface water run-off from public realm hardstanding shalll be directed to these bioretention systems which shall provide a first stage of attenuation and treatment of run-off. Overflow from these bio-retention swales shall be directed into the wider surface water drainage system.

5.12 Norwich County Council's Highway Team have been consulted as part of the application consultation process and have commented upon the provision of bio-retention swales along the western boundary of the site which would collect surface water run-off from Botolph Street and form part of the highway drainage network. They have raised no objection shall require a commuted sum in order to adopt them. This will be detailed further post-planning in any S278/S38 negotiations.

Tree Planters

5.13 Bio-Retention Swales will provide Biodiversity, Water Quality and Water Volume benefits in line with the Four Pillars of SuDS. Biodiversity is formed by use of suitable planting. In terms of Water Quality, the bioretention tree-pit filter mediums shall provide a treatment stage for surface water runoff. Water Volume – bioretention tree-pits shall provide attenuation volume and slow the rate of waters entering the main sewer system. Transpiration shall also reduce overall water volumes.

5.14 CIRIA SuDS Manual C753 Chapter 19 describes Tree Systems as follows:

"*Trees and their planting structures provide benefits to surface water management in the following ways:*

Transpiration – This is the process by which water, taken in from soil by tree roots, is evapourated through the pores or stomata on the surface of leaves. Trees draw large quantities of water from the soil, which can contribute to reducing run-off volumes.

Interception – Leaves, branches and trunk surfaces intercept (store and allow water to evapourate) and absorb rainfall, reducing the amount of water that reached the ground, delaying the onset and reducing the volume of run-off.

Increased infiltration – Root growth and decomposition increase soil infiltration capacity and rate, reducing runoff volues.

Phytoremediation – In the process of drawing water from the soil, trees also take up trace amounts of harmful chemicals, including metals, organs compunds, fuels and solvents that

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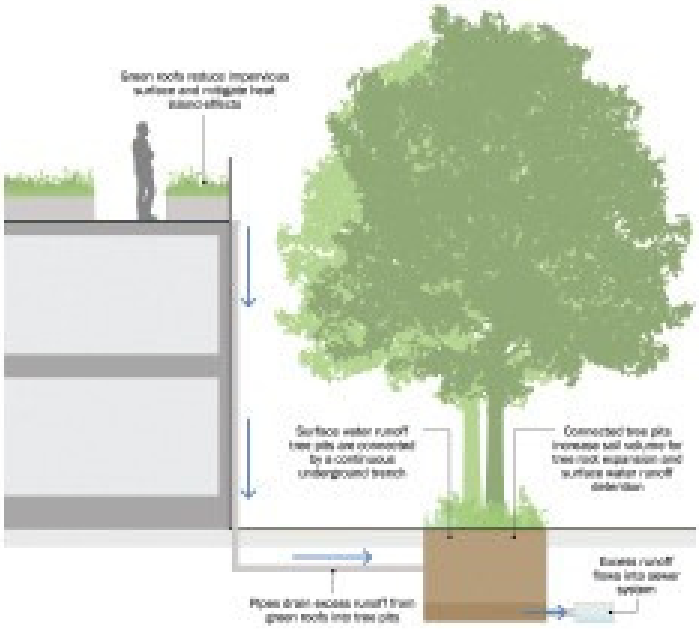
are present in the soil. Inside the tree, these chemicals can be transformed into less harmful substances, used as nutrients and/or storeg in roots, stems and leaves.

…Tree Planters are essentially bio-retention systems with trees in them, to enhance capacity and performance, and/or to deliver amenity and biodiversity benefits. They have similar functionality and design requiements to standard tree pits, but have open surace and generally a larger surface area, so their overall appearance is different"



5.15 Bio-Retention Tree-Pits are proposed within the public realm of the Full Planning Application and Outline Planning Application areas. Where possible, surface water run-off from public realm hardstanding shalll be directed to these bioretention systems which shall provide a first stage of attenuation and treatment of run-off. Overflow from these bio-retention swales shall be directed into the wider surface water drainage system.

Pervious Pavements

5.16 Pervious Pavements will provide Water Quality and Water Volume benefits in line with the Four Pillars of SuDS. In terms of Water Quality, the subbase gravels shall provide a treatment stage for surface water runoff. Water Volume – subbase gravels shall provide attenuation volume and slow the rate of waters entering the main sewer system. Some transpiration shall also reduce overall water volumes as waters within the subbase and within sand layers between blocks shall have (little) opportunity to evaporate – this is still to be considered overall.

5.17 CIRIA SuDS Manual C753 Chapter 20 describes Pervious Pavements as follows:

"*Pervious surfaces, along with their associated substructures, are an efficient means of managing surface water runoff close to its source – intercepting runoff, reducing the volume and frequency of runoff, and providing a treatment medium. Treatment processes that occur within the surface structure, the subsurface matrix and the geotextile layers include:*

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-Filtration
-Absorption
-Biodegredation
-Sedimentation"

5.18 Sections of Lined Permeable Block Paving Attenuation System are proposed across the site. The access road and parking areas for Block A in the north of the site; the forecourts in Block H, Block E/F and F; and the hardstanding areas to the south of and in between Blocks G and J will all comprise permeable paving attenuation.

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6 Maintenance of Development Drainage

6.1 The responsibility for ongoing maintenance will be the responsibility of an elected Management and Maintenance Company whom will be appointed by the Site Owner.

6.2 The proposed private surface water sewers, attenuation tanks and green/brown roofs should be regularly inspected and maintained to ensure they are effective throughout the lifetime of the development and do not become blocked or damaged over time.

6.3 It is proposed to install secondary (back-up) pumps within the pumping chamber for each of the pumps serving the proposed development. The secondary pumps will be programmed to start should the primary pump fail. Both pumps will have an alarm system in place which will be directed to a control panel within the management's office. In addition, an 'Alarm-Tel' feature will be put in place to monitor the state of operation of the various pumps. When a fault occurs it will automatically dial up to three telephone numbers with a pre-recorded message alerting the problem. In the unlikely event that both pumps fail and maintenance hasn't yet had a chance to resolve the problem, it should be noted that no residential dwelling is present at ground floor or basement level within the main Anglia Square development, so if minor flooding should occur the risk to people is low. Please note – the 'Alarm-Tel' feature should be separate to the flood warning sensor on the attenuation tanks, as the attenuation tank reaching capacity could not be detected by the pump.

6.4 Some maintenance details for elements of the drainage system from CIRIA SUDS Manual (C753) are included in Tables 6.1 and 6.2 below.

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance) and from silt traps prior to cells.	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration as necessary	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually or as required
Remedial actions	Reconstruct soakaway if performance deteriorates or in the event of failure.	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year then annually
	Survey inside of tank for sediment build up and remove if necessary.	Every 5 years or as required

Table 6.1: Maintenance tasks for attenuation tanks (Source: CIRIA C753, The SuDS Manual)

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Maintenance Schedule	Required Action	Frequency
Regular maintenance	Brushing and vacuuming.	Three times per year at end of winter, mid-summer, after autumn leaf fall, or as required based on site specific observations of clogging or manufacturer's recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weeds.	As required.
Remedial actions	Remediate any landscaping which, through vegetation maintenance of 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 of a hazard to the user.	As required
	Rehabilitation of surface and upper sub-surface.	As required (if infiltration performance is reduced as a result of significant clogging.)
Monitoring	Initial inspection	Monthly for 3 months after installation. 3 monthly, 48 hours after large storms.
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action	Annually.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually

Table 6.2: Maintenance tasks for permeable paving (Source: CIRIA C753, The SuDS Manual)

Manholes and Sewers

6.5 Manhole covers should be lifted each year to remove visible debris and check for blockages – it is suggested that this is undertaken every November after the heaviest leaf-fall has occurred.

6.6 Should a blockage occur at any time, it is advised to seek professional help to jet the drainage system to clean and clear the system.

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Gutters and Downpipes

6.7 It is good practice to ensure that these are occasionally inspected to ensure they are in good order and free of leaves & debris. Once every 6 months should be sufficient.

Orifice Plate with Suitable Filter

6.8 It is advised that maintenance company take time to review the manufactures maintenance recommendations and follow accordingly, with regular inspections anticipated to be required every 3 months and after heavy rainfall events.

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7 Water Quality Management During Construction

7.1 It is anticipated that a suitably worded Condition to Planning shall be included which sets out requirement to confirm any schemes for water quality management during the construction of the development. For guidance and to demonstrate that this has been considered during the planning stage, the following information has been provided:

7.2 Activities such as earthworks and construction plant use may result in an increase of silt load in surface water runoff onsite. The presence of heavy plant and other vehicles onsite also introduces the potential for spillages, for example, diesel and hydraulic fluids, wet concrete, construction chemicals and wash-down wastes. Contaminants could enter the sub-soils, surface water, groundwater and nearby watercourse via infiltration and surface water runoff.

7.3 Earthmoving operations should be sequenced and timed to avoid heavy rainfall events. This will reduce the risk of soils and silts being mobilised within surface water run-off. Designated vehicle washdown areas shall be provided. Wash-down and surface water run-off from this area will be directed to the drainage network via a silt trap and oil interceptor and a suitable agreement for a temporary use with Anglian Water will be sought. A watching brief for unforeseen contamination of groundwater and surface water will be prepared. Spillages of fuels and chemicals will be controlled in secure bunded areas and containment at refuelling and maintenance facilities in accordance with the EA guidelines.

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8 Conclusions

8.1 EAS have been commissioned by Weston Homes Ltd to prepare a Surface Water Drainage Strategy for the redevelopment of Anglia Square, Norwich, Norfolk.

8.2 A separate report, undertaken by others, deals with the flood risk assessment, hydraulic modelling study and impact assessment and should be read in conjunction with this report.

8.3 As described in Section 1, it is proposed to make a Hybrid planning application: Full Planning for Blocks, A, B, C, J3, K/L and M and Outline Planning for Blocks E, F, G, H and J.

8.4 The proposed surface water drainage strategy for the Hybrid Planning Application site has been based on sustainable principles with aim to provide a significant betterment to the existing situation. Currently the site does not benefit from any attenuation features and as such surface water run-off flows freely into the adopted sewer network, unrestricted and untreated.

8.5 The city center site gives opportunities for "urban types" of Sustainable Drainage Systems (SuDS) features to be incorporated. These features provide water quality and biodiversity betterments and it is proposed that wherever possible, these features will form the wider SuDS Drainage Strategy. The proposals include green roofs, bioretention swales, bioretention tree-pits, lined permeable paving and geo-cellular attenuation devices. These will improve water quality, biodiversity and amenity.

8.6 An assessment was undertaken to determine the existing surface water run-off from the site and what flow rate would likely enter the adopted sewer network. The assessment was discussed with Anglian Water and it was agreed that the proposed site should achieve a reduction of run-off to the adopted network to a maximum of 242 l/s to manage all storms up to and including the 1:100yr + 45% Climate Change Event. This will be the equivalent of 43% of the existing 1:1yr surface water run-off rate, a significant reduction.

8.7 The development parcels have been split into 9no. drainage catchments. Each catchment has a restricted outfall to the adopted surface water sewer network and attenuation designed to accommodate a 1:100yr + Climate Change Storm Event. Suitable water treatment stages, in line with CIRIA SuDS Manual are proposed and will provide an improvement to the existing situation, where waters enter the adopted sewer network, untreated.

8.8 Due to the surface water flood risk within the city of Norwich, it is proposed that the attenuation tanks will have capacity sensors and alarms fitted within them which monitor how full they become during storm events. The attenuation tanks will likely collect run-off from both roof and hardstanding areas and it is not possible to prevent any exceedance surface water run-off flows from off-site from entering the proposed drainage systems. The alarm would trigger in the Anglia Square management office, and it would be the management's responsibility to distribute the warning to each of the ground floor and retail, commercial and leisure uses. This would allow them time to evacuate, safeguard and close their premises. The flood warning strategy has been discussed further the separate FRA document by Royal Haskoning DHV.

8.9 Maintenance of the attenuation features will remain the responsibility of the site owner or an appointed management company. The Anglian Water sewers that pass through the site will remain the responsibility of Anglian Water.

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8.10 In line with the Four Pillars of SuDS, the proposed surface water drainage strategy, covering 9no catchments, will provide Water Quality, Amenity, Biodiversity and Water Volume benefits/improvements.

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9 Appendices

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Appendix: A – Location Plan

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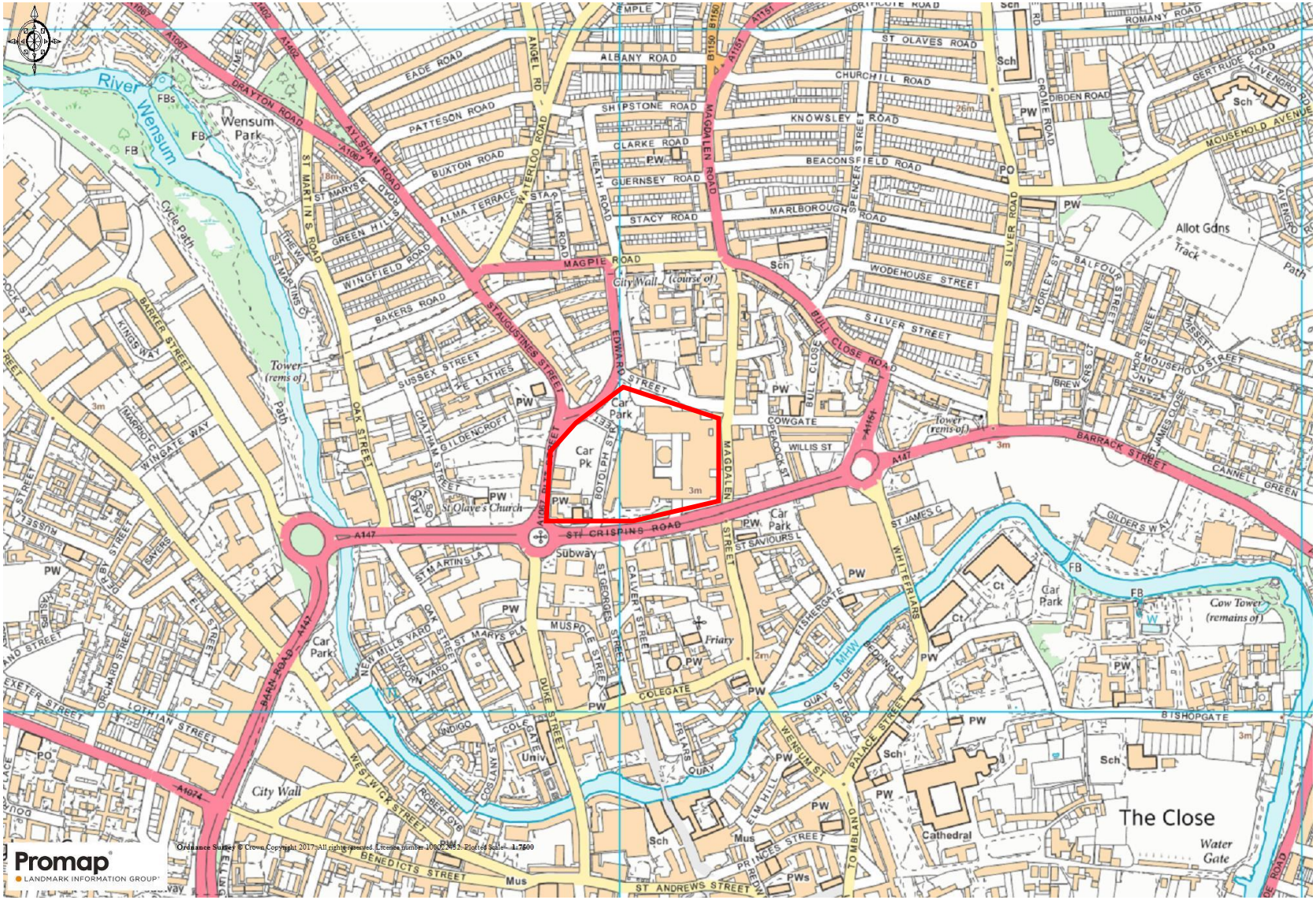
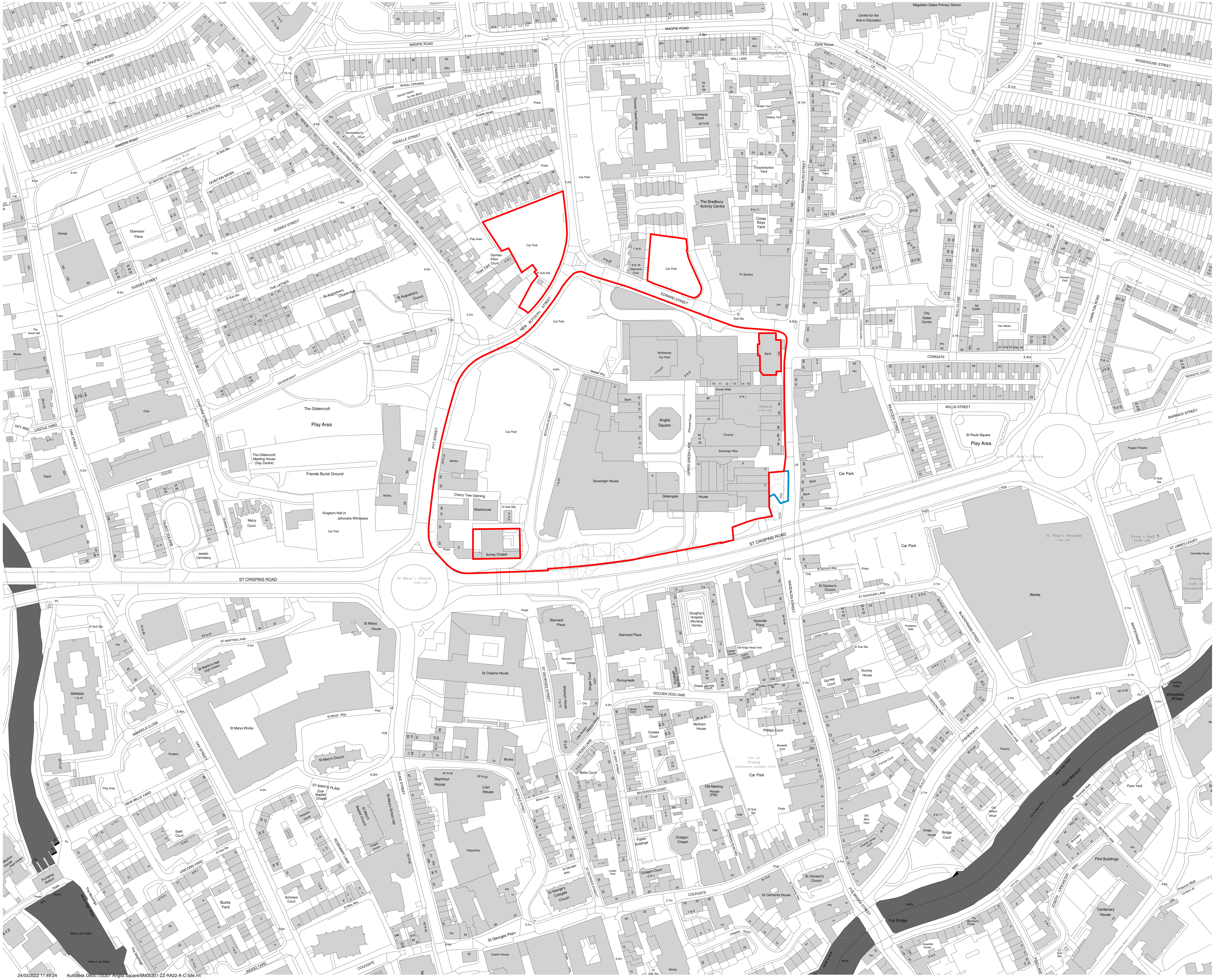
Anglia Square, Norwich, Norfolk NR3 1DZ

Site





Contractors and consultants are not to scale dimensions from this drawing

The survey information shown on this drawing is based on a topographical survey prepared by a third party and Broadway Malyan Limited accept no responsibility for the accuracy or completeness of the survey.

Drawings to be read in conjunction with the associated Design & Access Statement, associated consultant desin team documents & reports and landscape information

Landscape shown is for illustrative purposes only. For detailed landscape information, please refer to the landscape information & documents.

0m 62.5m 125m

N

General Notes

All figures and areas are approximate only and subject to statutory constraints, detail design & design development

Structural Design: Subject to structural input & coordination

Services Design: Subject to services input & coordination

Fire Strategy: Subject to fire input & coordination

Application Boundary

Land Owned by CT to be subject to separate application for part of the Mobility Hub

Revision	Date	Drawn By	Description
D0-1	31.03.22		Issued For Planning

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4 Pear Place
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E: Lon@BroadwayMalyan.com

www.BroadwayMalyan.com

Client
Weston Homes

Project
Anglia Square
Norwich

Description
Hybrid Application - Location Plan on Existing OS Base

Status
For Planning

Scale	Drawn By	Date
1:1250@A1	BM	31.03.22
Job Number	**Drawing Number**	**Revision**
35301	ZZ-00-DR-A-01-1000	D0-1

Anglia Square: Hybrid Application Development Description

"Hybrid (part full/part outline) application on site of 4.65ha for demolition and clearance of all buildings and structures and the phased, comprehensive redevelopment of the site with 14 buildings ranging in height from 1 to 8 storeys, for a maximum of 1,100 residential dwellings, (houses, duplexes and flats) (Use Class C3); a maximum of 8,000 sqm flexible retail, commercial and other non-residential floorspace (retail, business, services, food and drink premises, offices, workshops, non-residential institutions, community hub, local community uses, and other floorspace (Use Classes E/F1/F2/Sui Generis (public conveniences, drinking establishments with expanded food provision, bookmakers and/or nail bars (up to 550sqm), and dry cleaner (up to 150sqm))); service yard, cycle and refuse stores, plant rooms, car parking and other ancillary space; with associated new and amended means of access on Edward Street and Pitt Street, closure of existing means of access on Edward Street, New Botolph Street, Pitt Street and St Crispins Road flyover, formation of cycle path between Edward Street and St Crispins Road, formation of wider footways, laybys and other associated highway works on all boundaries, formation of car club parking area off New Botolph Street, up to 450 car parking spaces (at least 95% spaces for class C3 use, and up to 5% for class E/F1/F2/Sui Generis uses), hard and soft landscaping of public open spaces comprising streets and squares/courtyards for pedestrians and cyclists, other landscape works within existing streets surrounding the site, service infrastructure and other associated work; (All floor areas given as maximum Net Internal Area);

Comprising;

Full planning permission on 2.25ha of the site for demolition and clearance of all buildings and structures, erection of 8 buildings ranging in height from 1 to 7 storeys for 353 residential dwellings (Use Class C3) (142 dwellings in Block A, 25 dwellings in Block B, 21 dwellings in Block C, 28 dwellings in Block D, 8 dwellings in Block J3, 81 dwellings in Block K/L, and 48 dwellings in Block M) with associated cycle and refuse stores), and, for 5,411sqm flexible retail, commercial and other non-residential floorspace (retail, business, services, food and drink premises, offices, workshops, non-residential institutions, community hub, local community uses, and other floorspace (Use Classes E/F1/F2/Sui Generis (public conveniences, drinking establishments with expanded food provision, bookmakers and/or nail bars (up to 550sqm), and dry cleaner (up to 150sqm))), service yard, cycle and refuse stores, plant rooms, car parking and other ancillary space, with associated new and amended means of access on Edward Street, closure of existing means of access on Edward Street and New Botolph Street, formation of cycle path from Edward Street to St Crispins Road, formation of wider footways, laybys and other associated highway works on Edward Street, New Botolph Street, and Magdalen Street, formation of car club parking area off New Botolph Street, 137 car parking spaces (at least 95% spaces for class C3 use, and up to 5% for class E/F1/F2/Sui Generis uses) within Blocks A and B, hard and soft landscape works to public open spaces comprising streets and squares for pedestrians and cyclists, other landscape works, service infrastructure and other associated works; (All floor areas given as maximum Net Internal Areas);

and

Outline planning permission on 2.4ha of the site, with landscaping and appearance as reserved matters, for demolition and clearance of all buildings and structures, erection of 6 buildings (Blocks E – H and J) ranging in height from 2 to 8 stories for up to 747 residential dwellings, (houses, duplexes, and flats) (Use Class C3), a maximum of 2,589 sqm flexible retail, commercial and other non-residential floorspace (retail, business, services, food and drink premises, offices, non-residential institutions, local community uses and other floorspace (Use Classes E/F1/F2/Sui Generis (drinking

establishments with expanded food provision, bookmakers and/or nail bars (up to 550sqm), and dry cleaner (up to 150sqm))); cycle and refuse stores, plant rooms, car parking and other ancillary space; with associated new and altered means of access on Pitt Street and St Crispins Road, closure of means of access on Pitt Street and St Crispins Road flyover, formation of wider footways, laybys and other associated highway works on Pitt Street and St Crispins Road, a maximum of 313 car parking spaces (at least 95% spaces for class C3 use, and up to 5% for class E/F1/F2/Sui Generis uses), service infrastructure and other associated works (landscaping and appearance are reserved matters); (All floor areas given as maximum Net Internal Areas)."

Appendix: B – Proposed Development Plans

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
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Contractors and consultants are not to scale dimensions from this drawing

The survey information shown on this drawing is based on a topographical survey prepared by a third party and Broadway Malyan Limited accept no responsibility for the accuracy or completeness of the survey.

Drawings to be read in conjunction with the associated Design & Access Statement, associated consultant desin team documents & reports and landscape information

Landscape shown is for illustrative purposes only. For detailed landscape information, please refer to the landscape information & documents.

0m 25m 50m

N

General Notes

All figures and areas are approximate only and subject to statutory constraints, detail design & design development

Structural Design: Subject to structural input & coordination

Services Design: Subject to services input & coordination

Fire Strategy: Subject to fire input & coordination

Application Boundary

Land Ownerd by CT to be subject to separate application for part of the Mobility Hub

Existing Buildings

- Site B - Area 0.27 ha

- Site C - Area 0.13 ha

- Applcation Boundary (All Blocks) and public realm - Area 4.65ha

- Detailed Application (Block A,B,C,D,M,KL & J3) and public realm - Area 2.25ha

Revision	Date	Drawn By	Description
D0-1	31.03.22		Issued For Planning

BroadwayMalyan BM

4 Pear Place
London
SE1 8BT

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F: +44 (0)20 7261 4300
E: Lon@BroadwayMalyan.com

www.BroadwayMalyan.com

Client
Weston Homes

Project
Anglia Square
Norwich

Description
Hybrid Application Site Plan
Block Plan on Proposed layout

Status
For Planning

Scale	Drawn By	Date
1:500@A1	BM	31.03.22
Job Number	Drawing Number	Revision
35301	ZZ-00-DR-A-01-0300	D0-1

Appendix: C – Topographical Survey

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
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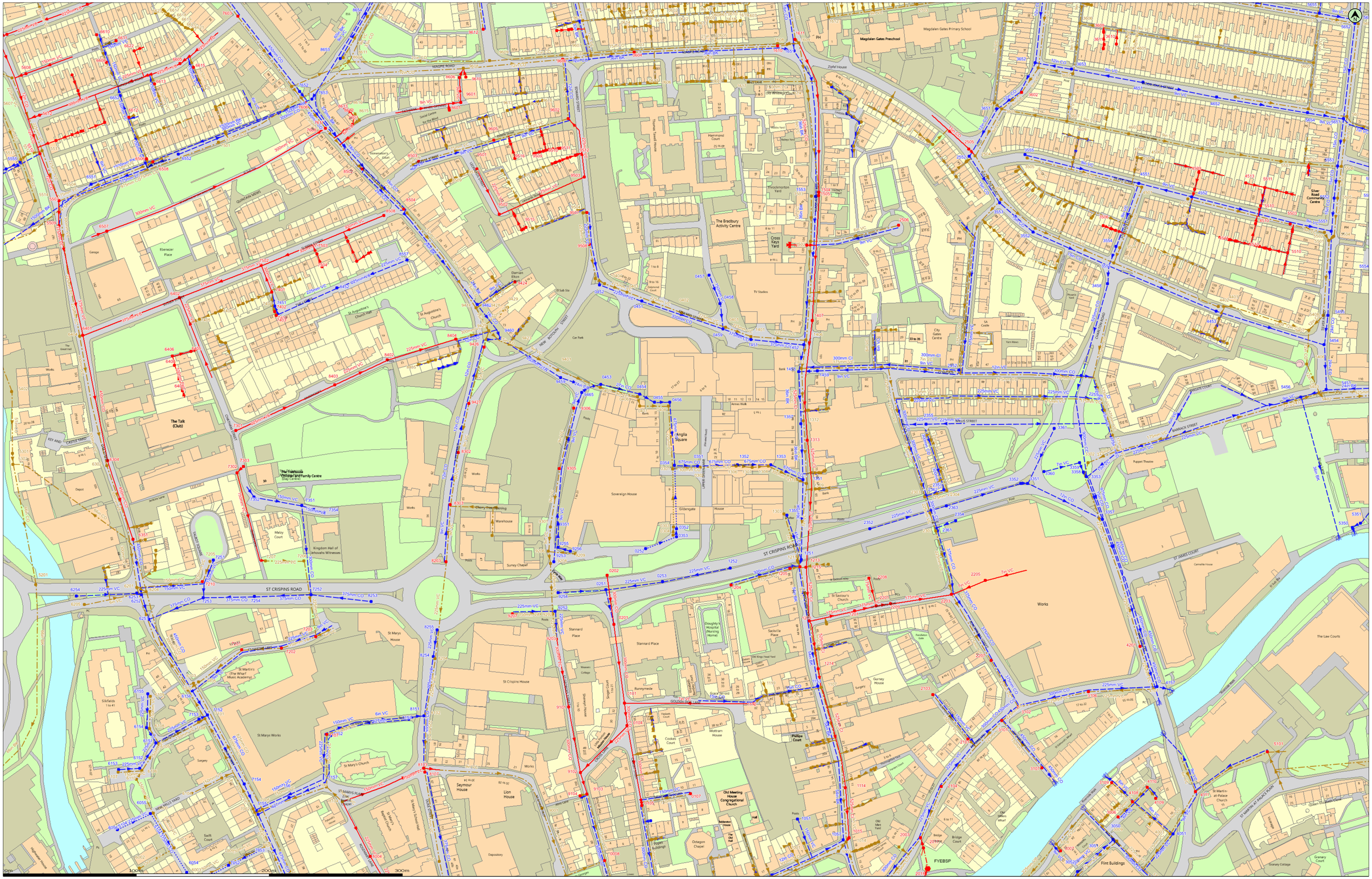
SERVICE LEGEND

- FOUL DRAINAGE
- SURFACE WATER DRAINAGE
- WATER
- GAS
- ELECTRICITY
- TELEPHONE
- CABLE TV
- MERCURY
- TRAFFIC SIGNAL
- OIL
- UNKNOWN SERVICE
- NEW DETAIL
- UNDERGROUND CHAMBER

Appendix: D – Thames Water Sewer Mapping

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk



(c) Crown copyright and database rights 2022 Ordnance Survey 100022432 | Date: 21/06/22 | Scale: 1:1250 | Map Centre: 623069,309376 | Data updated: 31/05/22 | Our Ref: 882987 - 1 | Wastewater Plan A1

Foul Sewer	Outfall*	Sewage Treatment Works	
Surface Sewer			
Combined Sewer		Public Pumping Station	
Final Effluent	Inlet*		
Rising Main*		Decommissioned Pumping Station	
Private Sewer*	Manhole*	*(Colour denotes effluent type)	
Decommissioned Sewer*			

james.cahuzac@eastp.co.uk
Anglia Square

love every drop anglianwater

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert
0008	623008	309060	C	3.23	0.28	2.95
0101	623023	309178	C	4	1.85	2.15
0104	623025	309161	C	3.95	1.74	2.21
0105	623036	309101	C	3.43	0.14	3.29
0107	623073	309110	C	3.64	2.28	1.36
0201	623015	309237	C	4.34	2.12	2.22
0202	623010	309274	C	-	-	-
0604	623030	309667	C	-	-	2.4
1015	623192	309077	C	-	-	-
1112	623120	309178	C	3.874	1.179	2.695
1114	623189	309114	C	2.742	1.072	1.67
1201	623196	309247	C	3.13	1.38	1.75
1203	623162	309240	C	3.147	1.647	1.5
1204	623103	309267	C	3.55	1.18	2.37
1205	623147	309279	C	3.38	1.17	2.21
1213	623155	309280	C	3.347	1.747	1.6
1214	623169	309204	C	-	-	-
1215	623159	309280	C	-	-	-
1313	623160	309375	C	-	-	-
1407	623164	309465	C	-	-	-
1504	623169	309561	C	-	-	-
1505	623169	309559	C	5.342	1.407	3.935
1610	623138	309671	C	-	-	2.51
1611	623151	309676	C	-	-	2.68
2003	623246	309077	C	-	-	4.3
2017	623248	309069	C	-	-	-
2101	623281	309151	C	2.47	1	1.47
2103	623255	309184	C	2.99	1.86	1.13
2104	623261	309115	C	-	-	3.95
2201	623212	309251	C	3.28	0.13	3.15
2203	623269	309260	C	-	-	3.275
2205	623294	309270	C	3.02	1.29	1.73
2207	623298	309210	C	-	-	3.1
2208	623207	309272	C	-	-	-
2209	623223	309253	C	-	-	-
2505	623282	309594	C	-	-	-
2506	623229	309537	C	-	-	-
3006	623394	309092	C	3.5	1.97	1.53
3007	623351	309067	C	-	-	-
3101	623307	309165	C	2.449	0.349	2.1
3102	623319	309175	C	2.406	0.456	1.95
3106	623372	309187	C	-	-	3.48
3107	623337	309129	C	1.76	0.28	1.48
3109	623389	309118	C	-	-	-
3506	623383	309536	C	-	-	-
3602	623321	309637	C	-	-	-
3609	623383	309682	C	-	-	-
3610	623383	309673	C	-	-	-
3611	623383	309669	C	-	-	-
4108	623405	309104	C	3.44	1.23	2.21
4109	623422	309107	C	3.73	2.25	1.48
4110	623416	309115	C	3.36	1.78	1.58
4111	623452	309112	C	3.837	-	-
4201	623410	309220	C	-	-	3.275
4509	623455	309579	C	8.19	6.92	1.27
4510	623497	309538	C	-	-	1.7
4511	623471	309527	C	-	-	-
4512	623494	309522	C	-	-	0.62
4513	623490	309568	C	-	-	-
5101	623506	309141	C	-	-	3.125
5503	623523	309538	C	-	-	-
5507	622598	309555	C	-	-	8
5509	622598	309537	C	-	-	-
5510	622584	309590	C	-	-	4.61
5510	623521	309516	C	-	-	1.42
5510	623501	309552	C	-	-	1.05
5511	623504	309565	C	-	-	1.42
5608	622573	309651	C	-	-	2.3
5609	622559	309680	C	-	-	1.41
5612	622583	309620	C	-	-	1.62
6304	622635	309360	C	-	-	2.62
6351	622654	309301	C	-	-	1.82
6401	622616	309454	C	-	-	3.2
6402	622689	309483	C	-	-	3.82
6405	622697	309442	C	-	-	-
6406	622683	309438	C	-	-	-
6407	622685	309432	C	-	-	-
6408	622691	309412	C	-	-	-
6506	622664	309587	C	-	-	1.07
6507	622634	309532	C	-	-	1
6508	622669	309584	C	-	-	2.845
6605	622689	309658	C	-	-	1.9
6608	622634	309659	C	-	-	1.67
6610	622627	309680	C	-	-	0.97
6611	622641	309675	C	-	-	0.66
6612	622651	309618	C	-	-	1.35
6613	622670	309643	C	-	-	1.63
6615	622699	309655	C	-	-	1.42
6622	622655	309668	C	-	-	-
6703	622619	309702	C	-	-	1.47
7107	622799	309154	C	-	-	2.58
7201	622736	309218	C	-	-	2.71
7202	622765	309219	C	-	-	1.74
7203	622791	309228	C	-	-	2.83
7210	622706	309269	C	-	-	1.4
7301	622731	309382	C	-	-	1.37
7302	622732	309351	C	-	-	1.43
7303	622737	309356	C	-	-	1.5
7401	622758	309486	C	-	-	2.69
7402	622760	309472	C	-	-	2.015
7403	622761	309469	C	-	-	1.98
7502	622750	309506	C	-	-	3.56
7503	622792	309515	C	-	-	-

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert
7504	622796	309506	C	-	-	-
7603	622733	309694	C	12.802	10.449	2.353
7606	622783	309629	C	10.756	8.12	2.636
7608	622798	309609	C	9.754	7.196	2.558
7611	622793	309607	C	-	-	0.83
8004	622832	309063	C	-	-	1.92
8103	622872	309129	C	4.18	1.44	2.74
8107	622873	309126	C	4.19	0.94	3.25
8203	622889	309284	C	-	-	2.21
8302	622898	309366	C	-	-	2.565
8303	622892	309327	C	-	-	2.16
8402	622845	309436	C	-	-	2.24
8403	622805	309417	C	-	-	2
8404	622896	309451	C	-	-	2.6
8502	622826	309579	C	7.483	3.292	4.191
8503	622868	309585	C	-	-	2.011
8504	622857	309549	C	7.483	3.292	4.191
8508	622842	309544	C	-	-	1.93
8601	622891	309623	C	-	-	0.84
8606	622899	309648	C	-	-	1.3
8607	622819	309612	C	-	-	0.915
8612	622817	309622	C	-	-	-
8613	622815	309623	C	-	-	-
9101	622981	309175	C	-	-	2.51
9102	622990	309126	C	3.65	1.26	2.39
9103	622995	309110	C	3.6	1.04	2.56
9104	622990	309108	C	3.63	1.43	2.2
9203	622972	309226	C	4.29	1.82	2.47
9207	622939	309245	C	4.76	2.73	2.03
9305	622974	309354	C	-	-	2.77
9306	622985	309400	C	-	-	2.87
9424	622941	309494	C	-	-	2.745
9426	622917	309445	C	-	-	2.92
9427	622906	309403	C	-	-	3.02
9501	622912	309579	C	-	-	1.04
9502	622929	309545	C	-	-	0.915
9503	622993	309573	C	-	-	1.725
9507	622995	309546	C	5.15	3.49	1.66
9508	622997	309522	C	5.09	3.31	1.78
9509	622955	309591	C	-	-	-
9510	622964	309593	C	-	-	0.8
9511	622975	309595	C	-	-	-
9512	622986	309589	C	-	-	-
9515	622949	309535	C	-	-	-
9516	622941	309587	C	-	-	0.5
9601	622900	309629	C	-	-	0.99
9602	622981	309617	C	6.248	4.328	1.92
9605	622925	309601	C	-	-	1.525
9606	622977	309661	C	6.111	4.023	2.088
9610	622904	309648	C	-	-0.61	0.61
9612	622917	309684	C	6.767	5.352	1.415
0301	623059	309354	F	3.99	0.33	3.66
0302	623080	309355	F	4	0.22	3.78
0303	623060	309310	F	3	1.36	1.64
0304	623060	309304	F	3.23	1.45	1.78
0401	623099	309460	F	4.22	1.41	2.81
0402	623066	309471	F	4.41	1.72	2.69
0403	623025	309487	F	4.65	2.04	2.61
0404	623008	309493	F	4.91	2.36	2.55
0405	623005	309415	F	4.5	1.92	2.58
0406	623033	309408	F	3.98	1.36	2.62
0407	623035	309401	F	3.97	1.14	2.83
0408	623056	309401	F	3.96	0.9	3.06
0409	623001	309497	F	-	-	-
0601	623023	309693	F	-	-	1.22
0602	623056	309694	F	-	-	1.02
0603	623029	309669	F	-	-	-
0605	623092	309675	F	-	-	-
0606	623046	309644	F	-	-	-
0607	623086	309645	F	-	-	-
0608	623091	309689	F	-	-	-
0609	623088	309690	F	-	-	-
0610	623097	309690	F	-	-	-
0611	623095	309690	F	-	-	-
0612	623067	309688	F	-	-	-
0613	623079	309688	F	-	-	-
0614	623024	309686	F	-	-	-
0615	623043	309686	F	-	-	-
0616	623039	309687	F	-	-	-
0617	623042	309644	F	-	-	-
0618	623086	309660	F	-	-	-
0619	623099	309645	F	-	-	-
1001	623158	309073	F	2.81	2.04	0.77
1003	623184	309067	F	2.55	-2.02	4.57
1014	623190	309074	F	2.56	0.8	1.76
1107	623171	309190	F	2.826	-0.934	3.76
1119	623129	309187	F	-	-	-
1211	623153	309285	F	3.42	0.59	2.83
1303	623143	309320	F	3.47	0.99	2.48
1306	623107	309356	F	3.91	-0.02	3.93
1307	623119	309355	F	3.61	-	-
1308	623131	309356	F	-	-	3.35
1309	623160	309343	F	3.18	-0.2	3.38
1310	623152	309346	F	-	-	3.5
1312	623158	309390	F	3.42	1.81	1.61
1401	623118	309453	F	4.1	1.25	2.85
1403	623156	309429	F	3.75	0.25	3.5
1406	623159	309451	F	4.07	1.96	2.11
1502	623163	309525	F	4.558	1.203	3.355
1503	623163	309559	F	4.558	1.203	3.355
1607	623114	309698	F	-	-	-
1608	623138	309673	F	-	-	-
1609	623154	309674	F	-	-	-

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert
1612	623177	309693	F	-	-	0.91
1614	623161	309637	F	-	-	-
1617	623116	309645	F	7.333	5.473	1.86
1618	623102	309690	F	-	-	-
1619	623110	309690	F	-	-	-
2303	623249	309333	F	3.22	1.1	2.12
2304	623265	309338	F	3.37	1.57	1.8
2307	623257	309307	F	2.917	0.918	1.999
2504	623287	309589	F	-	-	2.5
2703	623243	309703	F	-	-	0.87
3008	623347	309072	F	-	-	-
3009	623393	309074	F	-	-	-
3010	623380	309064	F	-	-	-
3011	623364	309049	F	-	-	-
3302	623371	309359	F	2.57	-0.08	2.65
3501	623391	309509	F	-	-	2.1
3502	623332	309534	F	-	-	2.2
3503	623306	309556	F	-	-	-
3504	623395	309520	F	-	-	-
3505	623326	309587	F	-	-	-
3601	623306	309624	F	-	-	2.5
3603	623334	309655	F	-	-	2.4
3604	623301	309629	F	-	-	1.2
3605	623360	309651	F	-	-	-
3606	623365	309688	F	-	-	2.13
3607	623356	309615	F	-	-	-
3608	623358	309635	F	-	-	-
3609	623364	309603	F	-	-	-
4003	623433	309080	F	3.95	0.15	3.8
4101	623421	309189	F	-	-	3.455
4401	623479	309476	F	-	-	2.86
4402	623469	309476	F	-	-	2.8
4501	623412	309565	F	-	-	-
4502	623446	309557	F	-	-	-
4503	623457	309594	F	-	-	1.52
4504	623408	309588	F	-	-	-
4505	623413	309587	F	-	-	-
4506	623420	309585	F	-	-	-
4507	623438	309513	F	-	-	-
4508	623445	309538	F	-	-	-
4601	623454	309674	F	-	-	1.37
4602	623482	309633	F	-	-	-
4603	623402	309605	F	-	-	-
4604	623406	309670	F	-	-	-
4605	623406	309667	F	-	-	-
5201	622581	309267	F	-	-	-
5301	622563	309365	F	-	-	-
5302	622564	309357	F	-	-	-
5402	622563	309412	F	-	-	-
5402	623549	309406	F	-	-	-
5403	623545	309411	F	2.87	-0.18	3.05
5406	623536	309433	F	-	-	3.607
5407	623537	309458	F	-	-	3.226
5408	623548	309469	F	-	-	2.77
5409	623516	309464	F	-	-	3.265
5410	623527	309405	F	-	-	-
5501	623552	309525	F	-	-	2.22
5502	623549	309531	F	-	-	-
5504	623556	309529	F	-	-	-
5505	623559	309557	F	-	-	2.25
5506	623562	309581	F	-	-	1.95
5507	623516	309585	F	-	-	-
5511	622586	309593	F	-	-	8.36
5512	622575	309590	F	-	-	3.886
5513	622570	309586	F	-	-	1.855
5514	622580	309555	F	-	-	0.915
5601	623566	309618	F	-	-	2.07
5602	623574	309688	F	-	-	2.28
5603	623572	309691	F	-	-	-
5604	622563	309647	F	-	-	9.13
5604	623537	309624	F	10.459	8.729	1.73
5605	623541	309659	F	-	-	1.905
5607	623543	309694	F	-	-	-
6000	622669	309095	F	4.042	2.39	1.652
6001	622684	309069	F	4.125	2.591	1.534
6002	622658	309054	F	4.3	2.792	1.508
6102	622695	309188	F	-	-	3.4
6103	622699	309193	F	-	-	6.4
6104	622698	309110	F	-	-	1.14
6105	622673	309147	F	-	1.5	-
6106	622660	309127	F	-	1.75	-
6107	622643	309126	F	-	1.95	-
6108	622666	309159	F	-	1.8	-
6109	622667	309183	F	-	2.2	-
6110	622656	309121	F	4	1.966	2.034
6201	622657	309265	F	-	1.411	-
6204	622664	309262	F	-	-	-
6205	622617	309252	F	-	1.643	-
6302	622634	309356	F	-	-	5.82
6404	622614	309454	F	-	-	7
6504	622609	309558	F	-	-	9.45
6616	622676	309698	F	-	-	-
6617	622680	309695	F	-	-	-
6618	622685	309692	F	-	-	-
6619	622689	309689	F	-	-	-
6620	622693	309685	F	-	-	-
6621	622698	309683	F	-	-	-
6623	622671	309696	F	-	-	-
7002	622744	309099	F	-	-	3.66
7005	622751	309098	F	-	-	6.8
7007	622756	309072	F	3.583	0.51	3.073
7008	622752	309070	F	3.603	2.015	1.588
7009	622727	309058	F	4.04	2.202	1.838

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert
7101	622708	309166	F	-	-0.04	-
7104	622720	309122	F	-	-	1.17
7105	622703	309194	F	-	-	2.7
7106	622799	309115	F	-	-	3
7108	622703	309164	F	-	1.1	-
7205	622712	309284	F	-	-	1.845
7206	622782	309285	F	-	-	-
7207	622753	309285	F	-	-	1.635
7404	622758	309477	F	-	-	-
7405	622704	309466	F	-	-	-
7406	622720	309473	F	-	-	-
7501	622718	309599	F	-	-	11.75
7602	622773	309641	F	10.67	8	2.67
8001	622884	309059	F	4.27	0.55	3.72
8102	622874	309170	F	4.32	1.71	2.61
8104	622811	309104	F	-	-	1.3
8204	622881	309211	F	-	-	-
8405	622862	309430	F	-	-	-
8509	622892	309570	F	-	-	-
8604	622816	309660	F	-	-	-
8610	622830	309693	F	9.982	5.902	4.08
8611	622812	309662	F	10.267	7.147	3.12
8615	622824	309616	F	-	-	-
8616	622818	309623	F	-	-	-
9001	622961	309099	F	3.87	1.77	2.1
9002	622979	309048	F	3.46	1.44	2.02
9202	622969	309245	F	-	-	2.6
9206	622966	309292	F	-	-	2.185
9208	622967	309283	F	4.3	2.13	2.17
9209	622986	309290	F	-	-	-
9301	622967	309310	F	4.37	2.25	2.12
9401	622973	309428	F	-	-	2.36
9414	622911	309475	F	-	-	2.845
9423	622945	309444	F	-	-	2.59
9425	622921	309458	F	-	-	2.615
9428	622929	309471	F	-	-	-
9429	622935	309475	F	-	-	-
9504	622992	309546	F	-	-	-
9513	622944	309573	F	-	-	-
9514	622905	309577	F	-	-	-
9607	622998	309664	F	5.447	3.487	1.96
9608	622902	309655	F	-	-	1.6
9609	622922	309660	F	6.1	0.176	5.924
9611	622992	309690	F	5.43	3.205	2.225
9613	622935	309623	F	-	-	-
9614	622948	309627	F	-	-	0.5
9615	622985	309689	F	-	-	0.95
9616	622962	309630	F	-	-	-
0251	623009	309263	S	4.47	3.05	1.42
0252	623039	309294	S	3.64	2.03	1.61
0253	623052	309269	S	-	4.66	-
0351	623078	309356	S	3.97	1.07	2.9
0352	623062	309309	S	3.05	1.74	1.31
0353	623062	309303	S	3.28	1.83	1.45
0354	623061	309356	S	4.01	1.03	2.98
0451	623036	309480	S	4.57	2.02	2.55
0452	623004	309492	S	5.01	2.2	2.81
0453	623005	309417	S	4.49	1.32	3.17
0454	623035	309410	S	3.95	1.21	2.74
0455	623046	309404	S	3.98	1.08	2.9
0456	623057	309404	S	3.96	1.08	2.88
0457	623087	309499	S	3.99	2.46	1.53
0458	623095	309478	S	4.19	2.23	1.96
0459	623097	309459	S	4.23	1.85	2.38
1051	623153	309091	S	2.83	1.69	1.14
1057	623187	309075	S	-	-	-
1153	623168	309191	S	-	-	2.49
1251	623156	309286	S	3.51	-0.55	4.06
1252	623103	309279	S	-	7.21	-
1351	623157	309346	S	3.23	0.79	2.44
1352	623108	309357	S	3.88	1.04	2.84
1353	623133	309357	S	-	-	2.45
1355	623145	309319	S	3.49	-0.26	3.75
1357	623156	309388	S	-	-	-
1451	623118	309451	S	4.09	1.64	2.45
1452	623158	309447	S	-	-	-
1453	623154	309427	S	3.78	1.02	2.76
1459	623168	309427	S	3.8	2.16	1.64
1553	623167	309558	S	-	-	-
1651	623150	309668	S	-	-	5.73
2351	623263	309338	S	-	-	1.93
2352	623207	309309	S	8.37	7.18	1.19
2354	623272	309315	S	3.09	1.29	1.8
2355	623250	309387	S	3.65	2.32	1.33
2361	623258	309307	S	2.918	1.168	1.75
2362	623250	309334	S	-	-	1.93
2363	623265	309326	S	-	4.11	-
2452	623274	309428	S	-	-	-
2552	623282	309589	S	-	-	2.2
3050	623390	309076	S	-	-	-
3051	623378	309064	S	-	-	-
3052	623364	309051	S	-	-	-
3351	623326	309343	S	3.29	1.24	2.05
3352	623321	309343	S	3.38	1.56	1.82
3353	623370	309348	S	2.54	0.65	1.89
3357	623382	309316	S	2.801	0.251	2.55
3358	623368	309351	S	-	-	-
3359	623365	309359	S	-	-	-
3360	623338	309352	S	-	-	-
3361	623346	309384	S	-	-	1.93
3457	623366	309424	S	-	-	3.04
3458	623386	309493	S	-	-	-
3551	623387	309506	S	-	-	2.1

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert
3552	623330	309532	S	-	-	1.8
3553	623305	309554	S	-	-	1.9
3554	623392	309521	S	-	-	-
3555	623324	309590	S	-	-	-
3651	623303	309624	S	-	-	2.1
3652	623332	309659	S	-	-	2.1
3653	623359	309654	S	-	-	-
4051	623435	309080	S	3.97	1.56	2.41
4157	623423	309190	S	-	-	2.77
4453	623468	309472	S	-	-	2.7
4551	623409	309568	S	-	-	-
4552	623449	309558	S	-	-	-
4651	623413	309644	S	-	-	-
4652	623468	309633	S	-	-	-
5350	623570	309310	S	2.1	0.51	1.59
5351	623576	309313	S	-	-	-
5451	623550	309413	S	2.86	0.28	2.58
5454	623549	309447	S	-	-	2.16
5455	623551	309469	S	-	-	2.415
5456	623531	309408	S	-	-	-
5551	623554	309532	S	-	-	1.92
5552	623556	309557	S	-	-	1.95
5553	623559	309581	S	-	-	1.67
5555	622569	309584	S	-	-	-
5556	622558	309579	S	-	-	1.168
5651	623563	309617	S	-	-	1.76
5652	623572	309688	S	-	-	1.98
5653	623575	309691	S	-	-	-
5654	623536	309621	S	10.441	9.016	1.425
5655	623545	309696	S	-	-	-
6054	622694	309051	S	4.022	1.333	2.689
6055	622667	309095	S	4.04	1.834	2.206
6056	622642	309083	S	4.319	2.634	1.685
6151	622671	309148	S	-	1.8	-
6152	622659	309129	S	-	2.05	-
6153	622643	309128	S	-	2.2	-
6154	622664	309160	S	-	2.1	-
6155	622665	309185	S	-	2.5	-
6156	622698	309187	S	-	-	1.2
6251	622666	309241	S	-	-	1.83
6252	622660	309259	S	-	1.548	-
6253	622657	309260	S	-	1.829	-
6254	622611	309258	S	-	2.999	-
6551	622622	309568	S	9.29	2.49	6.8
6552	622688	309590	S	10.73	7.65	3.08
6652	622644	309634	S	-	-	1.27
7052	622725	309056	S	4.102	1.861	2.241
7053	622749	309067	S	3.721	2.26	1.461
7152	622710	309169	S	-	1.3	-
7153	622703	309166	S	-	1.4	-
7154	622737	309117	S	-	-	2.9
7155	622748	309094	S	-	-	-
7156	622771	309107	S	-	-	-
7157	622798	309118	S	-	-	-
7251	622714	309285	S	-	-	1.575
7252	622788	309259	S	-	-	-
7253	622707	309257	S	-	1.734	-
7254	622745	309258	S	-	1.893	-
7351	622780	309326	S	-	-	1.83
7352	622745	309333	S	-	-	1.6
7354	622797	309321	S	-	-	1.3
7451	622760	309476	S	-	-	1.15
7652	622779	309637	S	-	-	3.81
7653	622788	309632	S	-	-	7.77
8151	622873	309169	S	4.32	1.96	2.36
8152	622802	309153	S	-	-	-
8153	622861	309166	S	-	-	-
8253	622833	309254	S	-	2.548	-
8254	622879	309213	S	-	-	-
8255	622882	309233	S	-	-	-
8452	622807	309490	S	-	-	1.38
8557	622860	309511	S	-	-	-
8653	622810	309662	S	10.267	7.447	2.82
8654	622829	309696	S	9.982	6.202	3.78
9252	622971	309247	S	-	-	2.25
9253	622970	309284	S	-	-	3.99
9254	622973	309261	S	-	-	-
9255	622973	309295	S	-	-	-
9256	622982	309292	S	-	-	-
9351	622973	309312	S	-	-	-
9459	622975	309422	S	-	-	3
9460	622930	309452	S	-	-	3.15
9462	622912	309477	S	-	-	3.48
9465	622991	309411	S	-	-	-

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert

Appendix: E – Existing Run-off Rates

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

Runoff calculations- Modified Rational Method

Q = CiA where C = $\frac{PIMP}{PR}$

PIMP = Percentage of impervious area to total area

PR = Percentage Runoff

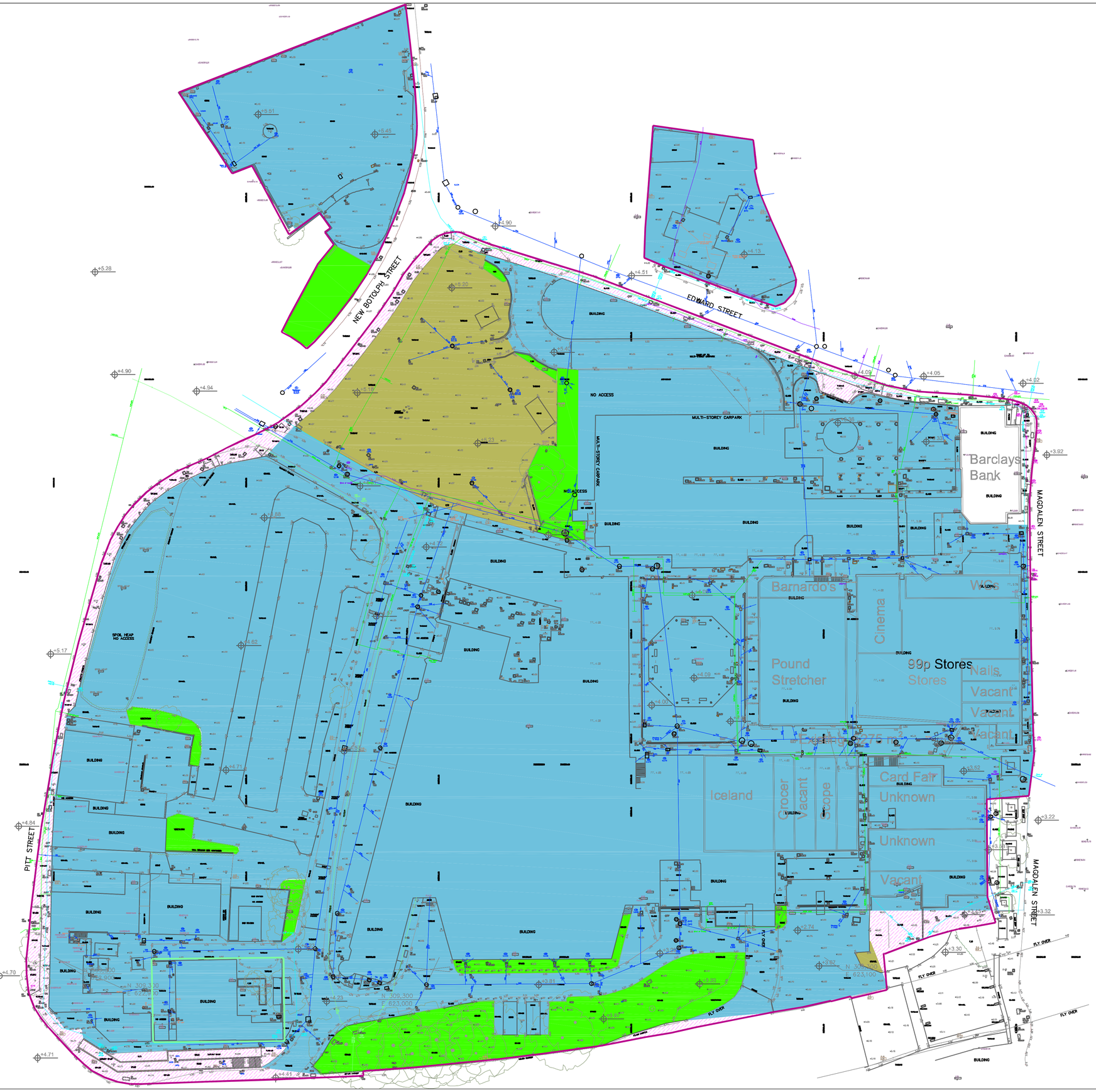
C=1

C	1	
Rainfall intensity (i)	50	mm/hr
	0.05	m/hr
	0.0000139	m/s
Site size (A)	40712	m2
Q for existing site	**565.44**	**l/s**

Ref: Butler, D and Davies, J. (2006), Urban Drainage, 2nd ed, SPON.

Appendix: F – Existing Run-off Catchments

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk



AREAS OF ADOPTED PUBLIC HIGHWAY: NOT INCLUDED IN THESE CALCULATIONS

AREA OF PERMEABLE SURFACE OR LANDSCAPING IT IS EXPECTED THAT SOME GREEN-FIELD RUNOFF WOULD OCCUR HOWEVER THESE RATES D SHALL NOT BE INCLUDED IN EXISTING RUN-OFF CALCULATIONS TO BE CONSERVATIVE.

AREA OF CAR PARK WHICH DRAINS TO PRIVATE DRAINAGE SYSTEM AND NOT INTO ANGLIAN WATER SEWERS.

AREA OF IMPERMEABLE SURFACE THAT DRAINS SURFACE WATER RUN-OFF TO EXISTING ANGLIAN WATER SURFACE WATER SEWERS (39,555m²)

REV	DATE	BY	DESCRIPTION	CHK	APD

DRAWING STATUS: FOR INFORMATION

Unit 23, The Maltings, Stanstead Abbotts, Hertfordshire, SG12 8HG
Tel: 01920 871777
www.eastp.co.uk

CLIENT: WESTON HOMES

ARCHITECT:

PROJECT: ANGLIA SQUARE, NORWICH

TITLE: EXISTING IMPERMEABLE AREAS WHICH DRAIN SURFACE WATER TO ANGLIAN WATER SURFACE WATER SEWERS

SCALE @ A1:	DESIGN-DRAWN:	DATE:
1:500	MD	06.04.2017
PROJECT No: 3831	DRAWING No: SK01-A	

Appendix: G –

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

Appendix: H – Greenfield Run-off Rates

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.150
Area (ha)	1.000	Urban	0.000
SAAR (mm)	614	Region Number	Region 5

Results l/s

QBAR Rural	0.3
QBAR Urban	0.3
Q100 years	1.2
Q1 year	0.3
Q30 years	0.8
Q100 years	1.2

Appendix: I – Anglian Water Approval In Principle

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

Pre-Planning Assessment Report

Anglia Square

InFlow Reference: PPE-0143339

Assessment Type: Used Water

Report published: 08/04/2022

Thank you for submitting a pre-planning enquiry.

This has been produced for EAS Transport Planning Ltd.

Your reference number is **PPE-0143339**.

This report can be submitted as a drainage strategy for the development should it seek planning permission.

If you have any questions upon receipt of this report, you can submit a further question via InFlow. Alternatively, please contact the Planning & Capacity team on **07929 786 955** or email planningliaison@anglianwater.co.uk

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Section 1 - Proposed development

The response within this report has been based on the following information which was submitted as part of your application:

List of planned developments	
Type of development	**No. Of units**
Shops	50
Restaurants and cafes	25
Dwellings	1500

The anticipated residential build rate is:

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12
Build rate	50	50	50	50	50	50	50	50	50	50	50	1025

Development type: Brownfield

Planning application status: Unknown

Site grid reference number: TG2302009411

The comments contained within this report relate to the public water mains and sewers indicated on our records.

Your attention is drawn to the disclaimer in the useful information section of this report.

Section 2 - Assets affected

Our records indicate that we have the following types of assets within or overlapping the boundary of your development site as listed in the table below.

Additionally, it is highly recommended that you carry out a thorough investigation of your proposed working area to establish whether any unmapped public or private sewers and lateral drains are in existence. We are unable to permit development either over or within the easement strip without our prior consent. The extent of the easement is provided in the table below. Please be aware that the existing water mains/public sewers should be located in highway or open space and not in private gardens. This is to ensure available access for any future maintenance and repair and this should be taken into consideration when planning your site layout.

Water and Used water easement information		
Asset type	Pipe size (mm)	Total easement required (m)
Water mains	152	6.00 m overall easement
Water mains	76	6.00 m overall easement
Water mains	102	4.50 m overall easement
Water mains	127	6.00 m overall easement
Water mains	102	4.50 m overall easement
Sewer mains	675	6.00 m either side of the centre line
Sewer mains	300	3.00 m either side of the centre line
Sewer mains	225	3.00 m either side of the centre line
Sewer mains	150	3.00 m either side of the centre line
Sewer mains	9	3.00 m either side of the centre line
Sewer mains	Unknown	3.00 m either side of the centre line
Sewer mains	27	3.00 m either side of the centre line
Sewer mains	7	4.50 m either side of the centre line
Sewer mains	850	4.00 m either side of the centre line
Sewer mains	36	3.00 m either side of the centre line
Sewer mains	24	6.00 m either side of the centre line
Sewer mains	375	3.00 m either side of the centre line
Sewer mains	225	3.00 m either side of the centre line

If it is not possible to avoid our assets then these may need to be diverted in accordance with Section 185 of the Water Industry Act (1991). You will need to make a formal application if you would like a diversion to be considered.

Due to the private sewer transfer in October 2011 many newly adopted public used water assets and their history are not indicated on our records. You also need to be aware that your development site may contain private water mains, drains or other assets not shown on our records. These are private assets and not the responsibility of Anglian Water but that of the landowner.

Section 3 - Water recycling services

In examining the used water system we assess the ability for your site to connect to the public sewerage network without causing a detriment to the operation of the system. We also assess the receiving water recycling centre and determine whether the water recycling centre can cope with the increased flow and effluent quality arising from your development.

Water recycling centre

The foul drainage from the proposed development is in the catchment of Whitlingham Trowse Water Recycling Centre, which currently has capacity to treat the flows from your development site. Anglian Water cannot reserve capacity and the available capacity at the water recycling centre can be reduced at any time due to growth, environmental and regulation driven changes.

Used water network

Our assessment has been based on development flows connecting to the nearest foul water sewer of the same size or greater pipe diameter to that required to drain the site. The infrastructure to convey foul water flows to the receiving sewerage network is assumed to be the responsibility of the developer. Conveyance to the connection point is considered as Onsite Work and includes all work carried out upstream from of the point of connection, including making the connection to our existing network. This connection point has been determined in reference to the calculated discharge flow and on this basis, a 375mm internal diameter pipe is required to drain the development site. The preferred connection point at manhole 1310 is to a 300mm sewer, that does not have capacity to accommodate the flows from the full development. The foul sewerage system will have capacity for the development if the connection is made over several points across the network surrounding the development site.

In order to assess a suitable drainage strategy and provide connection points, please provide us with a site layout and phasing plan. Anglian water has assessed the impact of gravity flows from the planned development to the public foul sewerage network. We can confirm that this is acceptable as the foul sewerage system, at present, has available capacity for your site.

Please note that Anglian Water will request a suitably worded condition at planning application stage to ensure this strategy is implemented to mitigate the risk of flooding.

It is assumed that the developer will provide the necessary infrastructure to convey flows from the site to the network. Consequently, this report does not include any costs for the conveyance of flows.

Surface water disposal

In principle, your proposed method of surface water disposal is acceptable to Anglian Water. It is our understanding that the evidence to confirm compliance with the surface water hierarchy is not available. Once the evidence has been confirmed, then a connection point may be made to manhole 1355 at NGR TG 23145 09319 at a rate of 242l/s. Our assessment has been based on development flows connecting to the nearest surface water sewer of the same size or greater pipe diameter. It is your responsibility to provide the evidence to confirm that all alternative methods of surface water disposal have been explored and these will be required before your connection can be agreed. This is subject to satisfactory evidence which shows the surface water management hierarchy as outlined in Building Regulations Part H has been explored. This would encompass the results from the site specific infiltration testing and/or confirmation that the flows cannot be discharged to a watercourse. Anglian Water's surface water policy follows the Surface Water hierarchy, outlined in Part H of the Building Regulations. Should your assumptions or evidence change then an alternative solution, connection point or flow rate may be required.

You are thereforeadvised to update Anglian Water with the key supporting evidence at your earliest convenience.

As you may be aware, Anglian Water will consider the adoption of SuDs provided that they meet the criteria outline in our SuDs adoption manual. This can be found on our website. We will adopt features located in public open space that are designed and constructed, in conjunction with the Local Authority and Lead Local Flood Authority (LLFA), to the criteria within our SuDs adoption manual. Specifically, developers must be able to demonstrate:

1. Effective upstream source control,
2. Effective exceedance design, and
3. Effective maintenance schedule demonstrating than the assets can be maintained both now and in the future with adequate access.

If you wish to look at the adoption of any SuDs then an expression of interest form can be found on our website

Trade Effluent

We note that you do not have any trade effluent requirements. Should this be required in the future you will need our written formal consent. This is in accordance with Section 118 of the Water Industry Act (1991).

Used Water Budget Costs

Your development site will be required to pay an Infrastructure charge for each new property connecting to the public water and sewerage network that benefits from Full planning permission. The infrastructure charge replaces the zonal charge as previously identified.

You will be required to pay an infrastructure charge upon connection for each new plot on your development site. The infrastructure charge are types of charges set out in Section 146(2) of the Water Industry Act 1991.

The charge should be paid by anyone who wishes to build or develop a property and is payable upon request of connection.

• The Infrastructure Charge is based on the cost of any reinforcement and upgrades to our existing network ("Network Reinforcements"), whether designed to address strategic or local capacity issues. For more information on our Infrastructure Charge, please see the 'Useful Information' section of this report.

Infrastructure charges are raised on a standard basis of one charge per new connection (one for water and one for sewerage).

The Water Recycling Infrastructure charge for your dwellings is:

Infrastructure charge	Number of units	Total
£ 490	1500	£735,000.00

Please note that you should also budget for infrastructure charges on non-household premises where applicable and these will be calculated according to the number and type of water fittings in the premises. This is called the "relevant multiplier" method of calculating the charge and the relevant multiplier will be applied to the figures set out in our 2022-23 Developer Charging Arrangements to arrive at the amount payable. Details of the relevant multiplier for each fitting can be found on our website.

Section 4 - Map of Proposed Point of Connection(s)

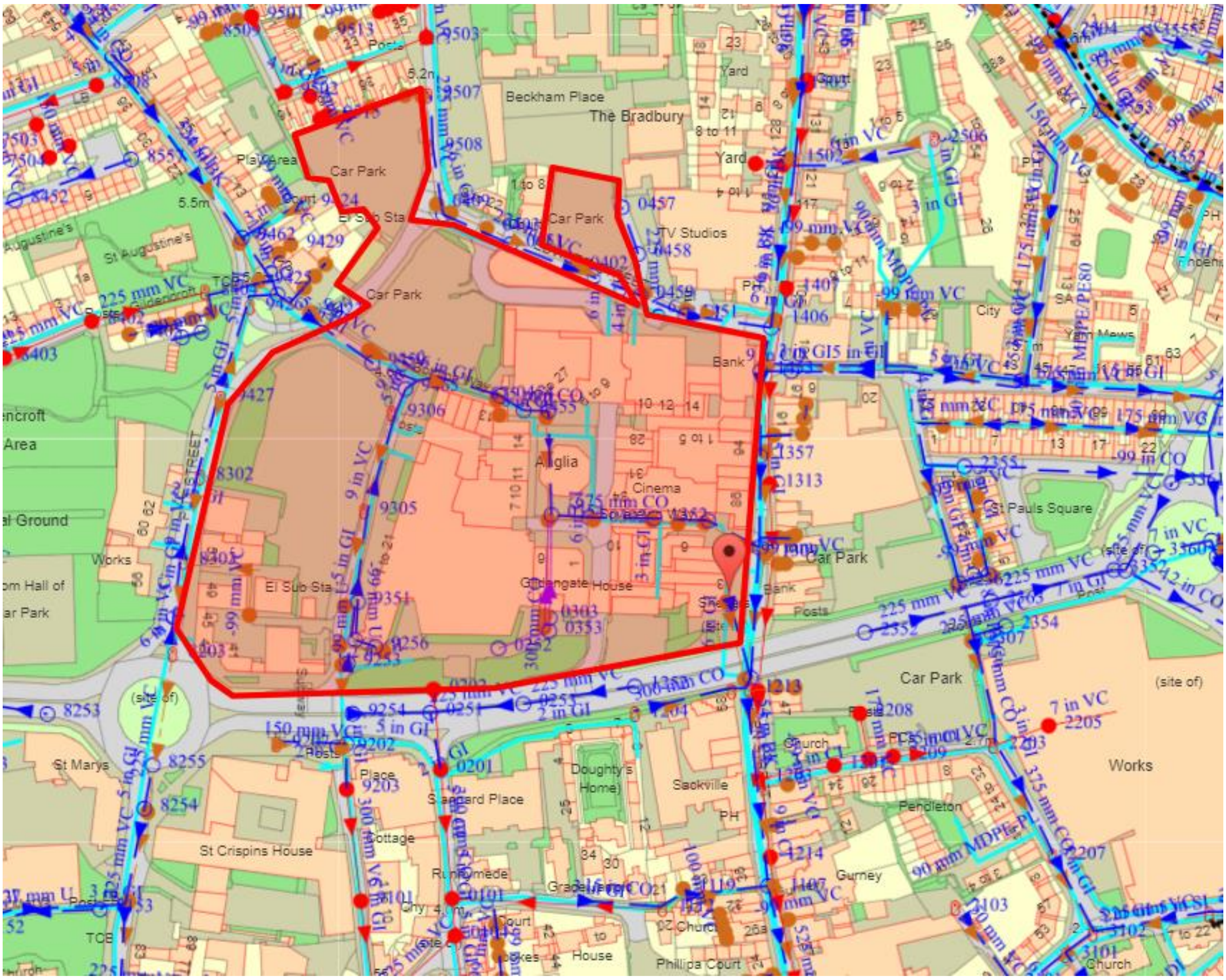


Figure 2: Showing your water recycling surface water point of connection

Section 5 - Useful information

Water Industry Act – Key used water sections

Section 98:

This provides you with the right to requisition a new public sewer. The new public sewer can be constructed by Anglian Water on your behalf. Alternatively, you can construct the sewer yourself under section 30 of the Anglian Water Authority Act 1977.

Section 102:

This provides you with the right to have an existing sewerage asset vested by us. It is your responsibility to bring the infrastructure to an adoptable condition ahead of the asset being vested.

Section 104:

This provides you with the right to have a design technically vetted and an agreement reached that will see us adopt your assets following their satisfactory construction and connection to the public sewer.

Section 106:

This provides you with the right to have your constructed sewer connected to the public sewer.

Section 185

This provides you with the right to have a public sewerage asset diverted.

Details on how to make a formal application for a new sewer, new connection or diversion are available on our website or via our Development Services team on **0345 60 66 087**.

Sustainable drainage systems

Many existing urban drainage systems can cause problems of flooding, pollution or damage to the environment and are not resilient to climate change in the long term. .

Our preferred method of surface water disposal is through the use of Sustainable Drainage Systems or SuDS.

SuDS are a range of techniques that aim to mimic the way surface water drains in natural systems within urban areas. For more information on SuDS, please visit our website

We recommend that you contact the Local Authority and Lead Local Flood Authority (LLFA) for your site to discuss your application.

Private sewer transfers

Sewers and lateral drains connected to the public sewer on the 1 July 2011 transferred into Water Company ownership on the 1 October 2011. This follows the implementation of the Floods and Water Management Act (FWMA). This included sewers and lateral drains that were subject to an existing Section 104 Adoption Agreement and those that were not. There were exemptions and the main non-transferable assets were as follows:

Surface water sewers and lateral drains that do not discharge to the public sewer, e.g. those that discharged to a watercourse.

Foul sewers and lateral drains that discharged to a privately owned sewage treatment/collection facility.

Pumping stations and rising mains will transfer between 1 October 2011 and 1 October 2016.

The implementation of Section 42 of the FWMA will ensure that future private sewers will not be created. It is anticipated that all new sewer applications will need to have an approved section 104 application ahead of a section 106 connection.

It is anticipated that all new sewer applications will need to have an approved Section104 application ahead of a Section 106 connection

Encroachment

Anglian Water operates a risk based approach to development encroaching close to our used water infrastructure. We assess the issue of encroachment if you are planning to build within 400 metres of a water recycling centre or, within 15 metres to 100 metres of a pumping station. We have more information available on our website

Locating our assets

Maps detailing the location of our water and used water infrastructure including both underground assets and above ground assets such as pumping stations and recycling centres are available from digdat

All requests from members of the public or non-statutory bodies for maps showing the location of our assets will be subject to an appropriate administrative charge.

We have more information on our website

Charging arrangements

Our charging arrangements and summary for this year's water and used water connection and infrastructure charges can be found on our website

Section 6 - Disclaimer

The information provided in this report is based on data currently held by Anglian Water Services Limited ('Anglian Water') or provided by a third party. Accordingly, the information in this report is provided with no guarantee of accuracy, timeliness, completeness and is without indemnity or warranty of any kind (express or implied).

This report should not be considered in isolation and does not nullify the need for the enquirer to make additional appropriate searches, inspections and enquiries. Anglian Water supports the plan led approach to sustainable development that is set out in the National Planning Policy Framework ('NPPF') and any infrastructure needs identified in this report must be considered in the context of current, adopted and/or emerging local plans. Where local plans are absent, silent or have expired these needs should be considered against the definition of sustainability holistically as set out in the NPPF.

Whilst the information in this report is based on the presumption that proposed development obtains planning permission, nothing in this report confirms that planning permission will be granted or that Anglian Water will be bound to carry out the works/proposals contained within this report.

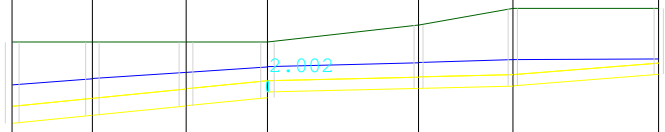
No liability whatsoever, including liability for negligence is accepted by Anglian Water or its partners, employees or agents, for any error or omission, or for the results obtained from the use of this report and/or its content.

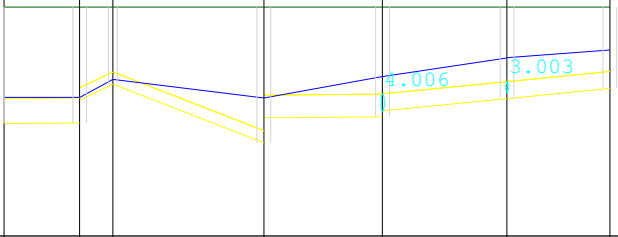
Furthermore, in no event will any of those parties be liable to the applicant or any third party for any decision made or action taken as a result of reliance on this report.

This report is valid from the date issued and the enquirer is advised to resubmit their request for an up to date report should there be a delay in submitting any subsequent application for water supply/sewer connection(s). Our pre-planning reports are valid for 12 months, however please note Anglian Water cannot reserve capacity and available capacity in our network can be reduced at any time due to increased requirements from existing businesses and houses as well as from new housing and new commercial developments.

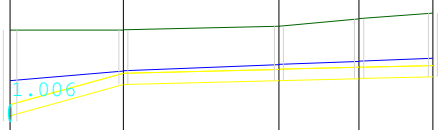
Appendix J – Hydraulic Model Outputs

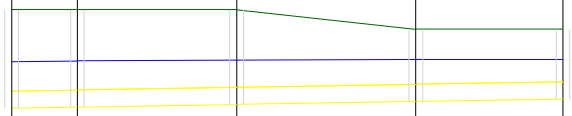
TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

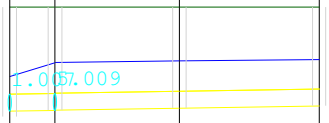
MH Name	MH10		MH08		MH03	MH02	MH01	
Hor Scale 1000 Ver Scale 200 Datum (m)-1.000								
PN			1.004		1.002	1.001	1.000	
Dia (mm)			450		300	300	300	
Slope (1:X)			50.0		200.0	198.4	62.5	
Cover Level (m)	4.050	4.050	4.050	4.050	4.500	4.950	4.950	
Invert Level (m)		1.902	2.114	2.362	2.362	2.578	2.728	2.828	2.828	2.891	2.891	3.200
Length (m)			12.400		20.000	12.500	19.300	

MH Name			PUMP AND GEO		MH35	MH15	MH10	
Hor Scale 1000 Ver Scale 200 Datum (m)-2.000								
PN				1.009	1.008	1.007	1.006	
Dia (mm)				325	600	450	450	
Slope (1:X)				-12.9	490.6	50.0	50.0	
Cover Level (m)	4.050	4.050	4.050	4.050	4.050	4.050	4.050	
Invert Level (m)		0.964	0.984	2.010	2.010	0.458	1.118	1.150	1.300	1.630	1.630	1.902
Length (m)				20.000	15.700	16.500	13.600	

MH Name	MH07	MH06		MH04	
Hor Scale 1000 Ver Scale 200 Datum (m)-1.000					
PN		2.002		2.000	
Dia (mm)		300		300	
Slope (1:X)		200.0		200.0	
Cover Level (m)	4.050	4.050	4.050	4.050	
Invert Level (m)		2.728	2.844	2.844	2.905	2.905	2.971	
Length (m)		23.200		13.200	

MH Name	MH15	MH14	MH13			
Hor Scale 1000 Ver Scale 200 Datum (m)-2.000						
PN		3.003	3.002			
Dia (mm)		300	300			
Slope (1:X)		18.1	200.0			
Cover Level (m)	4.050	4.050	4.150	4.350	4.500	
Invert Level (m)		1.780	2.611	2.611	2.714	2.714	2.767	2.767	2.816	
Length (m)		15.000	20.600			

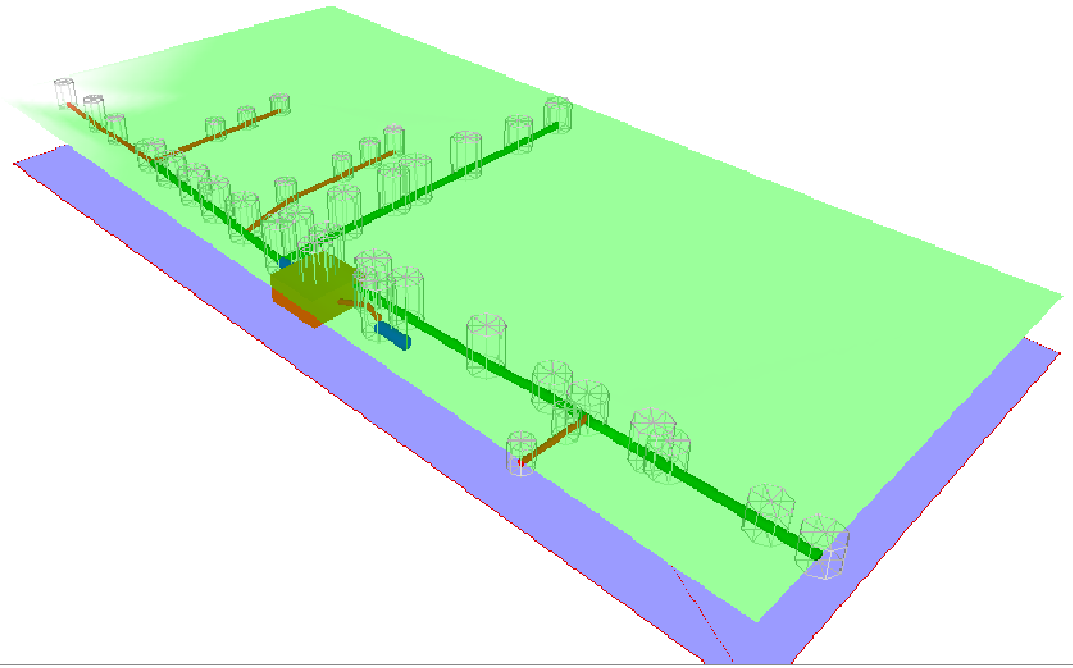
MH Name	MH20		MH18	MH17	MH16	
Hor Scale 1000 Ver Scale 200 Datum (m)-2.000						
PN			4.002	4.001	4.000	
Dia (mm)			450	450	450	
Slope (1:X)			301.4	300.0	300.0	
Cover Level (m)	4.050	4.050	4.050	3.525	3.525	
Invert Level (m)		1.436 1.465	1.465 1.535	1.535 1.614	1.614 1.679	
Length (m)			21.100	23.700	19.500	

MH Name	MH35		MH21	MH20	
Hor Scale 1000 Ver Scale 200 Datum (m)-2.000					
PN			4.005	4.004	
Dia (mm)			450	450	
Slope (1:X)			300.0	303.3	
Cover Level (m)	4.050	4.050	4.050	4.050	
Invert Level (m)		1.320 1.320	1.375 1.375	1.436	
Length (m)			16.500	18.500	

MH Name	MH30	MH29		MH25		MH23		
Hor Scale 1000 Ver Scale 200 Datum (m)-2.000				6.001				
PN		5.005		5.003		5.001		
Dia (mm)		450		450		450		
Slope (1:X)		68.9		296.5		297.5		
Cover Level (m)	4.000	3.525	3.550	4.000	3.525	3.525	3.525	
Invert Level (m)		1.557	1.853	1.853	1.880	1.887	1.944	1.958	1.958	2.037	2.037	2.075
Length (m)		20.400		16.900		23.500		

MH Name	MH34	MH33	MH32		MH30	
Hor Scale 1000 Ver Scale 200 Datum (m)-2.000		4.005				
PN		5.009	5.008		5.006	
Dia (mm)		450	450		450	
Slope (1:X)		300.0	301.6		300.0	
Cover Level (m)	4.050	4.050	4.050	4.050	4.000	
Invert Level (m)		1.320	1.362	1.362	1.425	1.425	1.465	1.465	1.557	
Length (m)		12.600	19.000		27.600	

MH Name	MH28		MH26	
Hor Scale 1000 Ver Scale 200 Datum (m)-2.000				
PN			6.000	
Dia (mm)			300	
Slope (1:X)			150.5	
Cover Level (m)	3.550	3.525	3.525	
Invert Level (m)		2.084	2.084 / 2.177	
Length (m)			14.000	



Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1

	PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
*	1.000	19.300	0.309	62.5	0.046	3.00	0.600	o	300	Pipe/Conduit
*	1.001	12.500	0.063	198.4	0.045	0.00	0.600	o	300	Pipe/Conduit
*	1.002	20.000	0.100	200.0	0.045	0.00	0.600	o	300	Pipe/Conduit
*	2.000	13.200	0.066	200.0	0.045	3.00	0.600	o	300	Pipe/Conduit
*	2.001	11.700	0.061	191.8	0.045	0.00	0.600	o	300	Pipe/Conduit
*	2.002	23.200	0.116	200.0	0.045	0.00	0.600	o	300	Pipe/Conduit
*	1.003	10.800	0.216	50.0	0.045	0.00	0.600	o	450	Pipe/Conduit
*	1.004	12.400	0.248	50.0	0.046	0.00	0.600	o	450	Pipe/Conduit
*	1.005	10.600	0.212	50.0	0.045	0.00	0.600	o	450	Pipe/Conduit
*	1.006	13.600	0.272	50.0	0.045	0.00	0.600	o	450	Pipe/Conduit
*	3.000	9.800	0.049	200.0	0.045	3.00	0.600	o	300	Pipe/Conduit
*	3.001	10.600	0.053	200.0	0.046	0.00	0.600	o	300	Pipe/Conduit
*	3.002	20.600	0.103	200.0	0.044	0.00	0.600	o	300	Pipe/Conduit
*	3.003	15.000	0.831	18.1	0.046	0.00	0.600	o	300	Pipe/Conduit
*	1.007	16.500	0.330	50.0	0.045	0.00	0.600	o	450	Pipe/Conduit

	PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
*	1.000	MH01	4.950	3.200	1.450	4.950	2.891	1.759		1200
*	1.001	MH02	4.950	2.891	1.759	4.500	2.828	1.372		1200
*	1.002	MH03	4.500	2.828	1.372	4.050	2.728	1.022		1200
*	2.000	MH04	4.050	2.971	0.779	4.050	2.905	0.845		1200
*	2.001	MH05	4.050	2.905	0.845	4.050	2.844	0.906		1200
*	2.002	MH06	4.050	2.844	0.906	4.050	2.728	1.022		1200
*	1.003	MH07	4.050	2.578	1.022	4.050	2.362	1.238		1800
*	1.004	MH08	4.050	2.362	1.238	4.050	2.114	1.486		1800
*	1.005	MH09	4.050	2.114	1.486	4.050	1.902	1.698		1800
*	1.006	MH10	4.050	1.902	1.698	4.050	1.630	1.970		1800
*	3.000	MH11	4.500	2.816	1.384	4.350	2.767	1.283		1200
*	3.001	MH12	4.350	2.767	1.283	4.150	2.714	1.136		1200
*	3.002	MH13	4.150	2.714	1.136	4.050	2.611	1.139		1200
*	3.003	MH14	4.050	2.611	1.139	4.050	1.780	1.970		1200
*	1.007	MH15	4.050	1.630	1.970	4.050	1.300	2.300		1800

Existing Network Details for Storm

	PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
*	4.000	19.500	0.065	300.0	0.045	3.00	0.600	o	450	Pipe/Conduit
*	4.001	23.700	0.079	300.0	0.043	0.00	0.600	o	450	Pipe/Conduit
*	4.002	21.100	0.070	301.4	0.043	0.00	0.600	o	450	Pipe/Conduit
*	4.003	8.700	0.029	300.0	0.043	0.00	0.600	o	450	Pipe/Conduit
*	4.004	18.500	0.061	303.3	0.043	0.00	0.600	o	450	Pipe/Conduit
*	4.005	16.500	0.055	300.0	0.043	0.00	0.600	o	450	Pipe/Conduit
*	5.000	11.300	0.038	297.4	0.042	3.00	0.600	o	450	Pipe/Conduit
*	5.001	23.500	0.079	297.5	0.040	0.00	0.600	o	450	Pipe/Conduit
*	5.002	4.200	0.014	300.0	0.040	0.00	0.600	o	450	Pipe/Conduit
*	5.003	16.900	0.057	296.5	0.043	0.00	0.600	o	450	Pipe/Conduit
*	6.000	14.000	0.093	150.5	0.043	3.00	0.600	o	300	Pipe/Conduit
*	6.001	7.100	0.047	151.1	0.042	0.00	0.600	o	300	Pipe/Conduit
*	5.004	10.000	0.027	370.4	0.040	0.00	0.600	o	450	Pipe/Conduit
*	5.005	20.400	0.296	68.9	0.040	0.00	0.600	o	450	Pipe/Conduit
*	5.006	27.600	0.092	300.0	0.040	0.00	0.600	o	450	Pipe/Conduit
*	5.007	12.000	0.040	300.0	0.040	0.00	0.600	o	450	Pipe/Conduit
*	5.008	19.000	0.063	301.6	0.040	0.00	0.600	o	450	Pipe/Conduit
*	5.009	12.600	0.042	300.0	0.043	0.00	0.600	o	450	Pipe/Conduit

	PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
*	4.000	MH16	3.525	1.679	1.396	3.525	1.614	1.461		1800
*	4.001	MH17	3.525	1.614	1.461	4.050	1.535	2.065		1800
*	4.002	MH18	4.050	1.535	2.065	4.050	1.465	2.135		1800
*	4.003	MH19	4.050	1.465	2.135	4.050	1.436	2.164		1800
*	4.004	MH20	4.050	1.436	2.164	4.050	1.375	2.225		1800
*	4.005	MH21	4.050	1.375	2.225	4.050	1.320	2.280		1800
*	5.000	MH22	3.525	2.075	1.000	3.525	2.037	1.038		1800
*	5.001	MH23	3.525	2.037	1.038	3.525	1.958	1.117		1800
*	5.002	MH24	3.525	1.958	1.117	4.000	1.944	1.606		1800
*	5.003	MH25	4.000	1.944	1.606	3.550	1.887	1.213		1800
*	6.000	MH26	3.525	2.177	1.048	3.525	2.084	1.141		1200
*	6.001	MH27	3.525	2.084	1.141	3.550	2.037	1.213		1200
*	5.004	MH28	3.550	1.880	1.220	3.525	1.853	1.222		1800
*	5.005	MH29	3.525	1.853	1.222	4.000	1.557	1.993		1800
*	5.006	MH30	4.000	1.557	1.993	4.050	1.465	2.135		1800
*	5.007	MH31	4.050	1.465	2.135	4.050	1.425	2.175		1800
*	5.008	MH32	4.050	1.425	2.175	4.050	1.362	2.238		1800
*	5.009	MH33	4.050	1.362	2.238	4.050	1.320	2.280		1800

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
* 4.006	6.000	0.020	300.0	0.044	0.00	0.600	o	450	Pipe/Conduit
* 1.008	15.700	0.032	490.6	0.000	0.00	0.600	o	600	Pipe/Conduit
* 1.009	20.000	-1.552	-12.9	0.000	0.00	0.600	o	325	Pipe/Conduit
* 1.010	4.400	0.420	10.5	0.000	0.00	0.600	o	325	Pipe/Conduit
* 1.011	10.000	0.020	500.0	0.000	0.00	0.600	o	675	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* 4.006	MH34	4.050	1.320	2.280	4.050	1.300	2.300		1800
* 1.008	MH35	4.050	1.150	2.300	4.050	1.118	2.332		1800
* 1.009	PUMP AND GEO	4.050	0.458	3.267	4.050	2.010	1.715	Pump	1800
* 1.010	MH36	4.050	2.010	1.715	4.050	1.590	2.135		1200
* 1.011	SW-A-07	4.050	0.984	2.391	4.050	0.964	2.411		1800

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)
MH01	4.950	1.750	Open Manhole	1200	1.000	3.200	300				
MH02	4.950	2.059	Open Manhole	1200	1.001	2.891	300	1.000	2.891	300	
MH03	4.500	1.672	Open Manhole	1200	1.002	2.828	300	1.001	2.828	300	
MH04	4.050	1.079	Open Manhole	1200	2.000	2.971	300				
MH05	4.050	1.145	Open Manhole	1200	2.001	2.905	300	2.000	2.905	300	
MH06	4.050	1.206	Open Manhole	1200	2.002	2.844	300	2.001	2.844	300	
MH07	4.050	1.472	Open Manhole	1800	1.003	2.578	450	1.002	2.728	300	
								2.002	2.728	300	
MH08	4.050	1.688	Open Manhole	1800	1.004	2.362	450	1.003	2.362	450	
MH09	4.050	1.936	Open Manhole	1800	1.005	2.114	450	1.004	2.114	450	
MH10	4.050	2.148	Open Manhole	1800	1.006	1.902	450	1.005	1.902	450	
MH11	4.500	1.684	Open Manhole	1200	3.000	2.816	300				
MH12	4.350	1.583	Open Manhole	1200	3.001	2.767	300	3.000	2.767	300	
MH13	4.150	1.436	Open Manhole	1200	3.002	2.714	300	3.001	2.714	300	
MH14	4.050	1.439	Open Manhole	1200	3.003	2.611	300	3.002	2.611	300	
MH15	4.050	2.420	Open Manhole	1800	1.007	1.630	450	1.006	1.630	450	
								3.003	1.780	300	
MH16	3.525	1.846	Open Manhole	1800	4.000	1.679	450				
MH17	3.525	1.911	Open Manhole	1800	4.001	1.614	450	4.000	1.614	450	
MH18	4.050	2.515	Open Manhole	1800	4.002	1.535	450	4.001	1.535	450	
MH19	4.050	2.585	Open Manhole	1800	4.003	1.465	450	4.002	1.465	450	
MH20	4.050	2.614	Open Manhole	1800	4.004	1.436	450	4.003	1.436	450	
MH21	4.050	2.675	Open Manhole	1800	4.005	1.375	450	4.004	1.375	450	
MH22	3.525	1.450	Open Manhole	1800	5.000	2.075	450				
MH23	3.525	1.488	Open Manhole	1800	5.001	2.037	450	5.000	2.037	450	
MH24	3.525	1.567	Open Manhole	1800	5.002	1.958	450	5.001	1.958	450	
MH25	4.000	2.056	Open Manhole	1800	5.003	1.944	450	5.002	1.944	450	
MH26	3.525	1.348	Open Manhole	1200	6.000	2.177	300				
MH27	3.525	1.441	Open Manhole	1200	6.001	2.084	300	6.000	2.084	300	
MH28	3.550	1.670	Open Manhole	1800	5.004	1.880	450	5.003	1.887	450	7
								6.001	2.037	300	7
MH29	3.525	1.672	Open Manhole	1800	5.005	1.853	450	5.004	1.853	450	
MH30	4.000	2.443	Open Manhole	1800	5.006	1.557	450	5.005	1.557	450	
MH31	4.050	2.585	Open Manhole	1800	5.007	1.465	450	5.006	1.465	450	
MH32	4.050	2.625	Open Manhole	1800	5.008	1.425	450	5.007	1.425	450	
MH33	4.050	2.688	Open Manhole	1800	5.009	1.362	450	5.008	1.362	450	
MH34	4.050	2.730	Open Manhole	1800	4.006	1.320	450	4.005	1.320	450	
								5.009	1.320	450	

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)	Backd (mm
MH35	4.050	2.900	Open Manhole	1800	1.008	1.150	600	1.007	1.300	450	
								4.006	1.300	450	
PUMP AND GEO	4.050	3.592	Open Manhole	1800	1.009	0.458	325	1.008	1.118	600	
MH36	4.050	2.040	Open Manhole	1200	1.010	2.010	325	1.009	2.010	325	
SW-A-07	4.050	3.066	Open Manhole	1800	1.011	0.984	675	1.010	1.590	325	
	4.050	3.086	Open Manhole	0		OUTFALL		1.011	0.964	675	

No coordinates have been specified, layout information cannot be produced.

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)
1.000	o	300	MH01	4.950	3.200	1.450	Open Manhole	1200
1.001	o	300	MH02	4.950	2.891	1.759	Open Manhole	1200
1.002	o	300	MH03	4.500	2.828	1.372	Open Manhole	1200
2.000	o	300	MH04	4.050	2.971	0.779	Open Manhole	1200
2.001	o	300	MH05	4.050	2.905	0.845	Open Manhole	1200
2.002	o	300	MH06	4.050	2.844	0.906	Open Manhole	1200
1.003	o	450	MH07	4.050	2.578	1.022	Open Manhole	1800
1.004	o	450	MH08	4.050	2.362	1.238	Open Manhole	1800
1.005	o	450	MH09	4.050	2.114	1.486	Open Manhole	1800
1.006	o	450	MH10	4.050	1.902	1.698	Open Manhole	1800
3.000	o	300	MH11	4.500	2.816	1.384	Open Manhole	1200
3.001	o	300	MH12	4.350	2.767	1.283	Open Manhole	1200
3.002	o	300	MH13	4.150	2.714	1.136	Open Manhole	1200
3.003	o	300	MH14	4.050	2.611	1.139	Open Manhole	1200
1.007	o	450	MH15	4.050	1.630	1.970	Open Manhole	1800
4.000	o	450	MH16	3.525	1.679	1.396	Open Manhole	1800

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	19.300	62.5	MH02	4.950	2.891	1.759	Open Manhole	1200
1.001	12.500	198.4	MH03	4.500	2.828	1.372	Open Manhole	1200
1.002	20.000	200.0	MH07	4.050	2.728	1.022	Open Manhole	1800
2.000	13.200	200.0	MH05	4.050	2.905	0.845	Open Manhole	1200
2.001	11.700	191.8	MH06	4.050	2.844	0.906	Open Manhole	1200
2.002	23.200	200.0	MH07	4.050	2.728	1.022	Open Manhole	1800
1.003	10.800	50.0	MH08	4.050	2.362	1.238	Open Manhole	1800
1.004	12.400	50.0	MH09	4.050	2.114	1.486	Open Manhole	1800
1.005	10.600	50.0	MH10	4.050	1.902	1.698	Open Manhole	1800
1.006	13.600	50.0	MH15	4.050	1.630	1.970	Open Manhole	1800
3.000	9.800	200.0	MH12	4.350	2.767	1.283	Open Manhole	1200
3.001	10.600	200.0	MH13	4.150	2.714	1.136	Open Manhole	1200
3.002	20.600	200.0	MH14	4.050	2.611	1.139	Open Manhole	1200
3.003	15.000	18.1	MH15	4.050	1.780	1.970	Open Manhole	1800
1.007	16.500	50.0	MH35	4.050	1.300	2.300	Open Manhole	1800
4.000	19.500	300.0	MH17	3.525	1.614	1.461	Open Manhole	1800

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)
4.001	o	450	MH17	3.525	1.614	1.461	Open Manhole	1800
4.002	o	450	MH18	4.050	1.535	2.065	Open Manhole	1800
4.003	o	450	MH19	4.050	1.465	2.135	Open Manhole	1800
4.004	o	450	MH20	4.050	1.436	2.164	Open Manhole	1800
4.005	o	450	MH21	4.050	1.375	2.225	Open Manhole	1800
5.000	o	450	MH22	3.525	2.075	1.000	Open Manhole	1800
5.001	o	450	MH23	3.525	2.037	1.038	Open Manhole	1800
5.002	o	450	MH24	3.525	1.958	1.117	Open Manhole	1800
5.003	o	450	MH25	4.000	1.944	1.606	Open Manhole	1800
6.000	o	300	MH26	3.525	2.177	1.048	Open Manhole	1200
6.001	o	300	MH27	3.525	2.084	1.141	Open Manhole	1200
5.004	o	450	MH28	3.550	1.880	1.220	Open Manhole	1800
5.005	o	450	MH29	3.525	1.853	1.222	Open Manhole	1800
5.006	o	450	MH30	4.000	1.557	1.993	Open Manhole	1800
5.007	o	450	MH31	4.050	1.465	2.135	Open Manhole	1800
5.008	o	450	MH32	4.050	1.425	2.175	Open Manhole	1800
5.009	o	450	MH33	4.050	1.362	2.238	Open Manhole	1800

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)
4.001	23.700	300.0	MH18	4.050	1.535	2.065	Open Manhole	1800
4.002	21.100	301.4	MH19	4.050	1.465	2.135	Open Manhole	1800
4.003	8.700	300.0	MH20	4.050	1.436	2.164	Open Manhole	1800
4.004	18.500	303.3	MH21	4.050	1.375	2.225	Open Manhole	1800
4.005	16.500	300.0	MH34	4.050	1.320	2.280	Open Manhole	1800
5.000	11.300	297.4	MH23	3.525	2.037	1.038	Open Manhole	1800
5.001	23.500	297.5	MH24	3.525	1.958	1.117	Open Manhole	1800
5.002	4.200	300.0	MH25	4.000	1.944	1.606	Open Manhole	1800
5.003	16.900	296.5	MH28	3.550	1.887	1.213	Open Manhole	1800
6.000	14.000	150.5	MH27	3.525	2.084	1.141	Open Manhole	1200
6.001	7.100	151.1	MH28	3.550	2.037	1.213	Open Manhole	1800
5.004	10.000	370.4	MH29	3.525	1.853	1.222	Open Manhole	1800
5.005	20.400	68.9	MH30	4.000	1.557	1.993	Open Manhole	1800
5.006	27.600	300.0	MH31	4.050	1.465	2.135	Open Manhole	1800
5.007	12.000	300.0	MH32	4.050	1.425	2.175	Open Manhole	1800
5.008	19.000	301.6	MH33	4.050	1.362	2.238	Open Manhole	1800
5.009	12.600	300.0	MH34	4.050	1.320	2.280	Open Manhole	1800

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)
4.006	o	450	MH34	4.050	1.320	2.280	Open Manhole	1800
1.008	o	600	MH35	4.050	1.150	2.300	Open Manhole	1800
1.009	o	325	PUMP AND GEO	4.050	0.458	3.267	Open Manhole	1800
1.010	o	325	MH36	4.050	2.010	1.715	Open Manhole	1200
1.011	o	675	SW-A-07	4.050	0.984	2.391	Open Manhole	1800

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)
4.006	6.000	300.0	MH35	4.050	1.300	2.300	Open Manhole	1800
1.008	15.700	490.6	PUMP AND GEO	4.050	1.118	2.332	Open Manhole	1800
1.009	20.000	-12.9	MH36	4.050	2.010	1.715	Open Manhole	1200
1.010	4.400	10.5	SW-A-07	4.050	1.590	2.135	Open Manhole	1800
1.011	10.000	500.0		4.050	0.964	2.411	Open Manhole	0

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.011		4.050	0.964	0.000	0	0

Datum (m) 0.984 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.675	15	0.675	29	0.675	43	0.675	57	0.675	71	0.675
2	0.675	16	0.675	30	0.675	44	0.675	58	0.675	72	0.675
3	0.675	17	0.675	31	0.675	45	0.675	59	0.675	73	0.675
4	0.675	18	0.675	32	0.675	46	0.675	60	0.675	74	0.675
5	0.675	19	0.675	33	0.675	47	0.675	61	0.675	75	0.675
6	0.675	20	0.675	34	0.675	48	0.675	62	0.675	76	0.675
7	0.675	21	0.675	35	0.675	49	0.675	63	0.675	77	0.675
8	0.675	22	0.675	36	0.675	50	0.675	64	0.675	78	0.675
9	0.675	23	0.675	37	0.675	51	0.675	65	0.675	79	0.675
10	0.675	24	0.675	38	0.675	52	0.675	66	0.675	80	0.675
11	0.675	25	0.675	39	0.675	53	0.675	67	0.675	81	0.675
12	0.675	26	0.675	40	0.675	54	0.675	68	0.675	82	0.675
13	0.675	27	0.675	41	0.675	55	0.675	69	0.675	83	0.675
14	0.675	28	0.675	42	0.675	56	0.675	70	0.675	84	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
85	0.675	135	0.675	185	0.675	235	0.675	285	0.675	335	0.675
86	0.675	136	0.675	186	0.675	236	0.675	286	0.675	336	0.675
87	0.675	137	0.675	187	0.675	237	0.675	287	0.675	337	0.675
88	0.675	138	0.675	188	0.675	238	0.675	288	0.675	338	0.675
89	0.675	139	0.675	189	0.675	239	0.675	289	0.675	339	0.675
90	0.675	140	0.675	190	0.675	240	0.675	290	0.675	340	0.675
91	0.675	141	0.675	191	0.675	241	0.675	291	0.675	341	0.675
92	0.675	142	0.675	192	0.675	242	0.675	292	0.675	342	0.675
93	0.675	143	0.675	193	0.675	243	0.675	293	0.675	343	0.675
94	0.675	144	0.675	194	0.675	244	0.675	294	0.675	344	0.675
95	0.675	145	0.675	195	0.675	245	0.675	295	0.675	345	0.675
96	0.675	146	0.675	196	0.675	246	0.675	296	0.675	346	0.675
97	0.675	147	0.675	197	0.675	247	0.675	297	0.675	347	0.675
98	0.675	148	0.675	198	0.675	248	0.675	298	0.675	348	0.675
99	0.675	149	0.675	199	0.675	249	0.675	299	0.675	349	0.675
100	0.675	150	0.675	200	0.675	250	0.675	300	0.675	350	0.675
101	0.675	151	0.675	201	0.675	251	0.675	301	0.675	351	0.675
102	0.675	152	0.675	202	0.675	252	0.675	302	0.675	352	0.675
103	0.675	153	0.675	203	0.675	253	0.675	303	0.675	353	0.675
104	0.675	154	0.675	204	0.675	254	0.675	304	0.675	354	0.675
105	0.675	155	0.675	205	0.675	255	0.675	305	0.675	355	0.675
106	0.675	156	0.675	206	0.675	256	0.675	306	0.675	356	0.675
107	0.675	157	0.675	207	0.675	257	0.675	307	0.675	357	0.675
108	0.675	158	0.675	208	0.675	258	0.675	308	0.675	358	0.675
109	0.675	159	0.675	209	0.675	259	0.675	309	0.675	359	0.675
110	0.675	160	0.675	210	0.675	260	0.675	310	0.675	360	0.675
111	0.675	161	0.675	211	0.675	261	0.675	311	0.675	361	0.675
112	0.675	162	0.675	212	0.675	262	0.675	312	0.675	362	0.675
113	0.675	163	0.675	213	0.675	263	0.675	313	0.675	363	0.675
114	0.675	164	0.675	214	0.675	264	0.675	314	0.675	364	0.675
115	0.675	165	0.675	215	0.675	265	0.675	315	0.675	365	0.675
116	0.675	166	0.675	216	0.675	266	0.675	316	0.675	366	0.675
117	0.675	167	0.675	217	0.675	267	0.675	317	0.675	367	0.675
118	0.675	168	0.675	218	0.675	268	0.675	318	0.675	368	0.675
119	0.675	169	0.675	219	0.675	269	0.675	319	0.675	369	0.675
120	0.675	170	0.675	220	0.675	270	0.675	320	0.675	370	0.675
121	0.675	171	0.675	221	0.675	271	0.675	321	0.675	371	0.675
122	0.675	172	0.675	222	0.675	272	0.675	322	0.675	372	0.675
123	0.675	173	0.675	223	0.675	273	0.675	323	0.675	373	0.675
124	0.675	174	0.675	224	0.675	274	0.675	324	0.675	374	0.675
125	0.675	175	0.675	225	0.675	275	0.675	325	0.675	375	0.675
126	0.675	176	0.675	226	0.675	276	0.675	326	0.675	376	0.675
127	0.675	177	0.675	227	0.675	277	0.675	327	0.675	377	0.675
128	0.675	178	0.675	228	0.675	278	0.675	328	0.675	378	0.675
129	0.675	179	0.675	229	0.675	279	0.675	329	0.675	379	0.675
130	0.675	180	0.675	230	0.675	280	0.675	330	0.675	380	0.675
131	0.675	181	0.675	231	0.675	281	0.675	331	0.675	381	0.675
132	0.675	182	0.675	232	0.675	282	0.675	332	0.675	382	0.675
133	0.675	183	0.675	233	0.675	283	0.675	333	0.675	383	0.675
134	0.675	184	0.675	234	0.675	284	0.675	334	0.675	384	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
385	0.675	435	0.675	485	0.675	535	0.675	585	0.675	635	0.675
386	0.675	436	0.675	486	0.675	536	0.675	586	0.675	636	0.675
387	0.675	437	0.675	487	0.675	537	0.675	587	0.675	637	0.675
388	0.675	438	0.675	488	0.675	538	0.675	588	0.675	638	0.675
389	0.675	439	0.675	489	0.675	539	0.675	589	0.675	639	0.675
390	0.675	440	0.675	490	0.675	540	0.675	590	0.675	640	0.675
391	0.675	441	0.675	491	0.675	541	0.675	591	0.675	641	0.675
392	0.675	442	0.675	492	0.675	542	0.675	592	0.675	642	0.675
393	0.675	443	0.675	493	0.675	543	0.675	593	0.675	643	0.675
394	0.675	444	0.675	494	0.675	544	0.675	594	0.675	644	0.675
395	0.675	445	0.675	495	0.675	545	0.675	595	0.675	645	0.675
396	0.675	446	0.675	496	0.675	546	0.675	596	0.675	646	0.675
397	0.675	447	0.675	497	0.675	547	0.675	597	0.675	647	0.675
398	0.675	448	0.675	498	0.675	548	0.675	598	0.675	648	0.675
399	0.675	449	0.675	499	0.675	549	0.675	599	0.675	649	0.675
400	0.675	450	0.675	500	0.675	550	0.675	600	0.675	650	0.675
401	0.675	451	0.675	501	0.675	551	0.675	601	0.675	651	0.675
402	0.675	452	0.675	502	0.675	552	0.675	602	0.675	652	0.675
403	0.675	453	0.675	503	0.675	553	0.675	603	0.675	653	0.675
404	0.675	454	0.675	504	0.675	554	0.675	604	0.675	654	0.675
405	0.675	455	0.675	505	0.675	555	0.675	605	0.675	655	0.675
406	0.675	456	0.675	506	0.675	556	0.675	606	0.675	656	0.675
407	0.675	457	0.675	507	0.675	557	0.675	607	0.675	657	0.675
408	0.675	458	0.675	508	0.675	558	0.675	608	0.675	658	0.675
409	0.675	459	0.675	509	0.675	559	0.675	609	0.675	659	0.675
410	0.675	460	0.675	510	0.675	560	0.675	610	0.675	660	0.675
411	0.675	461	0.675	511	0.675	561	0.675	611	0.675	661	0.675
412	0.675	462	0.675	512	0.675	562	0.675	612	0.675	662	0.675
413	0.675	463	0.675	513	0.675	563	0.675	613	0.675	663	0.675
414	0.675	464	0.675	514	0.675	564	0.675	614	0.675	664	0.675
415	0.675	465	0.675	515	0.675	565	0.675	615	0.675	665	0.675
416	0.675	466	0.675	516	0.675	566	0.675	616	0.675	666	0.675
417	0.675	467	0.675	517	0.675	567	0.675	617	0.675	667	0.675
418	0.675	468	0.675	518	0.675	568	0.675	618	0.675	668	0.675
419	0.675	469	0.675	519	0.675	569	0.675	619	0.675	669	0.675
420	0.675	470	0.675	520	0.675	570	0.675	620	0.675	670	0.675
421	0.675	471	0.675	521	0.675	571	0.675	621	0.675	671	0.675
422	0.675	472	0.675	522	0.675	572	0.675	622	0.675	672	0.675
423	0.675	473	0.675	523	0.675	573	0.675	623	0.675	673	0.675
424	0.675	474	0.675	524	0.675	574	0.675	624	0.675	674	0.675
425	0.675	475	0.675	525	0.675	575	0.675	625	0.675	675	0.675
426	0.675	476	0.675	526	0.675	576	0.675	626	0.675	676	0.675
427	0.675	477	0.675	527	0.675	577	0.675	627	0.675	677	0.675
428	0.675	478	0.675	528	0.675	578	0.675	628	0.675	678	0.675
429	0.675	479	0.675	529	0.675	579	0.675	629	0.675	679	0.675
430	0.675	480	0.675	530	0.675	580	0.675	630	0.675	680	0.675
431	0.675	481	0.675	531	0.675	581	0.675	631	0.675	681	0.675
432	0.675	482	0.675	532	0.675	582	0.675	632	0.675	682	0.675
433	0.675	483	0.675	533	0.675	583	0.675	633	0.675	683	0.675
434	0.675	484	0.675	534	0.675	584	0.675	634	0.675	684	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
685	0.675	735	0.675	785	0.675	835	0.675	885	0.675	935	0.675
686	0.675	736	0.675	786	0.675	836	0.675	886	0.675	936	0.675
687	0.675	737	0.675	787	0.675	837	0.675	887	0.675	937	0.675
688	0.675	738	0.675	788	0.675	838	0.675	888	0.675	938	0.675
689	0.675	739	0.675	789	0.675	839	0.675	889	0.675	939	0.675
690	0.675	740	0.675	790	0.675	840	0.675	890	0.675	940	0.675
691	0.675	741	0.675	791	0.675	841	0.675	891	0.675	941	0.675
692	0.675	742	0.675	792	0.675	842	0.675	892	0.675	942	0.675
693	0.675	743	0.675	793	0.675	843	0.675	893	0.675	943	0.675
694	0.675	744	0.675	794	0.675	844	0.675	894	0.675	944	0.675
695	0.675	745	0.675	795	0.675	845	0.675	895	0.675	945	0.675
696	0.675	746	0.675	796	0.675	846	0.675	896	0.675	946	0.675
697	0.675	747	0.675	797	0.675	847	0.675	897	0.675	947	0.675
698	0.675	748	0.675	798	0.675	848	0.675	898	0.675	948	0.675
699	0.675	749	0.675	799	0.675	849	0.675	899	0.675	949	0.675
700	0.675	750	0.675	800	0.675	850	0.675	900	0.675	950	0.675
701	0.675	751	0.675	801	0.675	851	0.675	901	0.675	951	0.675
702	0.675	752	0.675	802	0.675	852	0.675	902	0.675	952	0.675
703	0.675	753	0.675	803	0.675	853	0.675	903	0.675	953	0.675
704	0.675	754	0.675	804	0.675	854	0.675	904	0.675	954	0.675
705	0.675	755	0.675	805	0.675	855	0.675	905	0.675	955	0.675
706	0.675	756	0.675	806	0.675	856	0.675	906	0.675	956	0.675
707	0.675	757	0.675	807	0.675	857	0.675	907	0.675	957	0.675
708	0.675	758	0.675	808	0.675	858	0.675	908	0.675	958	0.675
709	0.675	759	0.675	809	0.675	859	0.675	909	0.675	959	0.675
710	0.675	760	0.675	810	0.675	860	0.675	910	0.675	960	0.675
711	0.675	761	0.675	811	0.675	861	0.675	911	0.675	961	0.675
712	0.675	762	0.675	812	0.675	862	0.675	912	0.675	962	0.675
713	0.675	763	0.675	813	0.675	863	0.675	913	0.675	963	0.675
714	0.675	764	0.675	814	0.675	864	0.675	914	0.675	964	0.675
715	0.675	765	0.675	815	0.675	865	0.675	915	0.675	965	0.675
716	0.675	766	0.675	816	0.675	866	0.675	916	0.675	966	0.675
717	0.675	767	0.675	817	0.675	867	0.675	917	0.675	967	0.675
718	0.675	768	0.675	818	0.675	868	0.675	918	0.675	968	0.675
719	0.675	769	0.675	819	0.675	869	0.675	919	0.675	969	0.675
720	0.675	770	0.675	820	0.675	870	0.675	920	0.675	970	0.675
721	0.675	771	0.675	821	0.675	871	0.675	921	0.675	971	0.675
722	0.675	772	0.675	822	0.675	872	0.675	922	0.675	972	0.675
723	0.675	773	0.675	823	0.675	873	0.675	923	0.675	973	0.675
724	0.675	774	0.675	824	0.675	874	0.675	924	0.675	974	0.675
725	0.675	775	0.675	825	0.675	875	0.675	925	0.675	975	0.675
726	0.675	776	0.675	826	0.675	876	0.675	926	0.675	976	0.675
727	0.675	777	0.675	827	0.675	877	0.675	927	0.675	977	0.675
728	0.675	778	0.675	828	0.675	878	0.675	928	0.675	978	0.675
729	0.675	779	0.675	829	0.675	879	0.675	929	0.675	979	0.675
730	0.675	780	0.675	830	0.675	880	0.675	930	0.675	980	0.675
731	0.675	781	0.675	831	0.675	881	0.675	931	0.675	981	0.675
732	0.675	782	0.675	832	0.675	882	0.675	932	0.675	982	0.675
733	0.675	783	0.675	833	0.675	883	0.675	933	0.675	983	0.675
734	0.675	784	0.675	834	0.675	884	0.675	934	0.675	984	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
985	0.675	1035	0.675	1085	0.675	1135	0.675	1185	0.675	1235	0.675
986	0.675	1036	0.675	1086	0.675	1136	0.675	1186	0.675	1236	0.675
987	0.675	1037	0.675	1087	0.675	1137	0.675	1187	0.675	1237	0.675
988	0.675	1038	0.675	1088	0.675	1138	0.675	1188	0.675	1238	0.675
989	0.675	1039	0.675	1089	0.675	1139	0.675	1189	0.675	1239	0.675
990	0.675	1040	0.675	1090	0.675	1140	0.675	1190	0.675	1240	0.675
991	0.675	1041	0.675	1091	0.675	1141	0.675	1191	0.675	1241	0.675
992	0.675	1042	0.675	1092	0.675	1142	0.675	1192	0.675	1242	0.675
993	0.675	1043	0.675	1093	0.675	1143	0.675	1193	0.675	1243	0.675
994	0.675	1044	0.675	1094	0.675	1144	0.675	1194	0.675	1244	0.675
995	0.675	1045	0.675	1095	0.675	1145	0.675	1195	0.675	1245	0.675
996	0.675	1046	0.675	1096	0.675	1146	0.675	1196	0.675	1246	0.675
997	0.675	1047	0.675	1097	0.675	1147	0.675	1197	0.675	1247	0.675
998	0.675	1048	0.675	1098	0.675	1148	0.675	1198	0.675	1248	0.675
999	0.675	1049	0.675	1099	0.675	1149	0.675	1199	0.675	1249	0.675
1000	0.675	1050	0.675	1100	0.675	1150	0.675	1200	0.675	1250	0.675
1001	0.675	1051	0.675	1101	0.675	1151	0.675	1201	0.675	1251	0.675
1002	0.675	1052	0.675	1102	0.675	1152	0.675	1202	0.675	1252	0.675
1003	0.675	1053	0.675	1103	0.675	1153	0.675	1203	0.675	1253	0.675
1004	0.675	1054	0.675	1104	0.675	1154	0.675	1204	0.675	1254	0.675
1005	0.675	1055	0.675	1105	0.675	1155	0.675	1205	0.675	1255	0.675
1006	0.675	1056	0.675	1106	0.675	1156	0.675	1206	0.675	1256	0.675
1007	0.675	1057	0.675	1107	0.675	1157	0.675	1207	0.675	1257	0.675
1008	0.675	1058	0.675	1108	0.675	1158	0.675	1208	0.675	1258	0.675
1009	0.675	1059	0.675	1109	0.675	1159	0.675	1209	0.675	1259	0.675
1010	0.675	1060	0.675	1110	0.675	1160	0.675	1210	0.675	1260	0.675
1011	0.675	1061	0.675	1111	0.675	1161	0.675	1211	0.675	1261	0.675
1012	0.675	1062	0.675	1112	0.675	1162	0.675	1212	0.675	1262	0.675
1013	0.675	1063	0.675	1113	0.675	1163	0.675	1213	0.675	1263	0.675
1014	0.675	1064	0.675	1114	0.675	1164	0.675	1214	0.675	1264	0.675
1015	0.675	1065	0.675	1115	0.675	1165	0.675	1215	0.675	1265	0.675
1016	0.675	1066	0.675	1116	0.675	1166	0.675	1216	0.675	1266	0.675
1017	0.675	1067	0.675	1117	0.675	1167	0.675	1217	0.675	1267	0.675
1018	0.675	1068	0.675	1118	0.675	1168	0.675	1218	0.675	1268	0.675
1019	0.675	1069	0.675	1119	0.675	1169	0.675	1219	0.675	1269	0.675
1020	0.675	1070	0.675	1120	0.675	1170	0.675	1220	0.675	1270	0.675
1021	0.675	1071	0.675	1121	0.675	1171	0.675	1221	0.675	1271	0.675
1022	0.675	1072	0.675	1122	0.675	1172	0.675	1222	0.675	1272	0.675
1023	0.675	1073	0.675	1123	0.675	1173	0.675	1223	0.675	1273	0.675
1024	0.675	1074	0.675	1124	0.675	1174	0.675	1224	0.675	1274	0.675
1025	0.675	1075	0.675	1125	0.675	1175	0.675	1225	0.675	1275	0.675
1026	0.675	1076	0.675	1126	0.675	1176	0.675	1226	0.675	1276	0.675
1027	0.675	1077	0.675	1127	0.675	1177	0.675	1227	0.675	1277	0.675
1028	0.675	1078	0.675	1128	0.675	1178	0.675	1228	0.675	1278	0.675
1029	0.675	1079	0.675	1129	0.675	1179	0.675	1229	0.675	1279	0.675
1030	0.675	1080	0.675	1130	0.675	1180	0.675	1230	0.675	1280	0.675
1031	0.675	1081	0.675	1131	0.675	1181	0.675	1231	0.675	1281	0.675
1032	0.675	1082	0.675	1132	0.675	1182	0.675	1232	0.675	1282	0.675
1033	0.675	1083	0.675	1133	0.675	1183	0.675	1233	0.675	1283	0.675
1034	0.675	1084	0.675	1134	0.675	1184	0.675	1234	0.675	1284	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1285	0.675	1311	0.675	1337	0.675	1363	0.675	1389	0.675	1415	0.675
1286	0.675	1312	0.675	1338	0.675	1364	0.675	1390	0.675	1416	0.675
1287	0.675	1313	0.675	1339	0.675	1365	0.675	1391	0.675	1417	0.675
1288	0.675	1314	0.675	1340	0.675	1366	0.675	1392	0.675	1418	0.675
1289	0.675	1315	0.675	1341	0.675	1367	0.675	1393	0.675	1419	0.675
1290	0.675	1316	0.675	1342	0.675	1368	0.675	1394	0.675	1420	0.675
1291	0.675	1317	0.675	1343	0.675	1369	0.675	1395	0.675	1421	0.675
1292	0.675	1318	0.675	1344	0.675	1370	0.675	1396	0.675	1422	0.675
1293	0.675	1319	0.675	1345	0.675	1371	0.675	1397	0.675	1423	0.675
1294	0.675	1320	0.675	1346	0.675	1372	0.675	1398	0.675	1424	0.675
1295	0.675	1321	0.675	1347	0.675	1373	0.675	1399	0.675	1425	0.675
1296	0.675	1322	0.675	1348	0.675	1374	0.675	1400	0.675	1426	0.675
1297	0.675	1323	0.675	1349	0.675	1375	0.675	1401	0.675	1427	0.675
1298	0.675	1324	0.675	1350	0.675	1376	0.675	1402	0.675	1428	0.675
1299	0.675	1325	0.675	1351	0.675	1377	0.675	1403	0.675	1429	0.675
1300	0.675	1326	0.675	1352	0.675	1378	0.675	1404	0.675	1430	0.675
1301	0.675	1327	0.675	1353	0.675	1379	0.675	1405	0.675	1431	0.675
1302	0.675	1328	0.675	1354	0.675	1380	0.675	1406	0.675	1432	0.675
1303	0.675	1329	0.675	1355	0.675	1381	0.675	1407	0.675	1433	0.675
1304	0.675	1330	0.675	1356	0.675	1382	0.675	1408	0.675	1434	0.675
1305	0.675	1331	0.675	1357	0.675	1383	0.675	1409	0.675	1435	0.675
1306	0.675	1332	0.675	1358	0.675	1384	0.675	1410	0.675	1436	0.675
1307	0.675	1333	0.675	1359	0.675	1385	0.675	1411	0.675	1437	0.675
1308	0.675	1334	0.675	1360	0.675	1386	0.675	1412	0.675	1438	0.675
1309	0.675	1335	0.675	1361	0.675	1387	0.675	1413	0.675	1439	0.675
1310	0.675	1336	0.675	1362	0.675	1388	0.675	1414	0.675	1440	0.675

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
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	FSR	Profile Type	Summer
Return Period (years)	5	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.402		

Online Controls for Storm

Pump Manhole: PUMP AND GEO, DS/PN: 1.009, Volume (m³): 13.1

Invert Level (m) 0.458

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.0000	0.900	65.0000	1.700	65.0000	2.500	65.0000
0.200	13.0000	1.000	65.0000	1.800	65.0000	2.600	65.0000
0.300	16.0000	1.100	65.0000	1.900	65.0000	2.700	65.0000
0.400	30.0000	1.200	65.0000	2.000	65.0000	2.800	65.0000
0.500	65.0000	1.300	65.0000	2.100	65.0000	2.900	65.0000
0.600	65.0000	1.400	65.0000	2.200	65.0000	3.000	65.0000
0.700	65.0000	1.500	65.0000	2.300	65.0000		
0.800	65.0000	1.600	65.0000	2.400	65.0000		

Storage Structures for Storm

Cellular Storage Manhole: PUMP AND GEO, DS/PN: 1.009

Invert Level (m) 0.458 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	307.2	0.0	1.670	307.2	0.0
0.660	307.2	0.0	1.671	0.0	0.0
1.320	307.2	0.0			

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	1
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	2013
Site Location	GB 623065 309383 TG 23065 09383
Data Type	Point
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	OFF

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	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)
1.000	MH01	15 minute 100 year Winter I+45%	4.950	3.695	0.195	0.000	0.554
1.001	MH02	15 minute 100 year Winter I+45%	4.950	3.671	0.480	0.000	2.156
1.002	MH03	15 minute 100 year Winter I+45%	4.500	3.588	0.460	0.000	1.653
2.000	MH04	15 minute 100 year Winter I+45%	4.050	3.698	0.427	0.000	0.817
2.001	MH05	15 minute 100 year Winter I+45%	4.050	3.675	0.470	0.000	1.713
2.002	MH06	15 minute 100 year Winter I+45%	4.050	3.596	0.452	0.000	1.587
1.003	MH07	15 minute 100 year Winter I+45%	4.050	3.460	0.432	0.000	5.073
1.004	MH08	120 minute 100 year Winter I+45%	4.050	3.393	0.581	0.000	4.041
1.005	MH09	120 minute 100 year Winter I+45%	4.050	3.388	0.824	0.000	4.914
1.006	MH10	120 minute 100 year Winter I+45%	4.050	3.383	1.031	0.000	5.155
3.000	MH11	120 minute 100 year Winter I+45%	4.500	3.394	0.278	0.000	0.649
3.001	MH12	120 minute 100 year Winter I+45%	4.350	3.393	0.326	0.000	1.310
3.002	MH13	120 minute 100 year Winter I+45%	4.150	3.390	0.376	0.000	1.423
3.003	MH14	120 minute 100 year Winter I+45%	4.050	3.384	0.473	0.000	2.240
1.007	MH15	120 minute 100 year Winter I+45%	4.050	3.376	1.296	0.000	7.262
4.000	MH16	120 minute 100 year Winter I+45%	3.525	3.386	1.257	0.000	4.331

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

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	MH01		37.1	SURCHARGED
1.001	MH02		63.4	SURCHARGED
1.002	MH03		90.9	SURCHARGED
2.000	MH04		31.8	SURCHARGED
2.001	MH05		59.7	SURCHARGED
2.002	MH06		90.2	SURCHARGED
1.003	MH07		181.7	SURCHARGED
1.004	MH08		86.3	SURCHARGED
1.005	MH09		97.0	SURCHARGED
1.006	MH10		107.7	SURCHARGED
3.000	MH11		10.8	SURCHARGED
3.001	MH12		21.7	SURCHARGED
3.002	MH13		32.2	SURCHARGED
3.003	MH14		43.2	SURCHARGED
1.007	MH15		161.5	SURCHARGED
4.000	MH16		10.7	FLOOD RISK

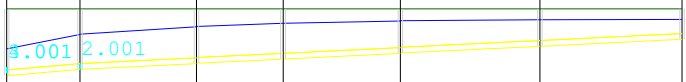
100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

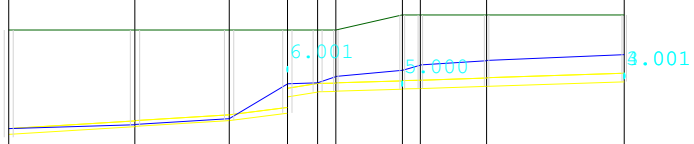
PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
4.001	MH17	120 minute 100 year Winter I+45%	3.525	3.385	1.321	0.000
4.002	MH18	120 minute 100 year Winter I+45%	4.050	3.384	1.399	0.000
4.003	MH19	120 minute 100 year Winter I+45%	4.050	3.381	1.466	0.000
4.004	MH20	120 minute 100 year Winter I+45%	4.050	3.379	1.493	0.000
4.005	MH21	120 minute 100 year Winter I+45%	4.050	3.376	1.551	0.000
5.000	MH22	120 minute 100 year Winter I+45%	3.525	3.413	0.888	0.000
5.001	MH23	120 minute 100 year Winter I+45%	3.525	3.412	0.925	0.000
5.002	MH24	120 minute 100 year Winter I+45%	3.525	3.410	1.002	0.000
5.003	MH25	120 minute 100 year Winter I+45%	4.000	3.410	1.016	0.000
6.000	MH26	120 minute 100 year Winter I+45%	3.525	3.411	0.934	0.000
6.001	MH27	120 minute 100 year Winter I+45%	3.525	3.409	1.025	0.000
5.004	MH28	120 minute 100 year Winter I+45%	3.550	3.407	1.077	0.000
5.005	MH29	120 minute 100 year Winter I+45%	3.525	3.404	1.101	0.000
5.006	MH30	120 minute 100 year Winter I+45%	4.000	3.398	1.391	0.000
5.007	MH31	120 minute 100 year Winter I+45%	4.050	3.391	1.476	0.000
5.008	MH32	120 minute 100 year Winter I+45%	4.050	3.386	1.511	0.000
5.009	MH33	120 minute 100 year Winter I+45%	4.050	3.378	1.566	0.000
4.006	MH34	120 minute 100 year Winter I+45%	4.050	3.371	1.601	0.000
1.008	MH35	120 minute 100 year Winter I+45%	4.050	3.365	1.615	0.000
1.009	PUMP AND GEO	120 minute 100 year Winter I+45%	4.050	3.353	2.570	0.000
1.010	MH36	480 minute 100 year Winter I+45%	4.050	2.141	-0.194	0.000
1.011	SW-A-07	480 minute 100 year Winter I+45%	4.050	1.666	0.007	0.000

PN	US/MH Name	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
4.001	MH17	7.310		20.8	FLOOD RISK
4.002	MH18	8.174		30.6	SURCHARGED
4.003	MH19	7.933		40.4	SURCHARGED
4.004	MH20	6.030		50.3	SURCHARGED
4.005	MH21	7.734		60.1	SURCHARGED
5.000	MH22	3.391		10.0	FLOOD RISK
5.001	MH23	4.997		19.3	FLOOD RISK
5.002	MH24	7.135		28.4	FLOOD RISK
5.003	MH25	4.099		38.4	SURCHARGED
6.000	MH26	1.390		10.3	FLOOD RISK
6.001	MH27	2.398		20.3	FLOOD RISK
5.004	MH28	6.671		67.8	FLOOD RISK
5.005	MH29	5.238		76.2	FLOOD RISK
5.006	MH30	7.631		84.7	SURCHARGED
5.007	MH31	8.992		93.7	SURCHARGED
5.008	MH32	6.599		103.0	SURCHARGED
5.009	MH33	7.853		113.0	SURCHARGED
4.006	MH34	9.263		183.2	SURCHARGED
1.008	MH35	8.630		344.1	SURCHARGED
1.009	PUMP AND GEO	500.184	133	65.0	SURCHARGED

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

PN	US/MH Name	Maximum Vol (m^3)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.010	MH36	0.168		65.0	OK
1.011	SW-A-07	1.726		65.0	SURCHARGED

MH Name	B11		B05		B03	B02	B01	
Hor Scale 1000 Ver Scale 200 Datum (m)0.000								
PN			1.004		1.002	1.001	1.000	
Dia (mm)			150		150	150	150	
Slope (1:X)			100.0		100.0	100.0	100.0	
Cover Level (m)	5.400	5.400	5.400	5.400	5.400	5.400	5.400	
Invert Level (m)		3.631	3.803	3.957	3.957	4.072	4.072	4.227	4.227	4.412	4.412	4.600	
Length (m)			15.400		15.500	18.500	18.800	

MH Name	AW-0452	ADOPT	ADOPT						B11	
Hor Scale 1000 Ver Scale 200 Datum (m)-1.000										
PN		1.014	1.013						1.006	
Dia (mm)		150	150						225	
Slope (1:X)		79.5	78.1						150.4	
Cover Level (m)	5.000	5.000	5.000	5.000	5.000	5.400	5.400	5.400		
Invert Level (m)		2.235	2.445	2.445	2.605	2.605	2.800	3.359	3.375	3.434	3.450	3.510	3.510	3.631	
Length (m)		16.700	12.500						18.200	

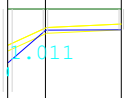
MH Name	ADOPT		
Hor Scale 1000 Ver Scale 200 Datum (m)-1.000			
PN			
Dia (mm)			
Slope (1:X)			
Cover Level (m)	5.000	5.000	
Invert Level (m)		2.093	2.160
Length (m)			

MH Name	B08	B07	B06	
Hor Scale 1000 Ver Scale 200 Datum (m)0.000		1.004		
PN		2.001	2.000	
Dia (mm)		150	150	
Slope (1:X)		30.2	100.0	
Cover Level (m)	5.400	5.400	5.400	
Invert Level (m)		3.803	4.418	4.418	4.600
Length (m)		18.600	18.200	

MH Name	B11	B10		
Hor Scale 1000 Ver Scale 200 Datum (m) 0.000				
PN		3.001		
Dia (mm)		150		
Slope (1:X)		14.8		
Cover Level (m)	5.400	5.400	5.400	
Invert Level (m)		3.706	4.530	4.600
Length (m)		12.200		

MH Name	B11			
Hor Scale 1000 Ver Scale 200 Datum (m) 0.000				
PN				
Dia (mm)				
Slope (1:X)				
Cover Level (m)	5.400	5.400	5.400	
Invert Level (m)		4.750	4.750	4.875
Length (m)				

MH Name	B15		
Hor Scale 1000 Ver Scale 200 Datum (m)0.000			
PN			
Dia (mm)			
Slope (1:X)			
Cover Level (m)	5.400	5.400	
Invert Level (m)		4.000	
Length (m)			

MH Name	GEO AND HYDRO			
Hor Scale 1000 Ver Scale 200 Datum (m)-1.000				
PN				
Dia (mm)				
Slope (1:X)				
Cover Level (m)	5.000	5.000	5.000	
Invert Level (m)		4.350	4.350 4.450	
Length (m)				

Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
* 1.000	18.800	0.188	100.0	0.007	3.00	0.600	o	150	Pipe/Conduit
* 1.001	18.500	0.185	100.0	0.007	0.00	0.600	o	150	Pipe/Conduit
* 1.002	15.500	0.155	100.0	0.007	0.00	0.600	o	150	Pipe/Conduit
* 1.003	11.500	0.115	100.0	0.007	0.00	0.600	o	150	Pipe/Conduit
* 1.004	15.400	0.154	100.0	0.008	0.00	0.600	o	150	Pipe/Conduit
* 2.000	18.200	0.182	100.0	0.008	3.00	0.600	o	150	Pipe/Conduit
* 2.001	18.600	0.615	30.2	0.008	0.00	0.600	o	150	Pipe/Conduit
* 1.005	9.700	0.172	56.4	0.008	0.00	0.600	o	150	Pipe/Conduit
* 3.000	5.600	0.070	80.0	0.007	3.00	0.600	o	150	Pipe/Conduit
* 3.001	12.200	0.824	14.8	0.007	0.00	0.600	o	150	Pipe/Conduit
* 4.000	10.000	0.125	80.0	0.000	3.00	0.600	o	150	Pipe/Conduit
* 4.001	5.000	1.044	4.8	0.048	0.00	0.600	o	150	Pipe/Conduit
* 1.006	18.200	0.121	150.4	0.007	0.00	0.600	o	225	Pipe/Conduit
* 1.007	8.800	0.060	146.7	0.007	0.00	0.600	o	225	Pipe/Conduit
* 1.008	2.400	0.016	150.0	0.007	0.00	0.600	o	225	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* 1.000	B01	5.400	4.600	0.650	5.400	4.412	0.838		600
* 1.001	B02	5.400	4.412	0.838	5.400	4.227	1.023		600
* 1.002	B03	5.400	4.227	1.023	5.400	4.072	1.178		600
* 1.003	B04	5.400	4.072	1.178	5.400	3.957	1.293		600
* 1.004	B05	5.400	3.957	1.293	5.400	3.803	1.447		600
* 2.000	B06	5.400	4.600	0.650	5.400	4.418	0.832		600
* 2.001	B07	5.400	4.418	0.832	5.400	3.803	1.447		600
* 1.005	B08	5.400	3.803	1.447	5.400	3.631	1.619		600
* 3.000	B09	5.400	4.600	0.650	5.400	4.530	0.720		600
* 3.001	B10	5.400	4.530	0.720	5.400	3.706	1.544		600
* 4.000	DUMMY	5.400	4.875	0.375	5.400	4.750	0.500		600
* 4.001	B-PP1	5.400	4.750	0.500	5.400	3.706	1.544	Orifice	600
* 1.006	B11	5.400	3.631	1.544	5.400	3.510	1.665		600
* 1.007	B12	5.400	3.510	1.665	5.400	3.450	1.725		600
* 1.008	B13	5.400	3.450	1.725	5.400	3.434	1.741		600

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
* 5.000	6.700	0.491	13.6	0.007	3.00	0.600	o	150	Pipe/Conduit
* 1.009	8.800	0.059	149.2	0.000	0.00	0.600	o	225	Pipe/Conduit
* 1.010	2.400	0.016	150.0	0.000	0.00	0.600	o	225	Pipe/Conduit
* 1.011	4.000	0.129	31.0	0.000	0.00	0.600	o	225	Pipe/Conduit
* 6.000	10.000	0.100	100.0	0.000	5.00	0.600	o	150	Pipe/Conduit
* 6.001	5.000	0.460	10.9	0.015	0.00	0.600	o	150	Pipe/Conduit
* 1.012	7.700	0.195	39.5	0.000	0.00	0.600	o	150	Pipe/Conduit
* 1.013	12.500	0.160	78.1	0.000	0.00	0.600	o	150	Pipe/Conduit
* 1.014	16.700	0.210	79.5	0.000	0.00	0.600	o	150	Pipe/Conduit
* 1.015	10.000	0.067	149.3	0.000	0.00	0.600	o	225	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* 5.000	B14	5.400	4.000	1.250	5.400	3.509	1.741		600
* 1.009	B15	5.400	3.434	1.741	5.000	3.375	1.400		600
* 1.010	B16	5.000	3.375	1.400	5.000	3.359	1.416		600
* 1.011	B17	5.000	3.359	1.416	5.000	3.230	1.545		1200
* 6.000	DUMMY	5.000	4.450	0.400	5.000	4.350	0.500		600
* 6.001	B-PP2	5.000	4.350	0.500	5.000	3.890	0.960	Orifice	600
* 1.012	GEO AND HYDRO	5.000	2.800	2.050	5.000	2.605	2.245	Hydro-Brake®	1200
* 1.013	ADOPT	5.000	2.605	2.245	5.000	2.445	2.405		1200
* 1.014	ADOPT	5.000	2.445	2.405	5.000	2.235	2.615		1200
* 1.015	AW-0452	5.000	2.160	2.615	5.000	2.093	2.682		1200

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)	Back (m
B01	5.400	0.800	Open Manhole	600	1.000	4.600	150				
B02	5.400	0.988	Open Manhole	600	1.001	4.412	150	1.000	4.412	150	
B03	5.400	1.173	Open Manhole	600	1.002	4.227	150	1.001	4.227	150	
B04	5.400	1.328	Open Manhole	600	1.003	4.072	150	1.002	4.072	150	
B05	5.400	1.443	Open Manhole	600	1.004	3.957	150	1.003	3.957	150	
B06	5.400	0.800	Open Manhole	600	2.000	4.600	150				
B07	5.400	0.982	Open Manhole	600	2.001	4.418	150	2.000	4.418	150	
B08	5.400	1.597	Open Manhole	600	1.005	3.803	150	1.004	3.803	150	
								2.001	3.803	150	
B09	5.400	0.800	Open Manhole	600	3.000	4.600	150				
B10	5.400	0.870	Open Manhole	600	3.001	4.530	150	3.000	4.530	150	
DUMMY	5.400	0.525	Open Manhole	600	4.000	4.875	150				
B-PP1	5.400	0.650	Open Manhole	600	4.001	4.750	150	4.000	4.750	150	
B11	5.400	1.769	Open Manhole	600	1.006	3.631	225	1.005	3.631	150	
								3.001	3.706	150	
								4.001	3.706	150	
B12	5.400	1.890	Open Manhole	600	1.007	3.510	225	1.006	3.510	225	
B13	5.400	1.950	Open Manhole	600	1.008	3.450	225	1.007	3.450	225	
B14	5.400	1.400	Open Manhole	600	5.000	4.000	150				
B15	5.400	1.966	Open Manhole	600	1.009	3.434	225	1.008	3.434	225	
								5.000	3.509	150	
B16	5.000	1.625	Open Manhole	600	1.010	3.375	225	1.009	3.375	225	
B17	5.000	1.641	Open Manhole	1200	1.011	3.359	225	1.010	3.359	225	
DUMMY	5.000	0.550	Open Manhole	600	6.000	4.450	150				
B-PP2	5.000	0.650	Open Manhole	600	6.001	4.350	150	6.000	4.350	150	
GEO AND HYDRO	5.000	2.200	Open Manhole	1200	1.012	2.800	150	1.011	3.230	225	
								6.001	3.890	150	
ADOPT	5.000	2.395	Open Manhole	1200	1.013	2.605	150	1.012	2.605	150	
ADOPT	5.000	2.555	Open Manhole	1200	1.014	2.445	150	1.013	2.445	150	
AW-0452	5.000	2.840	Open Manhole	1200	1.015	2.160	225	1.014	2.235	150	
ADOPT	5.000	2.907	Open Manhole	0		OUTFALL		1.015	2.093	225	

No coordinates have been specified, layout information cannot be produced.

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)
1.000	o	150	B01	5.400	4.600	0.650	Open Manhole	600
1.001	o	150	B02	5.400	4.412	0.838	Open Manhole	600
1.002	o	150	B03	5.400	4.227	1.023	Open Manhole	600
1.003	o	150	B04	5.400	4.072	1.178	Open Manhole	600
1.004	o	150	B05	5.400	3.957	1.293	Open Manhole	600
2.000	o	150	B06	5.400	4.600	0.650	Open Manhole	600
2.001	o	150	B07	5.400	4.418	0.832	Open Manhole	600
1.005	o	150	B08	5.400	3.803	1.447	Open Manhole	600
3.000	o	150	B09	5.400	4.600	0.650	Open Manhole	600
3.001	o	150	B10	5.400	4.530	0.720	Open Manhole	600
4.000	o	150	DUMMY	5.400	4.875	0.375	Open Manhole	600
4.001	o	150	B-PP1	5.400	4.750	0.500	Open Manhole	600
1.006	o	225	B11	5.400	3.631	1.544	Open Manhole	600
1.007	o	225	B12	5.400	3.510	1.665	Open Manhole	600
1.008	o	225	B13	5.400	3.450	1.725	Open Manhole	600

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	18.800	100.0	B02	5.400	4.412	0.838	Open Manhole	600
1.001	18.500	100.0	B03	5.400	4.227	1.023	Open Manhole	600
1.002	15.500	100.0	B04	5.400	4.072	1.178	Open Manhole	600
1.003	11.500	100.0	B05	5.400	3.957	1.293	Open Manhole	600
1.004	15.400	100.0	B08	5.400	3.803	1.447	Open Manhole	600
2.000	18.200	100.0	B07	5.400	4.418	0.832	Open Manhole	600
2.001	18.600	30.2	B08	5.400	3.803	1.447	Open Manhole	600
1.005	9.700	56.4	B11	5.400	3.631	1.619	Open Manhole	600
3.000	5.600	80.0	B10	5.400	4.530	0.720	Open Manhole	600
3.001	12.200	14.8	B11	5.400	3.706	1.544	Open Manhole	600
4.000	10.000	80.0	B-PP1	5.400	4.750	0.500	Open Manhole	600
4.001	5.000	4.8	B11	5.400	3.706	1.544	Open Manhole	600
1.006	18.200	150.4	B12	5.400	3.510	1.665	Open Manhole	600
1.007	8.800	146.7	B13	5.400	3.450	1.725	Open Manhole	600
1.008	2.400	150.0	B15	5.400	3.434	1.741	Open Manhole	600

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)
5.000	o	150	B14	5.400	4.000	1.250	Open Manhole	600
1.009	o	225	B15	5.400	3.434	1.741	Open Manhole	600
1.010	o	225	B16	5.000	3.375	1.400	Open Manhole	600
1.011	o	225	B17	5.000	3.359	1.416	Open Manhole	1200
6.000	o	150	DUMMY	5.000	4.450	0.400	Open Manhole	600
6.001	o	150	B-PP2	5.000	4.350	0.500	Open Manhole	600
1.012	o	150	GEO AND HYDRO	5.000	2.800	2.050	Open Manhole	1200
1.013	o	150	ADOPT	5.000	2.605	2.245	Open Manhole	1200
1.014	o	150	ADOPT	5.000	2.445	2.405	Open Manhole	1200
1.015	o	225	AW-0452	5.000	2.160	2.615	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)
5.000	6.700	13.6	B15	5.400	3.509	1.741	Open Manhole	600
1.009	8.800	149.2	B16	5.000	3.375	1.400	Open Manhole	600
1.010	2.400	150.0	B17	5.000	3.359	1.416	Open Manhole	1200
1.011	4.000	31.0	GEO AND HYDRO	5.000	3.230	1.545	Open Manhole	1200
6.000	10.000	100.0	B-PP2	5.000	4.350	0.500	Open Manhole	600
6.001	5.000	10.9	GEO AND HYDRO	5.000	3.890	0.960	Open Manhole	1200
1.012	7.700	39.5	ADOPT	5.000	2.605	2.245	Open Manhole	1200
1.013	12.500	78.1	ADOPT	5.000	2.445	2.405	Open Manhole	1200
1.014	16.700	79.5	AW-0452	5.000	2.235	2.615	Open Manhole	1200
1.015	10.000	149.3	ADOPT	5.000	2.093	2.682	Open Manhole	0

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.015	ADOPT	5.000	2.093	0.000	0	0

Datum (m) 2.160 Offset (mins) 0

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.225	51	0.225	101	0.225	151	0.225	201	0.225	251	0.225
2	0.225	52	0.225	102	0.225	152	0.225	202	0.225	252	0.225
3	0.225	53	0.225	103	0.225	153	0.225	203	0.225	253	0.225
4	0.225	54	0.225	104	0.225	154	0.225	204	0.225	254	0.225
5	0.225	55	0.225	105	0.225	155	0.225	205	0.225	255	0.225
6	0.225	56	0.225	106	0.225	156	0.225	206	0.225	256	0.225
7	0.225	57	0.225	107	0.225	157	0.225	207	0.225	257	0.225
8	0.225	58	0.225	108	0.225	158	0.225	208	0.225	258	0.225
9	0.225	59	0.225	109	0.225	159	0.225	209	0.225	259	0.225
10	0.225	60	0.225	110	0.225	160	0.225	210	0.225	260	0.225
11	0.225	61	0.225	111	0.225	161	0.225	211	0.225	261	0.225
12	0.225	62	0.225	112	0.225	162	0.225	212	0.225	262	0.225
13	0.225	63	0.225	113	0.225	163	0.225	213	0.225	263	0.225
14	0.225	64	0.225	114	0.225	164	0.225	214	0.225	264	0.225
15	0.225	65	0.225	115	0.225	165	0.225	215	0.225	265	0.225
16	0.225	66	0.225	116	0.225	166	0.225	216	0.225	266	0.225
17	0.225	67	0.225	117	0.225	167	0.225	217	0.225	267	0.225
18	0.225	68	0.225	118	0.225	168	0.225	218	0.225	268	0.225
19	0.225	69	0.225	119	0.225	169	0.225	219	0.225	269	0.225
20	0.225	70	0.225	120	0.225	170	0.225	220	0.225	270	0.225
21	0.225	71	0.225	121	0.225	171	0.225	221	0.225	271	0.225
22	0.225	72	0.225	122	0.225	172	0.225	222	0.225	272	0.225
23	0.225	73	0.225	123	0.225	173	0.225	223	0.225	273	0.225
24	0.225	74	0.225	124	0.225	174	0.225	224	0.225	274	0.225
25	0.225	75	0.225	125	0.225	175	0.225	225	0.225	275	0.225
26	0.225	76	0.225	126	0.225	176	0.225	226	0.225	276	0.225
27	0.225	77	0.225	127	0.225	177	0.225	227	0.225	277	0.225
28	0.225	78	0.225	128	0.225	178	0.225	228	0.225	278	0.225
29	0.225	79	0.225	129	0.225	179	0.225	229	0.225	279	0.225
30	0.225	80	0.225	130	0.225	180	0.225	230	0.225	280	0.225
31	0.225	81	0.225	131	0.225	181	0.225	231	0.225	281	0.225
32	0.225	82	0.225	132	0.225	182	0.225	232	0.225	282	0.225
33	0.225	83	0.225	133	0.225	183	0.225	233	0.225	283	0.225
34	0.225	84	0.225	134	0.225	184	0.225	234	0.225	284	0.225
35	0.225	85	0.225	135	0.225	185	0.225	235	0.225	285	0.225
36	0.225	86	0.225	136	0.225	186	0.225	236	0.225	286	0.225
37	0.225	87	0.225	137	0.225	187	0.225	237	0.225	287	0.225
38	0.225	88	0.225	138	0.225	188	0.225	238	0.225	288	0.225
39	0.225	89	0.225	139	0.225	189	0.225	239	0.225	289	0.225
40	0.225	90	0.225	140	0.225	190	0.225	240	0.225	290	0.225
41	0.225	91	0.225	141	0.225	191	0.225	241	0.225	291	0.225
42	0.225	92	0.225	142	0.225	192	0.225	242	0.225	292	0.225
43	0.225	93	0.225	143	0.225	193	0.225	243	0.225	293	0.225
44	0.225	94	0.225	144	0.225	194	0.225	244	0.225	294	0.225
45	0.225	95	0.225	145	0.225	195	0.225	245	0.225	295	0.225
46	0.225	96	0.225	146	0.225	196	0.225	246	0.225	296	0.225
47	0.225	97	0.225	147	0.225	197	0.225	247	0.225	297	0.225
48	0.225	98	0.225	148	0.225	198	0.225	248	0.225	298	0.225
49	0.225	99	0.225	149	0.225	199	0.225	249	0.225	299	0.225
50	0.225	100	0.225	150	0.225	200	0.225	250	0.225	300	0.225

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
301	0.225	351	0.225	401	0.225	451	0.225	501	0.225	551	0.225
302	0.225	352	0.225	402	0.225	452	0.225	502	0.225	552	0.225
303	0.225	353	0.225	403	0.225	453	0.225	503	0.225	553	0.225
304	0.225	354	0.225	404	0.225	454	0.225	504	0.225	554	0.225
305	0.225	355	0.225	405	0.225	455	0.225	505	0.225	555	0.225
306	0.225	356	0.225	406	0.225	456	0.225	506	0.225	556	0.225
307	0.225	357	0.225	407	0.225	457	0.225	507	0.225	557	0.225
308	0.225	358	0.225	408	0.225	458	0.225	508	0.225	558	0.225
309	0.225	359	0.225	409	0.225	459	0.225	509	0.225	559	0.225
310	0.225	360	0.225	410	0.225	460	0.225	510	0.225	560	0.225
311	0.225	361	0.225	411	0.225	461	0.225	511	0.225	561	0.225
312	0.225	362	0.225	412	0.225	462	0.225	512	0.225	562	0.225
313	0.225	363	0.225	413	0.225	463	0.225	513	0.225	563	0.225
314	0.225	364	0.225	414	0.225	464	0.225	514	0.225	564	0.225
315	0.225	365	0.225	415	0.225	465	0.225	515	0.225	565	0.225
316	0.225	366	0.225	416	0.225	466	0.225	516	0.225	566	0.225
317	0.225	367	0.225	417	0.225	467	0.225	517	0.225	567	0.225
318	0.225	368	0.225	418	0.225	468	0.225	518	0.225	568	0.225
319	0.225	369	0.225	419	0.225	469	0.225	519	0.225	569	0.225
320	0.225	370	0.225	420	0.225	470	0.225	520	0.225	570	0.225
321	0.225	371	0.225	421	0.225	471	0.225	521	0.225	571	0.225
322	0.225	372	0.225	422	0.225	472	0.225	522	0.225	572	0.225
323	0.225	373	0.225	423	0.225	473	0.225	523	0.225	573	0.225
324	0.225	374	0.225	424	0.225	474	0.225	524	0.225	574	0.225
325	0.225	375	0.225	425	0.225	475	0.225	525	0.225	575	0.225
326	0.225	376	0.225	426	0.225	476	0.225	526	0.225	576	0.225
327	0.225	377	0.225	427	0.225	477	0.225	527	0.225	577	0.225
328	0.225	378	0.225	428	0.225	478	0.225	528	0.225	578	0.225
329	0.225	379	0.225	429	0.225	479	0.225	529	0.225	579	0.225
330	0.225	380	0.225	430	0.225	480	0.225	530	0.225	580	0.225
331	0.225	381	0.225	431	0.225	481	0.225	531	0.225	581	0.225
332	0.225	382	0.225	432	0.225	482	0.225	532	0.225	582	0.225
333	0.225	383	0.225	433	0.225	483	0.225	533	0.225	583	0.225
334	0.225	384	0.225	434	0.225	484	0.225	534	0.225	584	0.225
335	0.225	385	0.225	435	0.225	485	0.225	535	0.225	585	0.225
336	0.225	386	0.225	436	0.225	486	0.225	536	0.225	586	0.225
337	0.225	387	0.225	437	0.225	487	0.225	537	0.225	587	0.225
338	0.225	388	0.225	438	0.225	488	0.225	538	0.225	588	0.225
339	0.225	389	0.225	439	0.225	489	0.225	539	0.225	589	0.225
340	0.225	390	0.225	440	0.225	490	0.225	540	0.225	590	0.225
341	0.225	391	0.225	441	0.225	491	0.225	541	0.225	591	0.225
342	0.225	392	0.225	442	0.225	492	0.225	542	0.225	592	0.225
343	0.225	393	0.225	443	0.225	493	0.225	543	0.225	593	0.225
344	0.225	394	0.225	444	0.225	494	0.225	544	0.225	594	0.225
345	0.225	395	0.225	445	0.225	495	0.225	545	0.225	595	0.225
346	0.225	396	0.225	446	0.225	496	0.225	546	0.225	596	0.225
347	0.225	397	0.225	447	0.225	497	0.225	547	0.225	597	0.225
348	0.225	398	0.225	448	0.225	498	0.225	548	0.225	598	0.225
349	0.225	399	0.225	449	0.225	499	0.225	549	0.225	599	0.225
350	0.225	400	0.225	450	0.225	500	0.225	550	0.225	600	0.225

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
601	0.225	651	0.225	701	0.225	751	0.225	801	0.225	851	0.225
602	0.225	652	0.225	702	0.225	752	0.225	802	0.225	852	0.225
603	0.225	653	0.225	703	0.225	753	0.225	803	0.225	853	0.225
604	0.225	654	0.225	704	0.225	754	0.225	804	0.225	854	0.225
605	0.225	655	0.225	705	0.225	755	0.225	805	0.225	855	0.225
606	0.225	656	0.225	706	0.225	756	0.225	806	0.225	856	0.225
607	0.225	657	0.225	707	0.225	757	0.225	807	0.225	857	0.225
608	0.225	658	0.225	708	0.225	758	0.225	808	0.225	858	0.225
609	0.225	659	0.225	709	0.225	759	0.225	809	0.225	859	0.225
610	0.225	660	0.225	710	0.225	760	0.225	810	0.225	860	0.225
611	0.225	661	0.225	711	0.225	761	0.225	811	0.225	861	0.225
612	0.225	662	0.225	712	0.225	762	0.225	812	0.225	862	0.225
613	0.225	663	0.225	713	0.225	763	0.225	813	0.225	863	0.225
614	0.225	664	0.225	714	0.225	764	0.225	814	0.225	864	0.225
615	0.225	665	0.225	715	0.225	765	0.225	815	0.225	865	0.225
616	0.225	666	0.225	716	0.225	766	0.225	816	0.225	866	0.225
617	0.225	667	0.225	717	0.225	767	0.225	817	0.225	867	0.225
618	0.225	668	0.225	718	0.225	768	0.225	818	0.225	868	0.225
619	0.225	669	0.225	719	0.225	769	0.225	819	0.225	869	0.225
620	0.225	670	0.225	720	0.225	770	0.225	820	0.225	870	0.225
621	0.225	671	0.225	721	0.225	771	0.225	821	0.225	871	0.225
622	0.225	672	0.225	722	0.225	772	0.225	822	0.225	872	0.225
623	0.225	673	0.225	723	0.225	773	0.225	823	0.225	873	0.225
624	0.225	674	0.225	724	0.225	774	0.225	824	0.225	874	0.225
625	0.225	675	0.225	725	0.225	775	0.225	825	0.225	875	0.225
626	0.225	676	0.225	726	0.225	776	0.225	826	0.225	876	0.225
627	0.225	677	0.225	727	0.225	777	0.225	827	0.225	877	0.225
628	0.225	678	0.225	728	0.225	778	0.225	828	0.225	878	0.225
629	0.225	679	0.225	729	0.225	779	0.225	829	0.225	879	0.225
630	0.225	680	0.225	730	0.225	780	0.225	830	0.225	880	0.225
631	0.225	681	0.225	731	0.225	781	0.225	831	0.225	881	0.225
632	0.225	682	0.225	732	0.225	782	0.225	832	0.225	882	0.225
633	0.225	683	0.225	733	0.225	783	0.225	833	0.225	883	0.225
634	0.225	684	0.225	734	0.225	784	0.225	834	0.225	884	0.225
635	0.225	685	0.225	735	0.225	785	0.225	835	0.225	885	0.225
636	0.225	686	0.225	736	0.225	786	0.225	836	0.225	886	0.225
637	0.225	687	0.225	737	0.225	787	0.225	837	0.225	887	0.225
638	0.225	688	0.225	738	0.225	788	0.225	838	0.225	888	0.225
639	0.225	689	0.225	739	0.225	789	0.225	839	0.225	889	0.225
640	0.225	690	0.225	740	0.225	790	0.225	840	0.225	890	0.225
641	0.225	691	0.225	741	0.225	791	0.225	841	0.225	891	0.225
642	0.225	692	0.225	742	0.225	792	0.225	842	0.225	892	0.225
643	0.225	693	0.225	743	0.225	793	0.225	843	0.225	893	0.225
644	0.225	694	0.225	744	0.225	794	0.225	844	0.225	894	0.225
645	0.225	695	0.225	745	0.225	795	0.225	845	0.225	895	0.225
646	0.225	696	0.225	746	0.225	796	0.225	846	0.225	896	0.225
647	0.225	697	0.225	747	0.225	797	0.225	847	0.225	897	0.225
648	0.225	698	0.225	748	0.225	798	0.225	848	0.225	898	0.225
649	0.225	699	0.225	749	0.225	799	0.225	849	0.225	899	0.225
650	0.225	700	0.225	750	0.225	800	0.225	850	0.225	900	0.225

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
901	0.225	951	0.225	1001	0.225	1051	0.225	1101	0.225	1151	0.225
902	0.225	952	0.225	1002	0.225	1052	0.225	1102	0.225	1152	0.225
903	0.225	953	0.225	1003	0.225	1053	0.225	1103	0.225	1153	0.225
904	0.225	954	0.225	1004	0.225	1054	0.225	1104	0.225	1154	0.225
905	0.225	955	0.225	1005	0.225	1055	0.225	1105	0.225	1155	0.225
906	0.225	956	0.225	1006	0.225	1056	0.225	1106	0.225	1156	0.225
907	0.225	957	0.225	1007	0.225	1057	0.225	1107	0.225	1157	0.225
908	0.225	958	0.225	1008	0.225	1058	0.225	1108	0.225	1158	0.225
909	0.225	959	0.225	1009	0.225	1059	0.225	1109	0.225	1159	0.225
910	0.225	960	0.225	1010	0.225	1060	0.225	1110	0.225	1160	0.225
911	0.225	961	0.225	1011	0.225	1061	0.225	1111	0.225	1161	0.225
912	0.225	962	0.225	1012	0.225	1062	0.225	1112	0.225	1162	0.225
913	0.225	963	0.225	1013	0.225	1063	0.225	1113	0.225	1163	0.225
914	0.225	964	0.225	1014	0.225	1064	0.225	1114	0.225	1164	0.225
915	0.225	965	0.225	1015	0.225	1065	0.225	1115	0.225	1165	0.225
916	0.225	966	0.225	1016	0.225	1066	0.225	1116	0.225	1166	0.225
917	0.225	967	0.225	1017	0.225	1067	0.225	1117	0.225	1167	0.225
918	0.225	968	0.225	1018	0.225	1068	0.225	1118	0.225	1168	0.225
919	0.225	969	0.225	1019	0.225	1069	0.225	1119	0.225	1169	0.225
920	0.225	970	0.225	1020	0.225	1070	0.225	1120	0.225	1170	0.225
921	0.225	971	0.225	1021	0.225	1071	0.225	1121	0.225	1171	0.225
922	0.225	972	0.225	1022	0.225	1072	0.225	1122	0.225	1172	0.225
923	0.225	973	0.225	1023	0.225	1073	0.225	1123	0.225	1173	0.225
924	0.225	974	0.225	1024	0.225	1074	0.225	1124	0.225	1174	0.225
925	0.225	975	0.225	1025	0.225	1075	0.225	1125	0.225	1175	0.225
926	0.225	976	0.225	1026	0.225	1076	0.225	1126	0.225	1176	0.225
927	0.225	977	0.225	1027	0.225	1077	0.225	1127	0.225	1177	0.225
928	0.225	978	0.225	1028	0.225	1078	0.225	1128	0.225	1178	0.225
929	0.225	979	0.225	1029	0.225	1079	0.225	1129	0.225	1179	0.225
930	0.225	980	0.225	1030	0.225	1080	0.225	1130	0.225	1180	0.225
931	0.225	981	0.225	1031	0.225	1081	0.225	1131	0.225	1181	0.225
932	0.225	982	0.225	1032	0.225	1082	0.225	1132	0.225	1182	0.225
933	0.225	983	0.225	1033	0.225	1083	0.225	1133	0.225	1183	0.225
934	0.225	984	0.225	1034	0.225	1084	0.225	1134	0.225	1184	0.225
935	0.225	985	0.225	1035	0.225	1085	0.225	1135	0.225	1185	0.225
936	0.225	986	0.225	1036	0.225	1086	0.225	1136	0.225	1186	0.225
937	0.225	987	0.225	1037	0.225	1087	0.225	1137	0.225	1187	0.225
938	0.225	988	0.225	1038	0.225	1088	0.225	1138	0.225	1188	0.225
939	0.225	989	0.225	1039	0.225	1089	0.225	1139	0.225	1189	0.225
940	0.225	990	0.225	1040	0.225	1090	0.225	1140	0.225	1190	0.225
941	0.225	991	0.225	1041	0.225	1091	0.225	1141	0.225	1191	0.225
942	0.225	992	0.225	1042	0.225	1092	0.225	1142	0.225	1192	0.225
943	0.225	993	0.225	1043	0.225	1093	0.225	1143	0.225	1193	0.225
944	0.225	994	0.225	1044	0.225	1094	0.225	1144	0.225	1194	0.225
945	0.225	995	0.225	1045	0.225	1095	0.225	1145	0.225	1195	0.225
946	0.225	996	0.225	1046	0.225	1096	0.225	1146	0.225	1196	0.225
947	0.225	997	0.225	1047	0.225	1097	0.225	1147	0.225	1197	0.225
948	0.225	998	0.225	1048	0.225	1098	0.225	1148	0.225	1198	0.225
949	0.225	999	0.225	1049	0.225	1099	0.225	1149	0.225	1199	0.225
950	0.225	1000	0.225	1050	0.225	1100	0.225	1150	0.225	1200	0.225

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1201	0.225	1241	0.225	1281	0.225	1321	0.225	1361	0.225	1401	0.225
1202	0.225	1242	0.225	1282	0.225	1322	0.225	1362	0.225	1402	0.225
1203	0.225	1243	0.225	1283	0.225	1323	0.225	1363	0.225	1403	0.225
1204	0.225	1244	0.225	1284	0.225	1324	0.225	1364	0.225	1404	0.225
1205	0.225	1245	0.225	1285	0.225	1325	0.225	1365	0.225	1405	0.225
1206	0.225	1246	0.225	1286	0.225	1326	0.225	1366	0.225	1406	0.225
1207	0.225	1247	0.225	1287	0.225	1327	0.225	1367	0.225	1407	0.225
1208	0.225	1248	0.225	1288	0.225	1328	0.225	1368	0.225	1408	0.225
1209	0.225	1249	0.225	1289	0.225	1329	0.225	1369	0.225	1409	0.225
1210	0.225	1250	0.225	1290	0.225	1330	0.225	1370	0.225	1410	0.225
1211	0.225	1251	0.225	1291	0.225	1331	0.225	1371	0.225	1411	0.225
1212	0.225	1252	0.225	1292	0.225	1332	0.225	1372	0.225	1412	0.225
1213	0.225	1253	0.225	1293	0.225	1333	0.225	1373	0.225	1413	0.225
1214	0.225	1254	0.225	1294	0.225	1334	0.225	1374	0.225	1414	0.225
1215	0.225	1255	0.225	1295	0.225	1335	0.225	1375	0.225	1415	0.225
1216	0.225	1256	0.225	1296	0.225	1336	0.225	1376	0.225	1416	0.225
1217	0.225	1257	0.225	1297	0.225	1337	0.225	1377	0.225	1417	0.225
1218	0.225	1258	0.225	1298	0.225	1338	0.225	1378	0.225	1418	0.225
1219	0.225	1259	0.225	1299	0.225	1339	0.225	1379	0.225	1419	0.225
1220	0.225	1260	0.225	1300	0.225	1340	0.225	1380	0.225	1420	0.225
1221	0.225	1261	0.225	1301	0.225	1341	0.225	1381	0.225	1421	0.225
1222	0.225	1262	0.225	1302	0.225	1342	0.225	1382	0.225	1422	0.225
1223	0.225	1263	0.225	1303	0.225	1343	0.225	1383	0.225	1423	0.225
1224	0.225	1264	0.225	1304	0.225	1344	0.225	1384	0.225	1424	0.225
1225	0.225	1265	0.225	1305	0.225	1345	0.225	1385	0.225	1425	0.225
1226	0.225	1266	0.225	1306	0.225	1346	0.225	1386	0.225	1426	0.225
1227	0.225	1267	0.225	1307	0.225	1347	0.225	1387	0.225	1427	0.225
1228	0.225	1268	0.225	1308	0.225	1348	0.225	1388	0.225	1428	0.225
1229	0.225	1269	0.225	1309	0.225	1349	0.225	1389	0.225	1429	0.225
1230	0.225	1270	0.225	1310	0.225	1350	0.225	1390	0.225	1430	0.225
1231	0.225	1271	0.225	1311	0.225	1351	0.225	1391	0.225	1431	0.225
1232	0.225	1272	0.225	1312	0.225	1352	0.225	1392	0.225	1432	0.225
1233	0.225	1273	0.225	1313	0.225	1353	0.225	1393	0.225	1433	0.225
1234	0.225	1274	0.225	1314	0.225	1354	0.225	1394	0.225	1434	0.225
1235	0.225	1275	0.225	1315	0.225	1355	0.225	1395	0.225	1435	0.225
1236	0.225	1276	0.225	1316	0.225	1356	0.225	1396	0.225	1436	0.225
1237	0.225	1277	0.225	1317	0.225	1357	0.225	1397	0.225	1437	0.225
1238	0.225	1278	0.225	1318	0.225	1358	0.225	1398	0.225	1438	0.225
1239	0.225	1279	0.225	1319	0.225	1359	0.225	1399	0.225	1439	0.225
1240	0.225	1280	0.225	1320	0.225	1360	0.225	1400	0.225	1440	0.225

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	5	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.405		

Online Controls for Storm

Orifice Manhole: B-PP1, DS/PN: 4.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 4.750

Orifice Manhole: B-PP2, DS/PN: 6.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 4.350

Hydro-Brake® Optimum Manhole: GEO AND HYDRO, DS/PN: 1.012, Volume (m³): 2.7

Unit Reference	MD-SHE-0101-5000-1320-5000
Design Head (m)	1.320
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	101
Invert Level (m)	2.800
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.320	5.0
Flush-Flo™	0.395	5.0
Kick-Flo®	0.815	4.0
Mean Flow over Head Range	-	4.4

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	3.3	1.200	4.8	3.000	7.3	7.000	11.0
0.200	4.6	1.400	5.1	3.500	7.9	7.500	11.3
0.300	4.9	1.600	5.5	4.000	8.4	8.000	11.7
0.400	5.0	1.800	5.8	4.500	8.9	8.500	12.0
0.500	4.9	2.000	6.1	5.000	9.3	9.000	12.4
0.600	4.8	2.200	6.3	5.500	9.8	9.500	12.7
0.800	4.1	2.400	6.6	6.000	10.2		
1.000	4.4	2.600	6.9	6.500	10.6		

Storage Structures for Storm

Porous Car Park Manhole: B-PP1, DS/PN: 4.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	21.8
Membrane Percolation (mm/hr)	1000	Length (m)	21.8
Max Percolation (l/s)	132.0	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.750	Membrane Depth (mm)	0

Porous Car Park Manhole: B-PP2, DS/PN: 6.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	12.2
Membrane Percolation (mm/hr)	1000	Length (m)	12.2
Max Percolation (l/s)	41.3	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.350	Membrane Depth (mm)	0

Cellular Storage Manhole: GEO AND HYDRO, DS/PN: 1.012

Invert Level (m)	2.800	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	35.2	0.0	1.321	0.0	0.0
1.320	35.2	0.0			

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	3
Number of Online Controls	3	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	2013
Site Location	GB 623065 309383 TG 23065 09383
Data Type	Point
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

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	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)
1.000	B01	15 minute 100 year Winter I+45%	5.400	5.215	0.465	0.000	0.172
1.001	B02	15 minute 100 year Winter I+45%	5.400	5.201	0.639	0.000	0.543
1.002	B03	15 minute 100 year Winter I+45%	5.400	5.169	0.792	0.000	0.581
1.003	B04	15 minute 100 year Winter I+45%	5.400	5.105	0.883	0.000	0.554
1.004	B05	15 minute 100 year Winter I+45%	5.400	5.011	0.904	0.000	0.489
2.000	B06	15 minute 100 year Winter I+45%	5.400	4.874	0.124	0.000	0.076
2.001	B07	15 minute 100 year Winter I+45%	5.400	4.856	0.288	0.000	0.433
1.005	B08	15 minute 100 year Winter I+45%	5.400	4.804	0.851	0.000	0.861
3.000	B09	15 minute 100 year Summer I+45%	5.400	4.665	-0.085	0.000	0.017
3.001	B10	15 minute 100 year Summer I+45%	5.400	4.584	-0.096	0.000	0.032
4.000	DUMMY	480 minute 100 year Winter I+45%	5.400	5.017	-0.008	0.000	0.039
4.001	B-PP1	480 minute 100 year Winter I+45%	5.400	5.017	0.117	0.000	35.176
1.006	B11	15 minute 100 year Winter I+45%	5.400	4.393	0.537	0.000	0.571
1.007	B12	15 minute 100 year Winter I+45%	5.400	4.220	0.485	0.000	0.899
1.008	B13	15 minute 100 year Winter I+45%	5.400	4.096	0.421	0.000	0.507
5.000	B14	120 minute 100 year Winter I+45%	5.400	4.048	-0.102	0.000	0.012

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

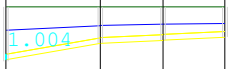
PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	B01		5.2	FLOOD RISK
1.001	B02		8.7	FLOOD RISK
1.002	B03		11.8	FLOOD RISK
1.003	B04		15.1	FLOOD RISK
1.004	B05		19.1	SURCHARGED
2.000	B06		6.5	SURCHARGED
2.001	B07		10.8	SURCHARGED
1.005	B08		32.4	SURCHARGED
3.000	B09		6.2	OK
3.001	B10		11.3	OK
4.000	DUMMY		0.0	OK
4.001	B-PP1	545	0.7	SURCHARGED
1.006	B11		44.6	SURCHARGED
1.007	B12		49.0	SURCHARGED
1.008	B13		53.4	SURCHARGED
5.000	B14		1.7	OK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.009	B15	120 minute 100 year Winter I+45%	5.400	4.048	0.389	0.000
1.010	B16	120 minute 100 year Winter I+45%	5.000	4.043	0.443	0.000
1.011	B17	120 minute 100 year Winter I+45%	5.000	4.041	0.457	0.000
6.000	DUMMY	240 minute 100 year Winter I+45%	5.000	4.532	-0.068	0.000
6.001	B-PP2	240 minute 100 year Winter I+45%	5.000	4.532	0.032	0.000
1.012	GEO AND HYDRO	120 minute 100 year Winter I+45%	5.000	4.038	1.088	0.000
1.013	ADOPT	960 minute 100 year Winter I+45%	5.000	2.658	-0.097	0.000
1.014	ADOPT	960 minute 100 year Winter I+45%	5.000	2.498	-0.097	0.000
1.015	AW-0452	15 minute 100 year Winter I+45%	5.000	2.392	0.007	0.000

PN	US/MH Name	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.009	B15	0.343		24.7	SURCHARGED
1.010	B16	0.513		24.7	SURCHARGED
1.011	B17	0.825		24.3	SURCHARGED
6.000	DUMMY	0.022		0.0	OK
6.001	B-PP2	7.765	184	0.5	SURCHARGED
1.012	GEO AND HYDRO	42.909	131	5.0	SURCHARGED
1.013	ADOPT	0.063		5.0	OK
1.014	ADOPT	0.072		5.0	OK
1.015	AW-0452	0.357		5.0	SURCHARGED

MH Name	ADOPT				C05			C02	C01	
Hor Scale 1000 Ver Scale 200 Datum (m)-1.000										
PN					1.004			1.001	1.000	
Dia (mm)					150			150	150	
Slope (1:X)					100.0			100.0	100.0	
Cover Level (m)	5.000	4.050	4.050	4.050	4.050		4.050	4.050	4.050	
Invert Level (m)		2.260	2.260	2.070	2.505	2.605	2.650	2.783	2.816	2.914	2.914	3.082	3.082	3.250	
Length (m)						13.300				16.800	16.800	

MH Name	C09	C08			
Hor Scale 1000 Ver Scale 200 Datum (m)-1.000					
PN		2.002			
Dia (mm)		150			
Slope (1:X)		28.7			
Cover Level (m)	4.050	4.050	4.050	4.050	
Invert Level (m)		2.650	3.085	3.085	3.168	3.168	3.250	
Length (m)		12.500			

Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
* 1.000	16.800	0.168	100.0	0.003	3.00	0.600	o	150	Pipe/Conduit
* 1.001	16.800	0.168	100.0	0.009	0.00	0.600	o	150	Pipe/Conduit
* 1.002	9.800	0.098	100.0	0.009	0.00	0.600	o	150	Pipe/Conduit
* 1.003	3.300	0.033	100.0	0.009	0.00	0.600	o	150	Pipe/Conduit
* 1.004	13.300	0.133	100.0	0.009	0.00	0.600	o	150	Pipe/Conduit
* 2.000	8.200	0.082	100.0	0.009	5.00	0.600	o	150	Pipe/Conduit
* 2.001	8.300	0.083	100.0	0.009	0.00	0.600	o	150	Pipe/Conduit
* 2.002	12.500	0.435	28.7	0.009	0.00	0.600	o	150	Pipe/Conduit
* 1.005	10.000	0.100	100.0	0.009	0.00	0.600	o	150	Pipe/Conduit
* 1.006	10.000	-0.190	-52.6	0.000	0.00	0.600	o	150	Pipe/Conduit
* 1.007	7.000	0.240	29.2	0.000	0.00	0.600	o	150	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* 1.000	C01	4.050	3.250	0.650	4.050	3.082	0.818		600
* 1.001	C02	4.050	3.082	0.818	4.050	2.914	0.986		600
* 1.002	C03	4.050	2.914	0.986	4.050	2.816	1.084		600
* 1.003	C04	4.050	2.816	1.084	4.050	2.783	1.117		600
* 1.004	C05	4.050	2.783	1.117	4.050	2.650	1.250		600
* 2.000	C06	4.050	3.250	0.650	4.050	3.168	0.732		600
* 2.001	C07	4.050	3.168	0.732	4.050	3.085	0.815		600
* 2.002	C08	4.050	3.085	0.815	4.050	2.650	1.250		600
* 1.005	C09	4.050	2.605	1.295	4.050	2.505	1.395		600
* 1.006	PUMP AND GEO	4.050	2.070	1.830	4.050	2.260	1.640	Pump	600
* 1.007	C10	4.050	2.260	1.640	5.000	2.020	2.830		600

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)	Backd (mm
C01	4.050	0.800	Open Manhole	600	1.000	3.250	150				
C02	4.050	0.968	Open Manhole	600	1.001	3.082	150	1.000	3.082	150	
C03	4.050	1.136	Open Manhole	600	1.002	2.914	150	1.001	2.914	150	
C04	4.050	1.234	Open Manhole	600	1.003	2.816	150	1.002	2.816	150	
C05	4.050	1.267	Open Manhole	600	1.004	2.783	150	1.003	2.783	150	
C06	4.050	0.800	Open Manhole	600	2.000	3.250	150				
C07	4.050	0.882	Open Manhole	600	2.001	3.168	150	2.000	3.168	150	
C08	4.050	0.965	Open Manhole	600	2.002	3.085	150	2.001	3.085	150	
C09	4.050	1.445	Open Manhole	600	1.005	2.605	150	1.004	2.650	150	
								2.002	2.650	150	
PUMP AND GEO	4.050	1.980	Open Manhole	600	1.006	2.070	150	1.005	2.505	150	
C10	4.050	1.790	Open Manhole	600	1.007	2.260	150	1.006	2.260	150	
ADOPT	5.000	2.980	Open Manhole	0		OUTFALL		1.007	2.020	150	

No coordinates have been specified, layout information cannot be produced.

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)
1.000	o	150	C01	4.050	3.250	0.650	Open Manhole	600
1.001	o	150	C02	4.050	3.082	0.818	Open Manhole	600
1.002	o	150	C03	4.050	2.914	0.986	Open Manhole	600
1.003	o	150	C04	4.050	2.816	1.084	Open Manhole	600
1.004	o	150	C05	4.050	2.783	1.117	Open Manhole	600
2.000	o	150	C06	4.050	3.250	0.650	Open Manhole	600
2.001	o	150	C07	4.050	3.168	0.732	Open Manhole	600
2.002	o	150	C08	4.050	3.085	0.815	Open Manhole	600
1.005	o	150	C09	4.050	2.605	1.295	Open Manhole	600
1.006	o	150	PUMP AND GEO	4.050	2.070	1.830	Open Manhole	600
1.007	o	150	C10	4.050	2.260	1.640	Open Manhole	600

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	16.800	100.0	C02	4.050	3.082	0.818	Open Manhole	600
1.001	16.800	100.0	C03	4.050	2.914	0.986	Open Manhole	600
1.002	9.800	100.0	C04	4.050	2.816	1.084	Open Manhole	600
1.003	3.300	100.0	C05	4.050	2.783	1.117	Open Manhole	600
1.004	13.300	100.0	C09	4.050	2.650	1.250	Open Manhole	600
2.000	8.200	100.0	C07	4.050	3.168	0.732	Open Manhole	600
2.001	8.300	100.0	C08	4.050	3.085	0.815	Open Manhole	600
2.002	12.500	28.7	C09	4.050	2.650	1.250	Open Manhole	600
1.005	10.000	100.0	PUMP AND GEO	4.050	2.505	1.395	Open Manhole	600
1.006	10.000	-52.6	C10	4.050	2.260	1.640	Open Manhole	600
1.007	7.000	29.2	ADOPT	5.000	2.020	2.830	Open Manhole	0

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007	ADOPT	5.000	2.020	0.000	0	0

Datum (m) 2.020 Offset (mins) 0

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.300	51	0.300	101	0.300	151	0.300	201	0.300	251	0.300
2	0.300	52	0.300	102	0.300	152	0.300	202	0.300	252	0.300
3	0.300	53	0.300	103	0.300	153	0.300	203	0.300	253	0.300
4	0.300	54	0.300	104	0.300	154	0.300	204	0.300	254	0.300
5	0.300	55	0.300	105	0.300	155	0.300	205	0.300	255	0.300
6	0.300	56	0.300	106	0.300	156	0.300	206	0.300	256	0.300
7	0.300	57	0.300	107	0.300	157	0.300	207	0.300	257	0.300
8	0.300	58	0.300	108	0.300	158	0.300	208	0.300	258	0.300
9	0.300	59	0.300	109	0.300	159	0.300	209	0.300	259	0.300
10	0.300	60	0.300	110	0.300	160	0.300	210	0.300	260	0.300
11	0.300	61	0.300	111	0.300	161	0.300	211	0.300	261	0.300
12	0.300	62	0.300	112	0.300	162	0.300	212	0.300	262	0.300
13	0.300	63	0.300	113	0.300	163	0.300	213	0.300	263	0.300
14	0.300	64	0.300	114	0.300	164	0.300	214	0.300	264	0.300
15	0.300	65	0.300	115	0.300	165	0.300	215	0.300	265	0.300
16	0.300	66	0.300	116	0.300	166	0.300	216	0.300	266	0.300
17	0.300	67	0.300	117	0.300	167	0.300	217	0.300	267	0.300
18	0.300	68	0.300	118	0.300	168	0.300	218	0.300	268	0.300
19	0.300	69	0.300	119	0.300	169	0.300	219	0.300	269	0.300
20	0.300	70	0.300	120	0.300	170	0.300	220	0.300	270	0.300
21	0.300	71	0.300	121	0.300	171	0.300	221	0.300	271	0.300
22	0.300	72	0.300	122	0.300	172	0.300	222	0.300	272	0.300
23	0.300	73	0.300	123	0.300	173	0.300	223	0.300	273	0.300
24	0.300	74	0.300	124	0.300	174	0.300	224	0.300	274	0.300
25	0.300	75	0.300	125	0.300	175	0.300	225	0.300	275	0.300
26	0.300	76	0.300	126	0.300	176	0.300	226	0.300	276	0.300
27	0.300	77	0.300	127	0.300	177	0.300	227	0.300	277	0.300
28	0.300	78	0.300	128	0.300	178	0.300	228	0.300	278	0.300
29	0.300	79	0.300	129	0.300	179	0.300	229	0.300	279	0.300
30	0.300	80	0.300	130	0.300	180	0.300	230	0.300	280	0.300
31	0.300	81	0.300	131	0.300	181	0.300	231	0.300	281	0.300
32	0.300	82	0.300	132	0.300	182	0.300	232	0.300	282	0.300
33	0.300	83	0.300	133	0.300	183	0.300	233	0.300	283	0.300
34	0.300	84	0.300	134	0.300	184	0.300	234	0.300	284	0.300
35	0.300	85	0.300	135	0.300	185	0.300	235	0.300	285	0.300
36	0.300	86	0.300	136	0.300	186	0.300	236	0.300	286	0.300
37	0.300	87	0.300	137	0.300	187	0.300	237	0.300	287	0.300
38	0.300	88	0.300	138	0.300	188	0.300	238	0.300	288	0.300
39	0.300	89	0.300	139	0.300	189	0.300	239	0.300	289	0.300
40	0.300	90	0.300	140	0.300	190	0.300	240	0.300	290	0.300
41	0.300	91	0.300	141	0.300	191	0.300	241	0.300	291	0.300
42	0.300	92	0.300	142	0.300	192	0.300	242	0.300	292	0.300
43	0.300	93	0.300	143	0.300	193	0.300	243	0.300	293	0.300
44	0.300	94	0.300	144	0.300	194	0.300	244	0.300	294	0.300
45	0.300	95	0.300	145	0.300	195	0.300	245	0.300	295	0.300
46	0.300	96	0.300	146	0.300	196	0.300	246	0.300	296	0.300
47	0.300	97	0.300	147	0.300	197	0.300	247	0.300	297	0.300
48	0.300	98	0.300	148	0.300	198	0.300	248	0.300	298	0.300
49	0.300	99	0.300	149	0.300	199	0.300	249	0.300	299	0.300
50	0.300	100	0.300	150	0.300	200	0.300	250	0.300	300	0.300

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
301	0.300	351	0.300	401	0.300	451	0.300	501	0.300	551	0.300
302	0.300	352	0.300	402	0.300	452	0.300	502	0.300	552	0.300
303	0.300	353	0.300	403	0.300	453	0.300	503	0.300	553	0.300
304	0.300	354	0.300	404	0.300	454	0.300	504	0.300	554	0.300
305	0.300	355	0.300	405	0.300	455	0.300	505	0.300	555	0.300
306	0.300	356	0.300	406	0.300	456	0.300	506	0.300	556	0.300
307	0.300	357	0.300	407	0.300	457	0.300	507	0.300	557	0.300
308	0.300	358	0.300	408	0.300	458	0.300	508	0.300	558	0.300
309	0.300	359	0.300	409	0.300	459	0.300	509	0.300	559	0.300
310	0.300	360	0.300	410	0.300	460	0.300	510	0.300	560	0.300
311	0.300	361	0.300	411	0.300	461	0.300	511	0.300	561	0.300
312	0.300	362	0.300	412	0.300	462	0.300	512	0.300	562	0.300
313	0.300	363	0.300	413	0.300	463	0.300	513	0.300	563	0.300
314	0.300	364	0.300	414	0.300	464	0.300	514	0.300	564	0.300
315	0.300	365	0.300	415	0.300	465	0.300	515	0.300	565	0.300
316	0.300	366	0.300	416	0.300	466	0.300	516	0.300	566	0.300
317	0.300	367	0.300	417	0.300	467	0.300	517	0.300	567	0.300
318	0.300	368	0.300	418	0.300	468	0.300	518	0.300	568	0.300
319	0.300	369	0.300	419	0.300	469	0.300	519	0.300	569	0.300
320	0.300	370	0.300	420	0.300	470	0.300	520	0.300	570	0.300
321	0.300	371	0.300	421	0.300	471	0.300	521	0.300	571	0.300
322	0.300	372	0.300	422	0.300	472	0.300	522	0.300	572	0.300
323	0.300	373	0.300	423	0.300	473	0.300	523	0.300	573	0.300
324	0.300	374	0.300	424	0.300	474	0.300	524	0.300	574	0.300
325	0.300	375	0.300	425	0.300	475	0.300	525	0.300	575	0.300
326	0.300	376	0.300	426	0.300	476	0.300	526	0.300	576	0.300
327	0.300	377	0.300	427	0.300	477	0.300	527	0.300	577	0.300
328	0.300	378	0.300	428	0.300	478	0.300	528	0.300	578	0.300
329	0.300	379	0.300	429	0.300	479	0.300	529	0.300	579	0.300
330	0.300	380	0.300	430	0.300	480	0.300	530	0.300	580	0.300
331	0.300	381	0.300	431	0.300	481	0.300	531	0.300	581	0.300
332	0.300	382	0.300	432	0.300	482	0.300	532	0.300	582	0.300
333	0.300	383	0.300	433	0.300	483	0.300	533	0.300	583	0.300
334	0.300	384	0.300	434	0.300	484	0.300	534	0.300	584	0.300
335	0.300	385	0.300	435	0.300	485	0.300	535	0.300	585	0.300
336	0.300	386	0.300	436	0.300	486	0.300	536	0.300	586	0.300
337	0.300	387	0.300	437	0.300	487	0.300	537	0.300	587	0.300
338	0.300	388	0.300	438	0.300	488	0.300	538	0.300	588	0.300
339	0.300	389	0.300	439	0.300	489	0.300	539	0.300	589	0.300
340	0.300	390	0.300	440	0.300	490	0.300	540	0.300	590	0.300
341	0.300	391	0.300	441	0.300	491	0.300	541	0.300	591	0.300
342	0.300	392	0.300	442	0.300	492	0.300	542	0.300	592	0.300
343	0.300	393	0.300	443	0.300	493	0.300	543	0.300	593	0.300
344	0.300	394	0.300	444	0.300	494	0.300	544	0.300	594	0.300
345	0.300	395	0.300	445	0.300	495	0.300	545	0.300	595	0.300
346	0.300	396	0.300	446	0.300	496	0.300	546	0.300	596	0.300
347	0.300	397	0.300	447	0.300	497	0.300	547	0.300	597	0.300
348	0.300	398	0.300	448	0.300	498	0.300	548	0.300	598	0.300
349	0.300	399	0.300	449	0.300	499	0.300	549	0.300	599	0.300
350	0.300	400	0.300	450	0.300	500	0.300	550	0.300	600	0.300

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
601	0.300	651	0.300	701	0.300	751	0.300	801	0.300	851	0.300
602	0.300	652	0.300	702	0.300	752	0.300	802	0.300	852	0.300
603	0.300	653	0.300	703	0.300	753	0.300	803	0.300	853	0.300
604	0.300	654	0.300	704	0.300	754	0.300	804	0.300	854	0.300
605	0.300	655	0.300	705	0.300	755	0.300	805	0.300	855	0.300
606	0.300	656	0.300	706	0.300	756	0.300	806	0.300	856	0.300
607	0.300	657	0.300	707	0.300	757	0.300	807	0.300	857	0.300
608	0.300	658	0.300	708	0.300	758	0.300	808	0.300	858	0.300
609	0.300	659	0.300	709	0.300	759	0.300	809	0.300	859	0.300
610	0.300	660	0.300	710	0.300	760	0.300	810	0.300	860	0.300
611	0.300	661	0.300	711	0.300	761	0.300	811	0.300	861	0.300
612	0.300	662	0.300	712	0.300	762	0.300	812	0.300	862	0.300
613	0.300	663	0.300	713	0.300	763	0.300	813	0.300	863	0.300
614	0.300	664	0.300	714	0.300	764	0.300	814	0.300	864	0.300
615	0.300	665	0.300	715	0.300	765	0.300	815	0.300	865	0.300
616	0.300	666	0.300	716	0.300	766	0.300	816	0.300	866	0.300
617	0.300	667	0.300	717	0.300	767	0.300	817	0.300	867	0.300
618	0.300	668	0.300	718	0.300	768	0.300	818	0.300	868	0.300
619	0.300	669	0.300	719	0.300	769	0.300	819	0.300	869	0.300
620	0.300	670	0.300	720	0.300	770	0.300	820	0.300	870	0.300
621	0.300	671	0.300	721	0.300	771	0.300	821	0.300	871	0.300
622	0.300	672	0.300	722	0.300	772	0.300	822	0.300	872	0.300
623	0.300	673	0.300	723	0.300	773	0.300	823	0.300	873	0.300
624	0.300	674	0.300	724	0.300	774	0.300	824	0.300	874	0.300
625	0.300	675	0.300	725	0.300	775	0.300	825	0.300	875	0.300
626	0.300	676	0.300	726	0.300	776	0.300	826	0.300	876	0.300
627	0.300	677	0.300	727	0.300	777	0.300	827	0.300	877	0.300
628	0.300	678	0.300	728	0.300	778	0.300	828	0.300	878	0.300
629	0.300	679	0.300	729	0.300	779	0.300	829	0.300	879	0.300
630	0.300	680	0.300	730	0.300	780	0.300	830	0.300	880	0.300
631	0.300	681	0.300	731	0.300	781	0.300	831	0.300	881	0.300
632	0.300	682	0.300	732	0.300	782	0.300	832	0.300	882	0.300
633	0.300	683	0.300	733	0.300	783	0.300	833	0.300	883	0.300
634	0.300	684	0.300	734	0.300	784	0.300	834	0.300	884	0.300
635	0.300	685	0.300	735	0.300	785	0.300	835	0.300	885	0.300
636	0.300	686	0.300	736	0.300	786	0.300	836	0.300	886	0.300
637	0.300	687	0.300	737	0.300	787	0.300	837	0.300	887	0.300
638	0.300	688	0.300	738	0.300	788	0.300	838	0.300	888	0.300
639	0.300	689	0.300	739	0.300	789	0.300	839	0.300	889	0.300
640	0.300	690	0.300	740	0.300	790	0.300	840	0.300	890	0.300
641	0.300	691	0.300	741	0.300	791	0.300	841	0.300	891	0.300
642	0.300	692	0.300	742	0.300	792	0.300	842	0.300	892	0.300
643	0.300	693	0.300	743	0.300	793	0.300	843	0.300	893	0.300
644	0.300	694	0.300	744	0.300	794	0.300	844	0.300	894	0.300
645	0.300	695	0.300	745	0.300	795	0.300	845	0.300	895	0.300
646	0.300	696	0.300	746	0.300	796	0.300	846	0.300	896	0.300
647	0.300	697	0.300	747	0.300	797	0.300	847	0.300	897	0.300
648	0.300	698	0.300	748	0.300	798	0.300	848	0.300	898	0.300
649	0.300	699	0.300	749	0.300	799	0.300	849	0.300	899	0.300
650	0.300	700	0.300	750	0.300	800	0.300	850	0.300	900	0.300

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
901	0.300	951	0.300	1001	0.300	1051	0.300	1101	0.300	1151	0.300
902	0.300	952	0.300	1002	0.300	1052	0.300	1102	0.300	1152	0.300
903	0.300	953	0.300	1003	0.300	1053	0.300	1103	0.300	1153	0.300
904	0.300	954	0.300	1004	0.300	1054	0.300	1104	0.300	1154	0.300
905	0.300	955	0.300	1005	0.300	1055	0.300	1105	0.300	1155	0.300
906	0.300	956	0.300	1006	0.300	1056	0.300	1106	0.300	1156	0.300
907	0.300	957	0.300	1007	0.300	1057	0.300	1107	0.300	1157	0.300
908	0.300	958	0.300	1008	0.300	1058	0.300	1108	0.300	1158	0.300
909	0.300	959	0.300	1009	0.300	1059	0.300	1109	0.300	1159	0.300
910	0.300	960	0.300	1010	0.300	1060	0.300	1110	0.300	1160	0.300
911	0.300	961	0.300	1011	0.300	1061	0.300	1111	0.300	1161	0.300
912	0.300	962	0.300	1012	0.300	1062	0.300	1112	0.300	1162	0.300
913	0.300	963	0.300	1013	0.300	1063	0.300	1113	0.300	1163	0.300
914	0.300	964	0.300	1014	0.300	1064	0.300	1114	0.300	1164	0.300
915	0.300	965	0.300	1015	0.300	1065	0.300	1115	0.300	1165	0.300
916	0.300	966	0.300	1016	0.300	1066	0.300	1116	0.300	1166	0.300
917	0.300	967	0.300	1017	0.300	1067	0.300	1117	0.300	1167	0.300
918	0.300	968	0.300	1018	0.300	1068	0.300	1118	0.300	1168	0.300
919	0.300	969	0.300	1019	0.300	1069	0.300	1119	0.300	1169	0.300
920	0.300	970	0.300	1020	0.300	1070	0.300	1120	0.300	1170	0.300
921	0.300	971	0.300	1021	0.300	1071	0.300	1121	0.300	1171	0.300
922	0.300	972	0.300	1022	0.300	1072	0.300	1122	0.300	1172	0.300
923	0.300	973	0.300	1023	0.300	1073	0.300	1123	0.300	1173	0.300
924	0.300	974	0.300	1024	0.300	1074	0.300	1124	0.300	1174	0.300
925	0.300	975	0.300	1025	0.300	1075	0.300	1125	0.300	1175	0.300
926	0.300	976	0.300	1026	0.300	1076	0.300	1126	0.300	1176	0.300
927	0.300	977	0.300	1027	0.300	1077	0.300	1127	0.300	1177	0.300
928	0.300	978	0.300	1028	0.300	1078	0.300	1128	0.300	1178	0.300
929	0.300	979	0.300	1029	0.300	1079	0.300	1129	0.300	1179	0.300
930	0.300	980	0.300	1030	0.300	1080	0.300	1130	0.300	1180	0.300
931	0.300	981	0.300	1031	0.300	1081	0.300	1131	0.300	1181	0.300
932	0.300	982	0.300	1032	0.300	1082	0.300	1132	0.300	1182	0.300
933	0.300	983	0.300	1033	0.300	1083	0.300	1133	0.300	1183	0.300
934	0.300	984	0.300	1034	0.300	1084	0.300	1134	0.300	1184	0.300
935	0.300	985	0.300	1035	0.300	1085	0.300	1135	0.300	1185	0.300
936	0.300	986	0.300	1036	0.300	1086	0.300	1136	0.300	1186	0.300
937	0.300	987	0.300	1037	0.300	1087	0.300	1137	0.300	1187	0.300
938	0.300	988	0.300	1038	0.300	1088	0.300	1138	0.300	1188	0.300
939	0.300	989	0.300	1039	0.300	1089	0.300	1139	0.300	1189	0.300
940	0.300	990	0.300	1040	0.300	1090	0.300	1140	0.300	1190	0.300
941	0.300	991	0.300	1041	0.300	1091	0.300	1141	0.300	1191	0.300
942	0.300	992	0.300	1042	0.300	1092	0.300	1142	0.300	1192	0.300
943	0.300	993	0.300	1043	0.300	1093	0.300	1143	0.300	1193	0.300
944	0.300	994	0.300	1044	0.300	1094	0.300	1144	0.300	1194	0.300
945	0.300	995	0.300	1045	0.300	1095	0.300	1145	0.300	1195	0.300
946	0.300	996	0.300	1046	0.300	1096	0.300	1146	0.300	1196	0.300
947	0.300	997	0.300	1047	0.300	1097	0.300	1147	0.300	1197	0.300
948	0.300	998	0.300	1048	0.300	1098	0.300	1148	0.300	1198	0.300
949	0.300	999	0.300	1049	0.300	1099	0.300	1149	0.300	1199	0.300
950	0.300	1000	0.300	1050	0.300	1100	0.300	1150	0.300	1200	0.300

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1201	0.300	1241	0.300	1281	0.300	1321	0.300	1361	0.300	1401	0.300
1202	0.300	1242	0.300	1282	0.300	1322	0.300	1362	0.300	1402	0.300
1203	0.300	1243	0.300	1283	0.300	1323	0.300	1363	0.300	1403	0.300
1204	0.300	1244	0.300	1284	0.300	1324	0.300	1364	0.300	1404	0.300
1205	0.300	1245	0.300	1285	0.300	1325	0.300	1365	0.300	1405	0.300
1206	0.300	1246	0.300	1286	0.300	1326	0.300	1366	0.300	1406	0.300
1207	0.300	1247	0.300	1287	0.300	1327	0.300	1367	0.300	1407	0.300
1208	0.300	1248	0.300	1288	0.300	1328	0.300	1368	0.300	1408	0.300
1209	0.300	1249	0.300	1289	0.300	1329	0.300	1369	0.300	1409	0.300
1210	0.300	1250	0.300	1290	0.300	1330	0.300	1370	0.300	1410	0.300
1211	0.300	1251	0.300	1291	0.300	1331	0.300	1371	0.300	1411	0.300
1212	0.300	1252	0.300	1292	0.300	1332	0.300	1372	0.300	1412	0.300
1213	0.300	1253	0.300	1293	0.300	1333	0.300	1373	0.300	1413	0.300
1214	0.300	1254	0.300	1294	0.300	1334	0.300	1374	0.300	1414	0.300
1215	0.300	1255	0.300	1295	0.300	1335	0.300	1375	0.300	1415	0.300
1216	0.300	1256	0.300	1296	0.300	1336	0.300	1376	0.300	1416	0.300
1217	0.300	1257	0.300	1297	0.300	1337	0.300	1377	0.300	1417	0.300
1218	0.300	1258	0.300	1298	0.300	1338	0.300	1378	0.300	1418	0.300
1219	0.300	1259	0.300	1299	0.300	1339	0.300	1379	0.300	1419	0.300
1220	0.300	1260	0.300	1300	0.300	1340	0.300	1380	0.300	1420	0.300
1221	0.300	1261	0.300	1301	0.300	1341	0.300	1381	0.300	1421	0.300
1222	0.300	1262	0.300	1302	0.300	1342	0.300	1382	0.300	1422	0.300
1223	0.300	1263	0.300	1303	0.300	1343	0.300	1383	0.300	1423	0.300
1224	0.300	1264	0.300	1304	0.300	1344	0.300	1384	0.300	1424	0.300
1225	0.300	1265	0.300	1305	0.300	1345	0.300	1385	0.300	1425	0.300
1226	0.300	1266	0.300	1306	0.300	1346	0.300	1386	0.300	1426	0.300
1227	0.300	1267	0.300	1307	0.300	1347	0.300	1387	0.300	1427	0.300
1228	0.300	1268	0.300	1308	0.300	1348	0.300	1388	0.300	1428	0.300
1229	0.300	1269	0.300	1309	0.300	1349	0.300	1389	0.300	1429	0.300
1230	0.300	1270	0.300	1310	0.300	1350	0.300	1390	0.300	1430	0.300
1231	0.300	1271	0.300	1311	0.300	1351	0.300	1391	0.300	1431	0.300
1232	0.300	1272	0.300	1312	0.300	1352	0.300	1392	0.300	1432	0.300
1233	0.300	1273	0.300	1313	0.300	1353	0.300	1393	0.300	1433	0.300
1234	0.300	1274	0.300	1314	0.300	1354	0.300	1394	0.300	1434	0.300
1235	0.300	1275	0.300	1315	0.300	1355	0.300	1395	0.300	1435	0.300
1236	0.300	1276	0.300	1316	0.300	1356	0.300	1396	0.300	1436	0.300
1237	0.300	1277	0.300	1317	0.300	1357	0.300	1397	0.300	1437	0.300
1238	0.300	1278	0.300	1318	0.300	1358	0.300	1398	0.300	1438	0.300
1239	0.300	1279	0.300	1319	0.300	1359	0.300	1399	0.300	1439	0.300
1240	0.300	1280	0.300	1320	0.300	1360	0.300	1400	0.300	1440	0.300

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
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	FSR	Profile Type	Summer
Return Period (years)	5	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.405		

Online Controls for Storm

Pump Manhole: PUMP AND GEO, DS/PN: 1.006, Volume (m³): 0.7

Invert Level (m) 2.070

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.5000	0.900	5.0000	1.700	5.0000	2.500	5.0000
0.200	1.0000	1.000	5.0000	1.800	5.0000	2.600	5.0000
0.300	1.5000	1.100	5.0000	1.900	5.0000	2.700	5.0000
0.400	2.0000	1.200	5.0000	2.000	5.0000	2.800	5.0000
0.500	3.0000	1.300	5.0000	2.100	5.0000	2.900	5.0000
0.600	4.0000	1.400	5.0000	2.200	5.0000	3.000	5.0000
0.700	5.0000	1.500	5.0000	2.300	5.0000		
0.800	5.0000	1.600	5.0000	2.400	5.0000		

Storage Structures for Storm

Cellular Storage Manhole: PUMP AND GEO, DS/PN: 1.006

Invert Level (m) 2.070 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	23.0	0.0	1.320	23.0	0.0
0.660	23.0	0.0	1.321	0.0	0.0

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	1
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	2013
Site Location	GB 623065 309383 TG 23065 09383
Data Type	Point
Cv (Summer)	0.750
Cv (Winter)	0.840

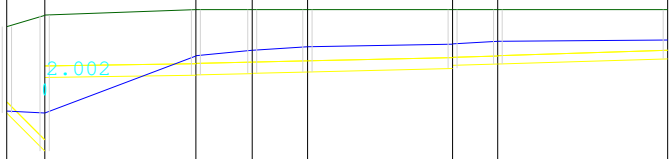
Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

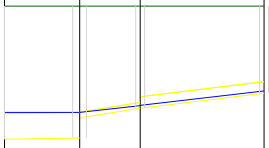
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	C01	15 minute 100 year Winter I+45%	4.050	3.913	0.513	0.000
1.001	C02	15 minute 100 year Winter I+45%	4.050	3.907	0.675	0.000
1.002	C03	15 minute 100 year Winter I+45%	4.050	3.878	0.814	0.000
1.003	C04	15 minute 100 year Winter I+45%	4.050	3.820	0.854	0.000
1.004	C05	15 minute 100 year Winter I+45%	4.050	3.741	0.808	0.000
2.000	C06	15 minute 100 year Winter I+45%	4.050	3.670	0.270	0.000
2.001	C07	15 minute 100 year Winter I+45%	4.050	3.652	0.334	0.000
2.002	C08	15 minute 100 year Winter I+45%	4.050	3.608	0.373	0.000
1.005	C09	15 minute 100 year Winter I+45%	4.050	3.473	0.718	0.000
1.006	PUMP AND GEO	120 minute 100 year Winter I+45%	4.050	3.337	1.117	0.000
1.007	C10	360 minute 100 year Winter I+45%	4.050	2.333	-0.077	0.000

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

PN	US/MH Name	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	C01	0.186		2.1	FLOOD RISK
1.001	C02	0.518		6.9	FLOOD RISK
1.002	C03	0.557		12.1	FLOOD RISK
1.003	C04	0.445		17.3	FLOOD RISK
1.004	C05	0.317		22.5	SURCHARGED
2.000	C06	0.117		6.0	SURCHARGED
2.001	C07	0.270		11.2	SURCHARGED
2.002	C08	0.283		16.5	SURCHARGED
1.005	C09	0.679		44.4	SURCHARGED
1.006	PUMP AND GEO	28.327	78	5.0	SURCHARGED
1.007	C10	0.037		5.0	OK

MH Name	D10		D06			D03		D01	
Hor Scale 1000 Ver Scale 200 Datum (m)-2.000									
PN			1.005			1.002		1.000	
Dia (mm)			300			300		225	
Slope (1:X)			333.3			200.0		150.0	
Cover Level (m)	4.500	4.800	4.950	4.950	4.950	4.950	4.950	4.950	
Invert Level (m)		1.200	3.150	3.210	3.252	3.289	3.385	3.500	3.650
Length (m)			20.000			19.200		22.500	

MH Name				D10	
Hor Scale 1000 Ver Scale 200 Datum (m)-2.000					
PN				1.007	
Dia (mm)				300	
Slope (1:X)				41.0	
Cover Level (m)	4.500	4.500	4.500	4.500	
Invert Level (m)	0.975	1.015	1.540	1.800	2.200
Length (m)				16.400	

MH Name	PUMP AND GEO		D08		
Hor Scale 1000 Ver Scale 200 Datum (m)-2.000			1.005		
PN			2.001		
Dia (mm)			300		
Slope (1:X)			198.4		
Cover Level (m)	4.800		4.700	4.500	
Invert Level (m)			2.781	2.845 2.845	3.000
Length (m)			12.700		

Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1

	PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
*	1.000	22.500	0.150	150.0	0.028	3.00	0.600	o	225	Pipe/Conduit
*	1.001	6.000	0.040	150.0	0.028	0.00	0.600	o	225	Pipe/Conduit
*	1.002	19.200	0.096	200.0	0.029	0.00	0.600	o	300	Pipe/Conduit
*	1.003	7.300	0.037	197.3	0.029	0.00	0.600	o	300	Pipe/Conduit
*	1.004	7.500	0.042	178.6	0.028	0.00	0.600	o	300	Pipe/Conduit
*	1.005	20.000	0.060	333.3	0.029	0.00	0.600	o	300	Pipe/Conduit
*	2.000	11.600	0.155	74.8	0.029	3.00	0.600	o	225	Pipe/Conduit
*	2.001	12.700	0.064	198.4	0.029	0.00	0.600	o	300	Pipe/Conduit
*	2.002	3.000	0.030	100.0	0.029	0.00	0.600	o	300	Pipe/Conduit
*	1.006	5.000	-1.000	-5.0	0.000	0.00	0.600	o	300	Pipe/Conduit
*	1.007	16.400	0.400	41.0	0.000	0.00	0.600	o	300	Pipe/Conduit
*	1.008	8.000	0.260	30.8	0.000	0.00	0.600	o	150	Pipe/Conduit
*	1.009	10.000	0.040	250.0	0.000	0.00	0.600	o	675	Pipe/Conduit

	PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
*	1.000	D01	4.950	3.650	1.075	4.950	3.500	1.225		1200
*	1.001	D02	4.950	3.500	1.225	4.950	3.460	1.265		1200
*	1.002	D03	4.950	3.385	1.265	4.950	3.289	1.361		1200
*	1.003	D04	4.950	3.289	1.361	4.950	3.252	1.398		1200
*	1.004	D05	4.950	3.252	1.398	4.950	3.210	1.440		1200
*	1.005	D06	4.950	3.210	1.440	4.800	3.150	1.350		1200
*	2.000	D07	4.500	3.000	1.275	4.700	2.845	1.630		1200
*	2.001	D08	4.700	2.845	1.555	4.800	2.781	1.719		1200
*	2.002	D09	4.800	2.706	1.794	4.800	2.676	1.824		1200
*	1.006	PUMP AND GEO	4.800	1.200	3.300	4.500	2.200	2.000	Pump	1200
*	1.007	D10	4.500	2.200	2.000	4.500	1.800	2.400		1200
*	1.008	D11	4.500	1.800	2.550	4.500	1.540	2.810		1200
*	1.009	SW-A-04	4.500	1.015	2.810	4.500	0.975	2.850		1800

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backd (mm
D01	4.950	1.300	Open Manhole	1200	1.000	3.650	225				
D02	4.950	1.450	Open Manhole	1200	1.001	3.500	225	1.000	3.500	225	
D03	4.950	1.565	Open Manhole	1200	1.002	3.385	300	1.001	3.460	225	
D04	4.950	1.661	Open Manhole	1200	1.003	3.289	300	1.002	3.289	300	
D05	4.950	1.698	Open Manhole	1200	1.004	3.252	300	1.003	3.252	300	
D06	4.950	1.740	Open Manhole	1200	1.005	3.210	300	1.004	3.210	300	
D07	4.500	1.500	Open Manhole	1200	2.000	3.000	225				
D08	4.700	1.855	Open Manhole	1200	2.001	2.845	300	2.000	2.845	225	
D09	4.800	2.094	Open Manhole	1200	2.002	2.706	300	2.001	2.781	300	
PUMP AND GEO	4.800	3.600	Open Manhole	1200	1.006	1.200	300	1.005	3.150	300	
								2.002	2.676	300	
D10	4.500	2.300	Open Manhole	1200	1.007	2.200	300	1.006	2.200	300	
D11	4.500	2.700	Open Manhole	1200	1.008	1.800	150	1.007	1.800	300	
SW-A-04	4.500	3.485	Open Manhole	1800	1.009	1.015	675	1.008	1.540	150	
	4.500	3.525	Open Manhole	0		OUTFALL		1.009	0.975	675	

No coordinates have been specified, layout information cannot be produced.

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)
1.000	o	225	D01	4.950	3.650	1.075	Open Manhole	1200
1.001	o	225	D02	4.950	3.500	1.225	Open Manhole	1200
1.002	o	300	D03	4.950	3.385	1.265	Open Manhole	1200
1.003	o	300	D04	4.950	3.289	1.361	Open Manhole	1200
1.004	o	300	D05	4.950	3.252	1.398	Open Manhole	1200
1.005	o	300	D06	4.950	3.210	1.440	Open Manhole	1200
2.000	o	225	D07	4.500	3.000	1.275	Open Manhole	1200
2.001	o	300	D08	4.700	2.845	1.555	Open Manhole	1200
2.002	o	300	D09	4.800	2.706	1.794	Open Manhole	1200
1.006	o	300	PUMP AND GEO	4.800	1.200	3.300	Open Manhole	1200
1.007	o	300	D10	4.500	2.200	2.000	Open Manhole	1200
1.008	o	150	D11	4.500	1.800	2.550	Open Manhole	1200
1.009	o	675	SW-A-04	4.500	1.015	2.810	Open Manhole	1800

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	22.500	150.0	D02	4.950	3.500	1.225	Open Manhole	1200
1.001	6.000	150.0	D03	4.950	3.460	1.265	Open Manhole	1200
1.002	19.200	200.0	D04	4.950	3.289	1.361	Open Manhole	1200
1.003	7.300	197.3	D05	4.950	3.252	1.398	Open Manhole	1200
1.004	7.500	178.6	D06	4.950	3.210	1.440	Open Manhole	1200
1.005	20.000	333.3	PUMP AND GEO	4.800	3.150	1.350	Open Manhole	1200
2.000	11.600	74.8	D08	4.700	2.845	1.630	Open Manhole	1200
2.001	12.700	198.4	D09	4.800	2.781	1.719	Open Manhole	1200
2.002	3.000	100.0	PUMP AND GEO	4.800	2.676	1.824	Open Manhole	1200
1.006	5.000	-5.0	D10	4.500	2.200	2.000	Open Manhole	1200
1.007	16.400	41.0	D11	4.500	1.800	2.400	Open Manhole	1200
1.008	8.000	30.8	SW-A-04	4.500	1.540	2.810	Open Manhole	1800
1.009	10.000	250.0		4.500	0.975	2.850	Open Manhole	0

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009		4.500	0.975	0.000	0	0

Datum (m) 1.015 Offset (mins) 0

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.675	51	0.675	101	0.675	151	0.675	201	0.675	251	0.675
2	0.675	52	0.675	102	0.675	152	0.675	202	0.675	252	0.675
3	0.675	53	0.675	103	0.675	153	0.675	203	0.675	253	0.675
4	0.675	54	0.675	104	0.675	154	0.675	204	0.675	254	0.675
5	0.675	55	0.675	105	0.675	155	0.675	205	0.675	255	0.675
6	0.675	56	0.675	106	0.675	156	0.675	206	0.675	256	0.675
7	0.675	57	0.675	107	0.675	157	0.675	207	0.675	257	0.675
8	0.675	58	0.675	108	0.675	158	0.675	208	0.675	258	0.675
9	0.675	59	0.675	109	0.675	159	0.675	209	0.675	259	0.675
10	0.675	60	0.675	110	0.675	160	0.675	210	0.675	260	0.675
11	0.675	61	0.675	111	0.675	161	0.675	211	0.675	261	0.675
12	0.675	62	0.675	112	0.675	162	0.675	212	0.675	262	0.675
13	0.675	63	0.675	113	0.675	163	0.675	213	0.675	263	0.675
14	0.675	64	0.675	114	0.675	164	0.675	214	0.675	264	0.675
15	0.675	65	0.675	115	0.675	165	0.675	215	0.675	265	0.675
16	0.675	66	0.675	116	0.675	166	0.675	216	0.675	266	0.675
17	0.675	67	0.675	117	0.675	167	0.675	217	0.675	267	0.675
18	0.675	68	0.675	118	0.675	168	0.675	218	0.675	268	0.675
19	0.675	69	0.675	119	0.675	169	0.675	219	0.675	269	0.675
20	0.675	70	0.675	120	0.675	170	0.675	220	0.675	270	0.675
21	0.675	71	0.675	121	0.675	171	0.675	221	0.675	271	0.675
22	0.675	72	0.675	122	0.675	172	0.675	222	0.675	272	0.675
23	0.675	73	0.675	123	0.675	173	0.675	223	0.675	273	0.675
24	0.675	74	0.675	124	0.675	174	0.675	224	0.675	274	0.675
25	0.675	75	0.675	125	0.675	175	0.675	225	0.675	275	0.675
26	0.675	76	0.675	126	0.675	176	0.675	226	0.675	276	0.675
27	0.675	77	0.675	127	0.675	177	0.675	227	0.675	277	0.675
28	0.675	78	0.675	128	0.675	178	0.675	228	0.675	278	0.675
29	0.675	79	0.675	129	0.675	179	0.675	229	0.675	279	0.675
30	0.675	80	0.675	130	0.675	180	0.675	230	0.675	280	0.675
31	0.675	81	0.675	131	0.675	181	0.675	231	0.675	281	0.675
32	0.675	82	0.675	132	0.675	182	0.675	232	0.675	282	0.675
33	0.675	83	0.675	133	0.675	183	0.675	233	0.675	283	0.675
34	0.675	84	0.675	134	0.675	184	0.675	234	0.675	284	0.675
35	0.675	85	0.675	135	0.675	185	0.675	235	0.675	285	0.675
36	0.675	86	0.675	136	0.675	186	0.675	236	0.675	286	0.675
37	0.675	87	0.675	137	0.675	187	0.675	237	0.675	287	0.675
38	0.675	88	0.675	138	0.675	188	0.675	238	0.675	288	0.675
39	0.675	89	0.675	139	0.675	189	0.675	239	0.675	289	0.675
40	0.675	90	0.675	140	0.675	190	0.675	240	0.675	290	0.675
41	0.675	91	0.675	141	0.675	191	0.675	241	0.675	291	0.675
42	0.675	92	0.675	142	0.675	192	0.675	242	0.675	292	0.675
43	0.675	93	0.675	143	0.675	193	0.675	243	0.675	293	0.675
44	0.675	94	0.675	144	0.675	194	0.675	244	0.675	294	0.675
45	0.675	95	0.675	145	0.675	195	0.675	245	0.675	295	0.675
46	0.675	96	0.675	146	0.675	196	0.675	246	0.675	296	0.675
47	0.675	97	0.675	147	0.675	197	0.675	247	0.675	297	0.675
48	0.675	98	0.675	148	0.675	198	0.675	248	0.675	298	0.675
49	0.675	99	0.675	149	0.675	199	0.675	249	0.675	299	0.675
50	0.675	100	0.675	150	0.675	200	0.675	250	0.675	300	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
301	0.675	351	0.675	401	0.675	451	0.675	501	0.675	551	0.675
302	0.675	352	0.675	402	0.675	452	0.675	502	0.675	552	0.675
303	0.675	353	0.675	403	0.675	453	0.675	503	0.675	553	0.675
304	0.675	354	0.675	404	0.675	454	0.675	504	0.675	554	0.675
305	0.675	355	0.675	405	0.675	455	0.675	505	0.675	555	0.675
306	0.675	356	0.675	406	0.675	456	0.675	506	0.675	556	0.675
307	0.675	357	0.675	407	0.675	457	0.675	507	0.675	557	0.675
308	0.675	358	0.675	408	0.675	458	0.675	508	0.675	558	0.675
309	0.675	359	0.675	409	0.675	459	0.675	509	0.675	559	0.675
310	0.675	360	0.675	410	0.675	460	0.675	510	0.675	560	0.675
311	0.675	361	0.675	411	0.675	461	0.675	511	0.675	561	0.675
312	0.675	362	0.675	412	0.675	462	0.675	512	0.675	562	0.675
313	0.675	363	0.675	413	0.675	463	0.675	513	0.675	563	0.675
314	0.675	364	0.675	414	0.675	464	0.675	514	0.675	564	0.675
315	0.675	365	0.675	415	0.675	465	0.675	515	0.675	565	0.675
316	0.675	366	0.675	416	0.675	466	0.675	516	0.675	566	0.675
317	0.675	367	0.675	417	0.675	467	0.675	517	0.675	567	0.675
318	0.675	368	0.675	418	0.675	468	0.675	518	0.675	568	0.675
319	0.675	369	0.675	419	0.675	469	0.675	519	0.675	569	0.675
320	0.675	370	0.675	420	0.675	470	0.675	520	0.675	570	0.675
321	0.675	371	0.675	421	0.675	471	0.675	521	0.675	571	0.675
322	0.675	372	0.675	422	0.675	472	0.675	522	0.675	572	0.675
323	0.675	373	0.675	423	0.675	473	0.675	523	0.675	573	0.675
324	0.675	374	0.675	424	0.675	474	0.675	524	0.675	574	0.675
325	0.675	375	0.675	425	0.675	475	0.675	525	0.675	575	0.675
326	0.675	376	0.675	426	0.675	476	0.675	526	0.675	576	0.675
327	0.675	377	0.675	427	0.675	477	0.675	527	0.675	577	0.675
328	0.675	378	0.675	428	0.675	478	0.675	528	0.675	578	0.675
329	0.675	379	0.675	429	0.675	479	0.675	529	0.675	579	0.675
330	0.675	380	0.675	430	0.675	480	0.675	530	0.675	580	0.675
331	0.675	381	0.675	431	0.675	481	0.675	531	0.675	581	0.675
332	0.675	382	0.675	432	0.675	482	0.675	532	0.675	582	0.675
333	0.675	383	0.675	433	0.675	483	0.675	533	0.675	583	0.675
334	0.675	384	0.675	434	0.675	484	0.675	534	0.675	584	0.675
335	0.675	385	0.675	435	0.675	485	0.675	535	0.675	585	0.675
336	0.675	386	0.675	436	0.675	486	0.675	536	0.675	586	0.675
337	0.675	387	0.675	437	0.675	487	0.675	537	0.675	587	0.675
338	0.675	388	0.675	438	0.675	488	0.675	538	0.675	588	0.675
339	0.675	389	0.675	439	0.675	489	0.675	539	0.675	589	0.675
340	0.675	390	0.675	440	0.675	490	0.675	540	0.675	590	0.675
341	0.675	391	0.675	441	0.675	491	0.675	541	0.675	591	0.675
342	0.675	392	0.675	442	0.675	492	0.675	542	0.675	592	0.675
343	0.675	393	0.675	443	0.675	493	0.675	543	0.675	593	0.675
344	0.675	394	0.675	444	0.675	494	0.675	544	0.675	594	0.675
345	0.675	395	0.675	445	0.675	495	0.675	545	0.675	595	0.675
346	0.675	396	0.675	446	0.675	496	0.675	546	0.675	596	0.675
347	0.675	397	0.675	447	0.675	497	0.675	547	0.675	597	0.675
348	0.675	398	0.675	448	0.675	498	0.675	548	0.675	598	0.675
349	0.675	399	0.675	449	0.675	499	0.675	549	0.675	599	0.675
350	0.675	400	0.675	450	0.675	500	0.675	550	0.675	600	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
601	0.675	651	0.675	701	0.675	751	0.675	801	0.675	851	0.675
602	0.675	652	0.675	702	0.675	752	0.675	802	0.675	852	0.675
603	0.675	653	0.675	703	0.675	753	0.675	803	0.675	853	0.675
604	0.675	654	0.675	704	0.675	754	0.675	804	0.675	854	0.675
605	0.675	655	0.675	705	0.675	755	0.675	805	0.675	855	0.675
606	0.675	656	0.675	706	0.675	756	0.675	806	0.675	856	0.675
607	0.675	657	0.675	707	0.675	757	0.675	807	0.675	857	0.675
608	0.675	658	0.675	708	0.675	758	0.675	808	0.675	858	0.675
609	0.675	659	0.675	709	0.675	759	0.675	809	0.675	859	0.675
610	0.675	660	0.675	710	0.675	760	0.675	810	0.675	860	0.675
611	0.675	661	0.675	711	0.675	761	0.675	811	0.675	861	0.675
612	0.675	662	0.675	712	0.675	762	0.675	812	0.675	862	0.675
613	0.675	663	0.675	713	0.675	763	0.675	813	0.675	863	0.675
614	0.675	664	0.675	714	0.675	764	0.675	814	0.675	864	0.675
615	0.675	665	0.675	715	0.675	765	0.675	815	0.675	865	0.675
616	0.675	666	0.675	716	0.675	766	0.675	816	0.675	866	0.675
617	0.675	667	0.675	717	0.675	767	0.675	817	0.675	867	0.675
618	0.675	668	0.675	718	0.675	768	0.675	818	0.675	868	0.675
619	0.675	669	0.675	719	0.675	769	0.675	819	0.675	869	0.675
620	0.675	670	0.675	720	0.675	770	0.675	820	0.675	870	0.675
621	0.675	671	0.675	721	0.675	771	0.675	821	0.675	871	0.675
622	0.675	672	0.675	722	0.675	772	0.675	822	0.675	872	0.675
623	0.675	673	0.675	723	0.675	773	0.675	823	0.675	873	0.675
624	0.675	674	0.675	724	0.675	774	0.675	824	0.675	874	0.675
625	0.675	675	0.675	725	0.675	775	0.675	825	0.675	875	0.675
626	0.675	676	0.675	726	0.675	776	0.675	826	0.675	876	0.675
627	0.675	677	0.675	727	0.675	777	0.675	827	0.675	877	0.675
628	0.675	678	0.675	728	0.675	778	0.675	828	0.675	878	0.675
629	0.675	679	0.675	729	0.675	779	0.675	829	0.675	879	0.675
630	0.675	680	0.675	730	0.675	780	0.675	830	0.675	880	0.675
631	0.675	681	0.675	731	0.675	781	0.675	831	0.675	881	0.675
632	0.675	682	0.675	732	0.675	782	0.675	832	0.675	882	0.675
633	0.675	683	0.675	733	0.675	783	0.675	833	0.675	883	0.675
634	0.675	684	0.675	734	0.675	784	0.675	834	0.675	884	0.675
635	0.675	685	0.675	735	0.675	785	0.675	835	0.675	885	0.675
636	0.675	686	0.675	736	0.675	786	0.675	836	0.675	886	0.675
637	0.675	687	0.675	737	0.675	787	0.675	837	0.675	887	0.675
638	0.675	688	0.675	738	0.675	788	0.675	838	0.675	888	0.675
639	0.675	689	0.675	739	0.675	789	0.675	839	0.675	889	0.675
640	0.675	690	0.675	740	0.675	790	0.675	840	0.675	890	0.675
641	0.675	691	0.675	741	0.675	791	0.675	841	0.675	891	0.675
642	0.675	692	0.675	742	0.675	792	0.675	842	0.675	892	0.675
643	0.675	693	0.675	743	0.675	793	0.675	843	0.675	893	0.675
644	0.675	694	0.675	744	0.675	794	0.675	844	0.675	894	0.675
645	0.675	695	0.675	745	0.675	795	0.675	845	0.675	895	0.675
646	0.675	696	0.675	746	0.675	796	0.675	846	0.675	896	0.675
647	0.675	697	0.675	747	0.675	797	0.675	847	0.675	897	0.675
648	0.675	698	0.675	748	0.675	798	0.675	848	0.675	898	0.675
649	0.675	699	0.675	749	0.675	799	0.675	849	0.675	899	0.675
650	0.675	700	0.675	750	0.675	800	0.675	850	0.675	900	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
901	0.675	951	0.675	1001	0.675	1051	0.675	1101	0.675	1151	0.675
902	0.675	952	0.675	1002	0.675	1052	0.675	1102	0.675	1152	0.675
903	0.675	953	0.675	1003	0.675	1053	0.675	1103	0.675	1153	0.675
904	0.675	954	0.675	1004	0.675	1054	0.675	1104	0.675	1154	0.675
905	0.675	955	0.675	1005	0.675	1055	0.675	1105	0.675	1155	0.675
906	0.675	956	0.675	1006	0.675	1056	0.675	1106	0.675	1156	0.675
907	0.675	957	0.675	1007	0.675	1057	0.675	1107	0.675	1157	0.675
908	0.675	958	0.675	1008	0.675	1058	0.675	1108	0.675	1158	0.675
909	0.675	959	0.675	1009	0.675	1059	0.675	1109	0.675	1159	0.675
910	0.675	960	0.675	1010	0.675	1060	0.675	1110	0.675	1160	0.675
911	0.675	961	0.675	1011	0.675	1061	0.675	1111	0.675	1161	0.675
912	0.675	962	0.675	1012	0.675	1062	0.675	1112	0.675	1162	0.675
913	0.675	963	0.675	1013	0.675	1063	0.675	1113	0.675	1163	0.675
914	0.675	964	0.675	1014	0.675	1064	0.675	1114	0.675	1164	0.675
915	0.675	965	0.675	1015	0.675	1065	0.675	1115	0.675	1165	0.675
916	0.675	966	0.675	1016	0.675	1066	0.675	1116	0.675	1166	0.675
917	0.675	967	0.675	1017	0.675	1067	0.675	1117	0.675	1167	0.675
918	0.675	968	0.675	1018	0.675	1068	0.675	1118	0.675	1168	0.675
919	0.675	969	0.675	1019	0.675	1069	0.675	1119	0.675	1169	0.675
920	0.675	970	0.675	1020	0.675	1070	0.675	1120	0.675	1170	0.675
921	0.675	971	0.675	1021	0.675	1071	0.675	1121	0.675	1171	0.675
922	0.675	972	0.675	1022	0.675	1072	0.675	1122	0.675	1172	0.675
923	0.675	973	0.675	1023	0.675	1073	0.675	1123	0.675	1173	0.675
924	0.675	974	0.675	1024	0.675	1074	0.675	1124	0.675	1174	0.675
925	0.675	975	0.675	1025	0.675	1075	0.675	1125	0.675	1175	0.675
926	0.675	976	0.675	1026	0.675	1076	0.675	1126	0.675	1176	0.675
927	0.675	977	0.675	1027	0.675	1077	0.675	1127	0.675	1177	0.675
928	0.675	978	0.675	1028	0.675	1078	0.675	1128	0.675	1178	0.675
929	0.675	979	0.675	1029	0.675	1079	0.675	1129	0.675	1179	0.675
930	0.675	980	0.675	1030	0.675	1080	0.675	1130	0.675	1180	0.675
931	0.675	981	0.675	1031	0.675	1081	0.675	1131	0.675	1181	0.675
932	0.675	982	0.675	1032	0.675	1082	0.675	1132	0.675	1182	0.675
933	0.675	983	0.675	1033	0.675	1083	0.675	1133	0.675	1183	0.675
934	0.675	984	0.675	1034	0.675	1084	0.675	1134	0.675	1184	0.675
935	0.675	985	0.675	1035	0.675	1085	0.675	1135	0.675	1185	0.675
936	0.675	986	0.675	1036	0.675	1086	0.675	1136	0.675	1186	0.675
937	0.675	987	0.675	1037	0.675	1087	0.675	1137	0.675	1187	0.675
938	0.675	988	0.675	1038	0.675	1088	0.675	1138	0.675	1188	0.675
939	0.675	989	0.675	1039	0.675	1089	0.675	1139	0.675	1189	0.675
940	0.675	990	0.675	1040	0.675	1090	0.675	1140	0.675	1190	0.675
941	0.675	991	0.675	1041	0.675	1091	0.675	1141	0.675	1191	0.675
942	0.675	992	0.675	1042	0.675	1092	0.675	1142	0.675	1192	0.675
943	0.675	993	0.675	1043	0.675	1093	0.675	1143	0.675	1193	0.675
944	0.675	994	0.675	1044	0.675	1094	0.675	1144	0.675	1194	0.675
945	0.675	995	0.675	1045	0.675	1095	0.675	1145	0.675	1195	0.675
946	0.675	996	0.675	1046	0.675	1096	0.675	1146	0.675	1196	0.675
947	0.675	997	0.675	1047	0.675	1097	0.675	1147	0.675	1197	0.675
948	0.675	998	0.675	1048	0.675	1098	0.675	1148	0.675	1198	0.675
949	0.675	999	0.675	1049	0.675	1099	0.675	1149	0.675	1199	0.675
950	0.675	1000	0.675	1050	0.675	1100	0.675	1150	0.675	1200	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1201	0.675	1241	0.675	1281	0.675	1321	0.675	1361	0.675	1401	0.675
1202	0.675	1242	0.675	1282	0.675	1322	0.675	1362	0.675	1402	0.675
1203	0.675	1243	0.675	1283	0.675	1323	0.675	1363	0.675	1403	0.675
1204	0.675	1244	0.675	1284	0.675	1324	0.675	1364	0.675	1404	0.675
1205	0.675	1245	0.675	1285	0.675	1325	0.675	1365	0.675	1405	0.675
1206	0.675	1246	0.675	1286	0.675	1326	0.675	1366	0.675	1406	0.675
1207	0.675	1247	0.675	1287	0.675	1327	0.675	1367	0.675	1407	0.675
1208	0.675	1248	0.675	1288	0.675	1328	0.675	1368	0.675	1408	0.675
1209	0.675	1249	0.675	1289	0.675	1329	0.675	1369	0.675	1409	0.675
1210	0.675	1250	0.675	1290	0.675	1330	0.675	1370	0.675	1410	0.675
1211	0.675	1251	0.675	1291	0.675	1331	0.675	1371	0.675	1411	0.675
1212	0.675	1252	0.675	1292	0.675	1332	0.675	1372	0.675	1412	0.675
1213	0.675	1253	0.675	1293	0.675	1333	0.675	1373	0.675	1413	0.675
1214	0.675	1254	0.675	1294	0.675	1334	0.675	1374	0.675	1414	0.675
1215	0.675	1255	0.675	1295	0.675	1335	0.675	1375	0.675	1415	0.675
1216	0.675	1256	0.675	1296	0.675	1336	0.675	1376	0.675	1416	0.675
1217	0.675	1257	0.675	1297	0.675	1337	0.675	1377	0.675	1417	0.675
1218	0.675	1258	0.675	1298	0.675	1338	0.675	1378	0.675	1418	0.675
1219	0.675	1259	0.675	1299	0.675	1339	0.675	1379	0.675	1419	0.675
1220	0.675	1260	0.675	1300	0.675	1340	0.675	1380	0.675	1420	0.675
1221	0.675	1261	0.675	1301	0.675	1341	0.675	1381	0.675	1421	0.675
1222	0.675	1262	0.675	1302	0.675	1342	0.675	1382	0.675	1422	0.675
1223	0.675	1263	0.675	1303	0.675	1343	0.675	1383	0.675	1423	0.675
1224	0.675	1264	0.675	1304	0.675	1344	0.675	1384	0.675	1424	0.675
1225	0.675	1265	0.675	1305	0.675	1345	0.675	1385	0.675	1425	0.675
1226	0.675	1266	0.675	1306	0.675	1346	0.675	1386	0.675	1426	0.675
1227	0.675	1267	0.675	1307	0.675	1347	0.675	1387	0.675	1427	0.675
1228	0.675	1268	0.675	1308	0.675	1348	0.675	1388	0.675	1428	0.675
1229	0.675	1269	0.675	1309	0.675	1349	0.675	1389	0.675	1429	0.675
1230	0.675	1270	0.675	1310	0.675	1350	0.675	1390	0.675	1430	0.675
1231	0.675	1271	0.675	1311	0.675	1351	0.675	1391	0.675	1431	0.675
1232	0.675	1272	0.675	1312	0.675	1352	0.675	1392	0.675	1432	0.675
1233	0.675	1273	0.675	1313	0.675	1353	0.675	1393	0.675	1433	0.675
1234	0.675	1274	0.675	1314	0.675	1354	0.675	1394	0.675	1434	0.675
1235	0.675	1275	0.675	1315	0.675	1355	0.675	1395	0.675	1435	0.675
1236	0.675	1276	0.675	1316	0.675	1356	0.675	1396	0.675	1436	0.675
1237	0.675	1277	0.675	1317	0.675	1357	0.675	1397	0.675	1437	0.675
1238	0.675	1278	0.675	1318	0.675	1358	0.675	1398	0.675	1438	0.675
1239	0.675	1279	0.675	1319	0.675	1359	0.675	1399	0.675	1439	0.675
1240	0.675	1280	0.675	1320	0.675	1360	0.675	1400	0.675	1440	0.675

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
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	FSR	Profile Type	Summer
Return Period (years)	5	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.407		

Online Controls for Storm

Pump Manhole: PUMP AND GEO, DS/PN: 1.006, Volume (m³): 5.5

Invert Level (m) 1.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.0000	1.200	12.5000	3.000	12.5000	7.000	12.5000
0.200	5.0000	1.400	12.5000	3.500	12.5000	7.500	12.5000
0.300	8.0000	1.600	12.5000	4.000	12.5000	8.000	12.5000
0.400	12.5000	1.800	12.5000	4.500	12.5000	8.500	12.5000
0.500	12.5000	2.000	12.5000	5.000	12.5000	9.000	12.5000
0.600	12.5000	2.200	12.5000	5.500	12.5000	9.500	12.5000
0.800	12.5000	2.400	12.5000	6.000	12.5000		
1.000	12.5000	2.600	12.5000	6.500	12.5000		

Storage Structures for Storm

Cellular Storage Manhole: PUMP AND GEO, DS/PN: 1.006

Invert Level (m) 1.200 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	71.0	0.0	1.320	71.0	0.0
0.660	71.0	0.0	1.321	0.0	0.0

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	1
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	2013
Site Location	GB 623065 309383 TG 23065 09383
Data Type	Point
Cv (Summer)	0.750
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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	D01	120 minute 100 year Winter I+45%	4.950	4.307	0.432	0.000
1.001	D02	120 minute 100 year Winter I+45%	4.950	4.304	0.579	0.000
1.002	D03	120 minute 100 year Winter I+45%	4.950	4.301	0.616	0.000
1.003	D04	120 minute 100 year Winter I+45%	4.950	4.297	0.708	0.000
1.004	D05	120 minute 100 year Winter I+45%	4.950	4.294	0.742	0.000
1.005	D06	120 minute 100 year Winter I+45%	4.950	4.291	0.781	0.000
2.000	D07	120 minute 100 year Winter I+45%	4.500	4.288	1.063	0.000
2.001	D08	120 minute 100 year Winter I+45%	4.700	4.285	1.140	0.000
2.002	D09	120 minute 100 year Winter I+45%	4.800	4.283	1.277	0.000
1.006	PUMP AND GEO	120 minute 100 year Winter I+45%	4.800	4.282	2.782	0.000
1.007	D10	15 minute 100 year Summer I+45%	4.500	2.258	-0.242	0.000
1.008	D11	15 minute 100 year Winter I+45%	4.500	1.870	-0.080	0.000
1.009	SW-A-04	15 minute 100 year Summer I+45%	4.500	1.691	0.001	0.000

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

PN	US/MH Name	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	D01	0.737		6.6	SURCHARGED
1.001	D02	1.750		13.2	SURCHARGED
1.002	D03	1.222		20.0	SURCHARGED
1.003	D04	2.407		26.8	SURCHARGED
1.004	D05	1.604		33.4	SURCHARGED
1.005	D06	1.662		40.2	SURCHARGED
2.000	D07	1.451		6.8	FLOOD RISK
2.001	D08	2.037		13.7	SURCHARGED
2.002	D09	2.591		20.5	SURCHARGED
1.006	PUMP AND GEO	94.235	112	12.5	SURCHARGED
1.007	D10	0.063		12.5	OK
1.008	D11	0.095		12.5	OK
1.009	SW-A-04	1.742		12.5	SURCHARGED

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 102 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	2.059	1.059	0.0	26.5	26.5	167.4	O K
30 min Summer	2.342	1.342	0.0	30.0	30.0	212.1	O K
60 min Summer	2.567	1.567	0.0	30.0	30.0	247.7	O K
120 min Summer	2.701	1.701	0.0	30.0	30.0	268.8	O K
180 min Summer	2.750	1.750	0.0	30.0	30.0	276.6	O K
240 min Summer	2.758	1.758	0.0	30.0	30.0	277.9	O K
360 min Summer	2.703	1.703	0.0	30.0	30.0	269.3	O K
480 min Summer	2.599	1.599	0.0	30.0	30.0	252.8	O K
600 min Summer	2.481	1.481	0.0	30.0	30.0	234.1	O K
720 min Summer	2.365	1.365	0.0	30.0	30.0	215.8	O K
960 min Summer	2.181	1.181	0.0	29.5	29.5	186.7	O K
1440 min Summer	1.959	0.959	0.0	24.0	24.0	151.7	O K
2160 min Summer	1.749	0.749	0.0	18.7	18.7	118.4	O K
2880 min Summer	1.617	0.617	0.0	15.4	15.4	97.6	O K
4320 min Summer	1.461	0.461	0.0	11.5	11.5	72.9	O K
5760 min Summer	1.373	0.373	0.0	9.3	9.3	59.0	O K
7200 min Summer	1.317	0.317	0.0	7.9	7.9	50.1	O K
8640 min Summer	1.278	0.278	0.0	7.0	7.0	44.0	O K
10080 min Summer	1.249	0.249	0.0	6.2	6.2	39.3	O K
15 min Winter	2.185	1.185	0.0	29.6	29.6	187.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	161.698	0.0	194.6	33
30 min Summer	106.079	0.0	255.4	44
60 min Summer	66.043	0.0	318.0	66
120 min Summer	40.674	0.0	391.7	104
180 min Summer	30.745	0.0	444.1	138
240 min Summer	25.190	0.0	485.2	172
360 min Summer	18.924	0.0	546.7	240
480 min Summer	15.309	0.0	589.7	304
600 min Summer	12.911	0.0	621.7	368
720 min Summer	11.192	0.0	646.7	428
960 min Summer	8.868	0.0	683.1	546
1440 min Summer	6.306	0.0	728.7	792
2160 min Summer	4.438	0.0	769.1	1156
2880 min Summer	3.453	0.0	798.0	1516
4320 min Summer	2.428	0.0	841.6	2248
5760 min Summer	1.899	0.0	877.7	2952
7200 min Summer	1.581	0.0	913.5	3680
8640 min Summer	1.367	0.0	947.9	4416
10080 min Summer	1.213	0.0	981.5	5144
15 min Winter	161.698	0.0	217.9	34

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	2.516	1.516	0.0	30.0	30.0	239.6	O K
60 min Winter	2.782	1.782	0.0	30.0	30.0	281.7	O K
120 min Winter	2.934	1.934	0.0	30.0	30.0	305.7	O K
180 min Winter	2.966	1.966	0.0	30.0	30.0	310.8	O K
240 min Winter	2.948	1.948	0.0	30.0	30.0	307.9	O K
360 min Winter	2.826	1.826	0.0	30.0	30.0	288.6	O K
480 min Winter	2.649	1.649	0.0	30.0	30.0	260.6	O K
600 min Winter	2.465	1.465	0.0	30.0	30.0	231.5	O K
720 min Winter	2.300	1.300	0.0	30.0	30.0	205.5	O K
960 min Winter	2.094	1.094	0.0	27.4	27.4	173.0	O K
1440 min Winter	1.844	0.844	0.0	21.1	21.1	133.5	O K
2160 min Winter	1.626	0.626	0.0	15.7	15.7	99.0	O K
2880 min Winter	1.500	0.500	0.0	12.5	12.5	79.0	O K
4320 min Winter	1.359	0.359	0.0	9.0	9.0	56.8	O K
5760 min Winter	1.283	0.283	0.0	7.1	7.1	44.8	O K
7200 min Winter	1.237	0.237	0.0	5.9	5.9	37.5	O K
8640 min Winter	1.206	0.206	0.0	5.1	5.1	32.5	O K
10080 min Winter	1.183	0.183	0.0	4.6	4.6	28.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	106.079	0.0	286.0	45
60 min Winter	66.043	0.0	356.2	68
120 min Winter	40.674	0.0	438.7	112
180 min Winter	30.745	0.0	497.4	148
240 min Winter	25.190	0.0	543.4	186
360 min Winter	18.924	0.0	612.3	258
480 min Winter	15.309	0.0	660.5	326
600 min Winter	12.911	0.0	696.3	388
720 min Winter	11.192	0.0	724.3	446
960 min Winter	8.868	0.0	765.1	566
1440 min Winter	6.306	0.0	816.1	812
2160 min Winter	4.438	0.0	861.4	1176
2880 min Winter	3.453	0.0	893.8	1540
4320 min Winter	2.428	0.0	942.6	2260
5760 min Winter	1.899	0.0	983.1	3000
7200 min Winter	1.581	0.0	1023.1	3688
8640 min Winter	1.367	0.0	1061.7	4416
10080 min Winter	1.213	0.0	1099.2	5144

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 623065 309383 TG 23065 09383
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.642

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.107	8	12	0.107	16	20	0.107
4	8	0.107	12	16	0.107	20	24	0.107

Model Details

Storage is Online Cover Level (m) 4.500

Cellular Storage Structure

Invert Level (m) 1.000 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	166.4	0.0	1.980	166.4	0.0
0.660	166.4	0.0	1.981	0.0	0.0
1.320	166.4	0.0			

Pump Outflow Control

Invert Level (m) 1.000

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	5.0000	1.800	30.0000	3.400	30.0000	5.000	30.0000
0.400	10.0000	2.000	30.0000	3.600	30.0000	5.200	30.0000
0.600	15.0000	2.200	30.0000	3.800	30.0000	5.400	30.0000
0.800	20.0000	2.400	30.0000	4.000	30.0000	5.600	30.0000
1.000	25.0000	2.600	30.0000	4.200	30.0000	5.800	30.0000
1.200	30.0000	2.800	30.0000	4.400	30.0000	6.000	30.0000
1.400	30.0000	3.000	30.0000	4.600	30.0000		
1.600	30.0000	3.200	30.0000	4.800	30.0000		

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 91 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	1.542	1.042	0.0	20.0	20.0	111.5	O K
30 min Summer	1.847	1.347	0.0	20.0	20.0	144.1	O K
60 min Summer	2.077	1.577	0.0	20.0	20.0	168.7	O K
120 min Summer	2.199	1.699	0.0	20.0	20.0	181.7	O K
180 min Summer	2.230	1.730	0.0	20.0	20.0	185.1	O K
240 min Summer	2.221	1.721	0.0	20.0	20.0	184.1	O K
360 min Summer	2.138	1.638	0.0	20.0	20.0	175.2	O K
480 min Summer	2.011	1.511	0.0	20.0	20.0	161.6	O K
600 min Summer	1.872	1.372	0.0	20.0	20.0	146.8	O K
720 min Summer	1.737	1.237	0.0	20.0	20.0	132.3	O K
960 min Summer	1.501	1.001	0.0	20.0	20.0	107.0	O K
1440 min Summer	1.238	0.738	0.0	18.4	18.4	78.9	O K
2160 min Summer	1.062	0.562	0.0	14.0	14.0	60.1	O K
2880 min Summer	0.956	0.456	0.0	11.4	11.4	48.8	O K
4320 min Summer	0.835	0.335	0.0	8.4	8.4	35.8	O K
5760 min Summer	0.768	0.268	0.0	6.7	6.7	28.7	O K
7200 min Summer	0.726	0.226	0.0	5.7	5.7	24.2	O K
8640 min Summer	0.697	0.197	0.0	4.9	4.9	21.1	O K
10080 min Summer	0.676	0.176	0.0	4.4	4.4	18.8	O K
15 min Winter	1.680	1.180	0.0	20.0	20.0	126.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	161.698	0.0	135.5	33
30 min Summer	106.079	0.0	177.8	44
60 min Summer	66.043	0.0	221.4	66
120 min Summer	40.674	0.0	272.7	104
180 min Summer	30.745	0.0	309.2	138
240 min Summer	25.190	0.0	337.8	172
360 min Summer	18.924	0.0	380.7	240
480 min Summer	15.309	0.0	410.6	306
600 min Summer	12.911	0.0	432.8	370
720 min Summer	11.192	0.0	450.3	432
960 min Summer	8.868	0.0	475.6	548
1440 min Summer	6.306	0.0	507.4	776
2160 min Summer	4.438	0.0	535.5	1136
2880 min Summer	3.453	0.0	555.6	1500
4320 min Summer	2.428	0.0	586.0	2220
5760 min Summer	1.899	0.0	611.1	2944
7200 min Summer	1.581	0.0	636.0	3680
8640 min Summer	1.367	0.0	660.0	4408
10080 min Summer	1.213	0.0	683.4	5144
15 min Winter	161.698	0.0	151.7	34

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	2.031	1.531	0.0	20.0	20.0	163.8	O K
60 min Winter	2.302	1.802	0.0	20.0	20.0	192.8	O K
120 min Winter	2.442	1.942	0.0	20.0	20.0	207.7	O K
180 min Winter	2.454	1.954	0.0	20.0	20.0	209.1	O K
240 min Winter	2.418	1.918	0.0	20.0	20.0	205.2	O K
360 min Winter	2.262	1.762	0.0	20.0	20.0	188.5	O K
480 min Winter	2.053	1.553	0.0	20.0	20.0	166.1	O K
600 min Winter	1.836	1.336	0.0	20.0	20.0	142.9	O K
720 min Winter	1.635	1.135	0.0	20.0	20.0	121.5	O K
960 min Winter	1.332	0.832	0.0	20.0	20.0	89.0	O K
1440 min Winter	1.119	0.619	0.0	15.5	15.5	66.2	O K
2160 min Winter	0.950	0.450	0.0	11.3	11.3	48.1	O K
2880 min Winter	0.855	0.355	0.0	8.9	8.9	38.0	O K
4320 min Winter	0.753	0.253	0.0	6.3	6.3	27.1	O K
5760 min Winter	0.699	0.199	0.0	5.0	5.0	21.3	O K
7200 min Winter	0.666	0.166	0.0	4.2	4.2	17.8	O K
8640 min Winter	0.644	0.144	0.0	3.6	3.6	15.4	O K
10080 min Winter	0.628	0.128	0.0	3.2	3.2	13.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	106.079	0.0	199.2	45
60 min Winter	66.043	0.0	248.0	68
120 min Winter	40.674	0.0	305.4	114
180 min Winter	30.745	0.0	346.3	148
240 min Winter	25.190	0.0	378.3	186
360 min Winter	18.924	0.0	426.3	260
480 min Winter	15.309	0.0	459.9	328
600 min Winter	12.911	0.0	484.8	392
720 min Winter	11.192	0.0	504.2	452
960 min Winter	8.868	0.0	532.7	554
1440 min Winter	6.306	0.0	568.3	790
2160 min Winter	4.438	0.0	599.8	1152
2880 min Winter	3.453	0.0	622.3	1512
4320 min Winter	2.428	0.0	656.3	2228
5760 min Winter	1.899	0.0	684.4	2952
7200 min Winter	1.581	0.0	712.3	3680
8640 min Winter	1.367	0.0	739.2	4416
10080 min Winter	1.213	0.0	765.4	5144

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 623065 309383 TG 23065 09383
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.447

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.075	8	12	0.075	16	20	0.074
4	8	0.075	12	16	0.074	20	24	0.074

Model Details

Storage is Online Cover Level (m) 4.050

Cellular Storage Structure

Invert Level (m) 0.500 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	112.6	0.0	1.980	112.6	0.0
0.660	112.6	0.0	1.981	0.0	0.0
1.320	112.6	0.0			

Pump Outflow Control

Invert Level (m) 0.500

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	5.0000	1.800	20.0000	3.400	20.0000	5.000	20.0000
0.400	10.0000	2.000	20.0000	3.600	20.0000	5.200	20.0000
0.600	15.0000	2.200	20.0000	3.800	20.0000	5.400	20.0000
0.800	20.0000	2.400	20.0000	4.000	20.0000	5.600	20.0000
1.000	20.0000	2.600	20.0000	4.200	20.0000	5.800	20.0000
1.200	20.0000	2.800	20.0000	4.400	20.0000	6.000	20.0000
1.400	20.0000	3.000	20.0000	4.600	20.0000		
1.600	20.0000	3.200	20.0000	4.800	20.0000		

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 53 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	1.112	1.112	0.0	70.0	70.0	206.9	O K
30 min Summer	1.404	1.404	0.0	70.0	70.0	261.2	O K
60 min Summer	1.654	1.654	0.0	70.0	70.0	307.7	O K
120 min Summer	1.770	1.770	0.0	70.0	70.0	329.2	O K
180 min Summer	1.775	1.775	0.0	70.0	70.0	330.3	O K
240 min Summer	1.734	1.734	0.0	70.0	70.0	322.5	O K
360 min Summer	1.579	1.579	0.0	70.0	70.0	293.6	O K
480 min Summer	1.390	1.390	0.0	70.0	70.0	258.5	O K
600 min Summer	1.218	1.218	0.0	70.0	70.0	226.5	O K
720 min Summer	1.085	1.085	0.0	70.0	70.0	201.8	O K
960 min Summer	0.978	0.978	0.0	64.4	64.4	181.9	O K
1440 min Summer	0.910	0.910	0.0	47.6	47.6	169.3	O K
2160 min Summer	0.856	0.856	0.0	33.9	33.9	159.2	O K
2880 min Summer	0.821	0.821	0.0	25.3	25.3	152.7	O K
4320 min Summer	0.633	0.633	0.0	16.7	16.7	117.7	O K
5760 min Summer	0.500	0.500	0.0	13.5	13.5	93.0	O K
7200 min Summer	0.410	0.410	0.0	11.2	11.2	76.2	O K
8640 min Summer	0.328	0.328	0.0	9.9	9.9	61.0	O K
10080 min Summer	0.269	0.269	0.0	9.0	9.0	50.0	O K
15 min Winter	1.232	1.232	0.0	70.0	70.0	229.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	161.698	0.0	292.2	47
30 min Summer	106.079	0.0	383.4	56
60 min Summer	66.043	0.0	477.4	72
120 min Summer	40.674	0.0	588.2	106
180 min Summer	30.745	0.0	666.9	138
240 min Summer	25.190	0.0	728.5	170
360 min Summer	18.924	0.0	820.9	232
480 min Summer	15.309	0.0	885.4	292
600 min Summer	12.911	0.0	933.4	348
720 min Summer	11.192	0.0	970.9	404
960 min Summer	8.868	0.0	1025.8	512
1440 min Summer	6.306	0.0	1094.2	752
2160 min Summer	4.438	0.0	1154.9	1116
2880 min Summer	3.453	0.0	1198.3	1500
4320 min Summer	2.428	0.0	1263.7	2268
5760 min Summer	1.899	0.0	1317.9	3000
7200 min Summer	1.581	0.0	1371.7	3752
8640 min Summer	1.367	0.0	1423.4	4440
10080 min Summer	1.213	0.0	1473.8	5168
15 min Winter	161.698	0.0	327.2	47

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	1.589	1.589	0.0	70.0	70.0	295.6	O K
60 min Winter	1.882	1.882	0.0	70.0	70.0	350.2	O K
120 min Winter	3.991	3.991	0.0	70.0	70.0	370.4	Flood Risk
180 min Winter	1.934	1.934	0.0	70.0	70.0	359.7	O K
240 min Winter	1.816	1.816	0.0	70.0	70.0	337.7	O K
360 min Winter	1.505	1.505	0.0	70.0	70.0	279.9	O K
480 min Winter	1.202	1.202	0.0	70.0	70.0	223.5	O K
600 min Winter	1.007	1.007	0.0	70.0	70.0	187.3	O K
720 min Winter	0.968	0.968	0.0	62.1	62.1	180.1	O K
960 min Winter	0.919	0.919	0.0	49.7	49.7	170.9	O K
1440 min Winter	0.863	0.863	0.0	35.7	35.7	160.4	O K
2160 min Winter	0.820	0.820	0.0	25.1	25.1	152.6	O K
2880 min Winter	0.712	0.712	0.0	18.2	18.2	132.4	O K
4320 min Winter	0.492	0.492	0.0	13.3	13.3	91.5	O K
5760 min Winter	0.358	0.358	0.0	10.4	10.4	66.6	O K
7200 min Winter	0.252	0.252	0.0	8.8	8.8	46.8	O K
8640 min Winter	0.194	0.194	0.0	7.8	7.8	36.1	O K
10080 min Winter	0.172	0.172	0.0	6.9	6.9	32.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	106.079	0.0	429.4	56
60 min Winter	66.043	0.0	534.8	74
120 min Winter	40.674	0.0	658.7	112
180 min Winter	30.745	0.0	746.9	146
240 min Winter	25.190	0.0	815.8	180
360 min Winter	18.924	0.0	919.4	242
480 min Winter	15.309	0.0	991.6	298
600 min Winter	12.911	0.0	1045.4	336
720 min Winter	11.192	0.0	1087.4	392
960 min Winter	8.868	0.0	1148.9	512
1440 min Winter	6.306	0.0	1225.5	752
2160 min Winter	4.438	0.0	1293.5	1124
2880 min Winter	3.453	0.0	1342.1	1580
4320 min Winter	2.428	0.0	1415.4	2300
5760 min Winter	1.899	0.0	1476.1	3064
7200 min Winter	1.581	0.0	1536.3	3768
8640 min Winter	1.367	0.0	1594.2	4416
10080 min Winter	1.213	0.0	1650.6	5144

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 623065 309383 TG 23065 09383
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.964

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.096	12	16	0.096	24	28	0.097	36	40	0.097
4	8	0.096	16	20	0.096	28	32	0.097			
8	12	0.096	20	24	0.096	32	36	0.097			

Model Details

Storage is Online Cover Level (m) 4.050

Cellular Storage Structure

Invert Level (m) 0.000 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	195.8	0.0	1.980	195.8	0.0
0.660	195.8	0.0	1.981	0.0	0.0
1.320	195.8	0.0			

Pump Outflow Control

Invert Level (m) 0.000

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	8.0000	1.800	70.0000	3.400	70.0000	5.000	70.0000
0.400	11.0000	2.000	70.0000	3.600	70.0000	5.200	70.0000
0.600	16.0000	2.200	70.0000	3.800	70.0000	5.400	70.0000
0.800	20.0000	2.400	70.0000	4.000	70.0000	5.600	70.0000
1.000	70.0000	2.600	70.0000	4.200	70.0000	5.800	70.0000
1.200	70.0000	2.800	70.0000	4.400	70.0000	6.000	70.0000
1.400	70.0000	3.000	70.0000	4.600	70.0000		
1.600	70.0000	3.200	70.0000	4.800	70.0000		

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 61 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	1.997	0.797	0.0	19.9	19.9	84.8	O K
30 min Summer	2.198	0.998	0.0	24.5	24.5	106.2	O K
60 min Summer	2.333	1.133	0.0	24.5	24.5	120.5	O K
120 min Summer	2.388	1.188	0.0	24.5	24.5	126.4	O K
180 min Summer	2.387	1.187	0.0	24.5	24.5	126.3	O K
240 min Summer	2.359	1.159	0.0	24.5	24.5	123.3	O K
360 min Summer	2.269	1.069	0.0	24.5	24.5	113.8	O K
480 min Summer	2.178	0.978	0.0	24.0	24.0	104.1	O K
600 min Summer	2.101	0.901	0.0	22.3	22.3	95.9	O K
720 min Summer	2.033	0.833	0.0	20.7	20.7	88.7	O K
960 min Summer	1.924	0.724	0.0	18.1	18.1	77.0	O K
1440 min Summer	1.772	0.572	0.0	14.3	14.3	60.8	O K
2160 min Summer	1.635	0.435	0.0	10.9	10.9	46.3	O K
2880 min Summer	1.553	0.353	0.0	8.8	8.8	37.6	O K
4320 min Summer	1.460	0.260	0.0	6.5	6.5	27.6	O K
5760 min Summer	1.408	0.208	0.0	5.2	5.2	22.1	O K
7200 min Summer	1.375	0.175	0.0	4.4	4.4	18.6	O K
8640 min Summer	1.353	0.153	0.0	3.8	3.8	16.2	O K
10080 min Summer	1.336	0.136	0.0	3.4	3.4	14.5	O K
15 min Winter	2.092	0.892	0.0	22.1	22.1	94.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	161.698	0.0	104.8	33
30 min Summer	106.079	0.0	137.6	42
60 min Summer	66.043	0.0	171.3	62
120 min Summer	40.674	0.0	211.1	94
180 min Summer	30.745	0.0	239.4	128
240 min Summer	25.190	0.0	261.5	162
360 min Summer	18.924	0.0	294.6	224
480 min Summer	15.309	0.0	317.8	286
600 min Summer	12.911	0.0	335.0	348
720 min Summer	11.192	0.0	348.5	410
960 min Summer	8.868	0.0	368.2	532
1440 min Summer	6.306	0.0	392.7	774
2160 min Summer	4.438	0.0	414.5	1136
2880 min Summer	3.453	0.0	430.1	1500
4320 min Summer	2.428	0.0	453.5	2216
5760 min Summer	1.899	0.0	473.0	2944
7200 min Summer	1.581	0.0	492.3	3680
8640 min Summer	1.367	0.0	510.9	4408
10080 min Summer	1.213	0.0	528.9	5144
15 min Winter	161.698	0.0	117.4	33

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	2.323	1.123	0.0	24.5	24.5	119.5	O K
60 min Winter	2.486	1.286	0.0	24.5	24.5	136.8	O K
120 min Winter	3.153	1.953	0.0	24.5	24.5	141.1	O K
180 min Winter	2.493	1.293	0.0	24.5	24.5	137.6	O K
240 min Winter	2.427	1.227	0.0	24.5	24.5	130.5	O K
360 min Winter	2.268	1.068	0.0	24.5	24.5	113.6	O K
480 min Winter	2.141	0.941	0.0	23.2	23.2	100.1	O K
600 min Winter	2.043	0.843	0.0	21.0	21.0	89.7	O K
720 min Winter	1.962	0.762	0.0	19.1	19.1	81.1	O K
960 min Winter	1.838	0.638	0.0	16.0	16.0	67.9	O K
1440 min Winter	1.679	0.479	0.0	12.0	12.0	51.0	O K
2160 min Winter	1.548	0.348	0.0	8.7	8.7	37.1	O K
2880 min Winter	1.475	0.275	0.0	6.9	6.9	29.3	O K
4320 min Winter	1.396	0.196	0.0	4.9	4.9	20.8	O K
5760 min Winter	1.354	0.154	0.0	3.9	3.9	16.4	O K
7200 min Winter	1.329	0.129	0.0	3.2	3.2	13.7	O K
8640 min Winter	1.311	0.111	0.0	2.8	2.8	11.9	O K
10080 min Winter	1.299	0.099	0.0	2.5	2.5	10.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	106.079	0.0	154.1	43
60 min Winter	66.043	0.0	191.9	64
120 min Winter	40.674	0.0	236.4	102
180 min Winter	30.745	0.0	268.1	138
240 min Winter	25.190	0.0	292.9	172
360 min Winter	18.924	0.0	330.0	236
480 min Winter	15.309	0.0	355.9	298
600 min Winter	12.911	0.0	375.2	360
720 min Winter	11.192	0.0	390.3	422
960 min Winter	8.868	0.0	412.3	546
1440 min Winter	6.306	0.0	439.8	790
2160 min Winter	4.438	0.0	464.3	1152
2880 min Winter	3.453	0.0	481.7	1512
4320 min Winter	2.428	0.0	508.0	2228
5760 min Winter	1.899	0.0	529.8	2944
7200 min Winter	1.581	0.0	551.4	3680
8640 min Winter	1.367	0.0	572.2	4416
10080 min Winter	1.213	0.0	592.4	5144

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 623065 309383 TG 23065 09383
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.346

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.058	8	12	0.058	16	20	0.057
4	8	0.058	12	16	0.058	20	24	0.057

Model Details

Storage is Online Cover Level (m) 4.500

Cellular Storage Structure

Invert Level (m) 1.200 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	112.0	0.0	1.320	112.0	0.0
0.660	112.0	0.0	1.321	0.0	0.0

Pump Outflow Control

Invert Level (m) 1.200

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	5.0000	1.800	24.5000	3.400	24.5000	5.000	24.5000
0.400	10.0000	2.000	24.5000	3.600	24.5000	5.200	24.5000
0.600	15.0000	2.200	24.5000	3.800	24.5000	5.400	24.5000
0.800	20.0000	2.400	24.5000	4.000	24.5000	5.600	24.5000
1.000	24.5000	2.600	24.5000	4.200	24.5000	5.800	24.5000
1.200	24.5000	2.800	24.5000	4.400	24.5000	6.000	24.5000
1.400	24.5000	3.000	24.5000	4.600	24.5000		
1.600	24.5000	3.200	24.5000	4.800	24.5000		

MH Name	B.ST 03	B.ST 02		B.ST 01		
Hor Scale 1000 Ver Scale 200 Datum (m)-1.000						
PN		1.001		1.000		
Dia (mm)		525		525		
Slope (1:X)		400.0		398.0		
Cover Level (m)	4.500	4.500		4.500		
Invert Level (m)		2.276	2.365	2.365	2.464	
Length (m)		35.600		39.400		

MH Name			B.ST 06	B.ST 05	B.ST 04	B.ST 03	
Hor Scale 1000 Ver Scale 200 Datum (m)-1.000							
PN			1.005	1.004	1.003	1.002	
Dia (mm)			525	525	525	525	
Slope (1:X)			400.0	403.8	400.0	400.0	
Cover Level (m)	4.500	4.500	4.500	4.500	4.500	4.500	
Invert Level (m)		2.100	2.100 2.147	2.147 2.199	2.199 2.238	2.238 2.276	
Length (m)			18.800	21.000	15.600	15.200	

Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
* 1.000	39.400	0.099	398.0	0.028	3.00	0.600	o	525	Pipe/Conduit
* 1.001	35.600	0.089	400.0	0.027	0.00	0.600	o	525	Pipe/Conduit
* 1.002	15.200	0.038	400.0	0.027	0.00	0.600	o	525	Pipe/Conduit
* 1.003	15.600	0.039	400.0	0.027	0.00	0.600	o	525	Pipe/Conduit
* 1.004	21.000	0.052	403.8	0.027	0.00	0.600	o	525	Pipe/Conduit
* 1.005	18.800	0.047	400.0	0.027	0.00	0.600	o	525	Pipe/Conduit
* 1.006	4.000	0.378	10.6	0.000	0.00	0.600	o	150	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* 1.000	B.ST 01	4.500	2.464	1.511	4.500	2.365	1.610		1800
* 1.001	B.ST 02	4.500	2.365	1.610	4.500	2.276	1.699		1800
* 1.002	B.ST 03	4.500	2.276	1.699	4.500	2.238	1.737		1800
* 1.003	B.ST 04	4.500	2.238	1.737	4.500	2.199	1.776		1800
* 1.004	B.ST 05	4.500	2.199	1.776	4.500	2.147	1.828		1800
* 1.005	B.ST 06	4.500	2.147	1.828	4.500	2.100	1.875		1800
* 1.006	B.SY HYDRO	4.500	2.100	2.250	4.500	1.722	2.628	Hydro-Brake®	1800

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)	Backdr (mm)
B.ST 01	4.500	2.036	Open Manhole	1800	1.000	2.464	525				
B.ST 02	4.500	2.135	Open Manhole	1800	1.001	2.365	525	1.000	2.365	525	
B.ST 03	4.500	2.224	Open Manhole	1800	1.002	2.276	525	1.001	2.276	525	
B.ST 04	4.500	2.262	Open Manhole	1800	1.003	2.238	525	1.002	2.238	525	
B.ST 05	4.500	2.301	Open Manhole	1800	1.004	2.199	525	1.003	2.199	525	
B.ST 06	4.500	2.353	Open Manhole	1800	1.005	2.147	525	1.004	2.147	525	
B.SY HYDRO	4.500	2.400	Open Manhole	1800	1.006	2.100	150	1.005	2.100	525	
	4.500	2.778	Open Manhole	0		OUTFALL		1.006	1.722	150	

No coordinates have been specified, layout information cannot be produced.

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)
1.000	o	525	B.ST 01	4.500	2.464	1.511	Open Manhole	1800
1.001	o	525	B.ST 02	4.500	2.365	1.610	Open Manhole	1800
1.002	o	525	B.ST 03	4.500	2.276	1.699	Open Manhole	1800
1.003	o	525	B.ST 04	4.500	2.238	1.737	Open Manhole	1800
1.004	o	525	B.ST 05	4.500	2.199	1.776	Open Manhole	1800
1.005	o	525	B.ST 06	4.500	2.147	1.828	Open Manhole	1800
1.006	o	150	B.SY HYDRO	4.500	2.100	2.250	Open Manhole	1800

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	39.400	398.0	B.ST 02	4.500	2.365	1.610	Open Manhole	1800
1.001	35.600	400.0	B.ST 03	4.500	2.276	1.699	Open Manhole	1800
1.002	15.200	400.0	B.ST 04	4.500	2.238	1.737	Open Manhole	1800
1.003	15.600	400.0	B.ST 05	4.500	2.199	1.776	Open Manhole	1800
1.004	21.000	403.8	B.ST 06	4.500	2.147	1.828	Open Manhole	1800
1.005	18.800	400.0	B.SY HYDRO	4.500	2.100	1.875	Open Manhole	1800
1.006	4.000	10.6		4.500	1.722	2.628	Open Manhole	0

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006		4.500	1.722	0.000	0	0

Datum (m) 1.197 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	0.675	13	0.675	25	0.675	37	0.675	49	0.675	61	0.675
2	0.675	14	0.675	26	0.675	38	0.675	50	0.675	62	0.675
3	0.675	15	0.675	27	0.675	39	0.675	51	0.675	63	0.675
4	0.675	16	0.675	28	0.675	40	0.675	52	0.675	64	0.675
5	0.675	17	0.675	29	0.675	41	0.675	53	0.675	65	0.675
6	0.675	18	0.675	30	0.675	42	0.675	54	0.675	66	0.675
7	0.675	19	0.675	31	0.675	43	0.675	55	0.675	67	0.675
8	0.675	20	0.675	32	0.675	44	0.675	56	0.675	68	0.675
9	0.675	21	0.675	33	0.675	45	0.675	57	0.675	69	0.675
10	0.675	22	0.675	34	0.675	46	0.675	58	0.675	70	0.675
11	0.675	23	0.675	35	0.675	47	0.675	59	0.675	71	0.675
12	0.675	24	0.675	36	0.675	48	0.675	60	0.675	72	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
73	0.675	123	0.675	173	0.675	223	0.675	273	0.675	323	0.675
74	0.675	124	0.675	174	0.675	224	0.675	274	0.675	324	0.675
75	0.675	125	0.675	175	0.675	225	0.675	275	0.675	325	0.675
76	0.675	126	0.675	176	0.675	226	0.675	276	0.675	326	0.675
77	0.675	127	0.675	177	0.675	227	0.675	277	0.675	327	0.675
78	0.675	128	0.675	178	0.675	228	0.675	278	0.675	328	0.675
79	0.675	129	0.675	179	0.675	229	0.675	279	0.675	329	0.675
80	0.675	130	0.675	180	0.675	230	0.675	280	0.675	330	0.675
81	0.675	131	0.675	181	0.675	231	0.675	281	0.675	331	0.675
82	0.675	132	0.675	182	0.675	232	0.675	282	0.675	332	0.675
83	0.675	133	0.675	183	0.675	233	0.675	283	0.675	333	0.675
84	0.675	134	0.675	184	0.675	234	0.675	284	0.675	334	0.675
85	0.675	135	0.675	185	0.675	235	0.675	285	0.675	335	0.675
86	0.675	136	0.675	186	0.675	236	0.675	286	0.675	336	0.675
87	0.675	137	0.675	187	0.675	237	0.675	287	0.675	337	0.675
88	0.675	138	0.675	188	0.675	238	0.675	288	0.675	338	0.675
89	0.675	139	0.675	189	0.675	239	0.675	289	0.675	339	0.675
90	0.675	140	0.675	190	0.675	240	0.675	290	0.675	340	0.675
91	0.675	141	0.675	191	0.675	241	0.675	291	0.675	341	0.675
92	0.675	142	0.675	192	0.675	242	0.675	292	0.675	342	0.675
93	0.675	143	0.675	193	0.675	243	0.675	293	0.675	343	0.675
94	0.675	144	0.675	194	0.675	244	0.675	294	0.675	344	0.675
95	0.675	145	0.675	195	0.675	245	0.675	295	0.675	345	0.675
96	0.675	146	0.675	196	0.675	246	0.675	296	0.675	346	0.675
97	0.675	147	0.675	197	0.675	247	0.675	297	0.675	347	0.675
98	0.675	148	0.675	198	0.675	248	0.675	298	0.675	348	0.675
99	0.675	149	0.675	199	0.675	249	0.675	299	0.675	349	0.675
100	0.675	150	0.675	200	0.675	250	0.675	300	0.675	350	0.675
101	0.675	151	0.675	201	0.675	251	0.675	301	0.675	351	0.675
102	0.675	152	0.675	202	0.675	252	0.675	302	0.675	352	0.675
103	0.675	153	0.675	203	0.675	253	0.675	303	0.675	353	0.675
104	0.675	154	0.675	204	0.675	254	0.675	304	0.675	354	0.675
105	0.675	155	0.675	205	0.675	255	0.675	305	0.675	355	0.675
106	0.675	156	0.675	206	0.675	256	0.675	306	0.675	356	0.675
107	0.675	157	0.675	207	0.675	257	0.675	307	0.675	357	0.675
108	0.675	158	0.675	208	0.675	258	0.675	308	0.675	358	0.675
109	0.675	159	0.675	209	0.675	259	0.675	309	0.675	359	0.675
110	0.675	160	0.675	210	0.675	260	0.675	310	0.675	360	0.675
111	0.675	161	0.675	211	0.675	261	0.675	311	0.675	361	0.675
112	0.675	162	0.675	212	0.675	262	0.675	312	0.675	362	0.675
113	0.675	163	0.675	213	0.675	263	0.675	313	0.675	363	0.675
114	0.675	164	0.675	214	0.675	264	0.675	314	0.675	364	0.675
115	0.675	165	0.675	215	0.675	265	0.675	315	0.675	365	0.675
116	0.675	166	0.675	216	0.675	266	0.675	316	0.675	366	0.675
117	0.675	167	0.675	217	0.675	267	0.675	317	0.675	367	0.675
118	0.675	168	0.675	218	0.675	268	0.675	318	0.675	368	0.675
119	0.675	169	0.675	219	0.675	269	0.675	319	0.675	369	0.675
120	0.675	170	0.675	220	0.675	270	0.675	320	0.675	370	0.675
121	0.675	171	0.675	221	0.675	271	0.675	321	0.675	371	0.675
122	0.675	172	0.675	222	0.675	272	0.675	322	0.675	372	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
373	0.675	423	0.675	473	0.675	523	0.675	573	0.675	623	0.675
374	0.675	424	0.675	474	0.675	524	0.675	574	0.675	624	0.675
375	0.675	425	0.675	475	0.675	525	0.675	575	0.675	625	0.675
376	0.675	426	0.675	476	0.675	526	0.675	576	0.675	626	0.675
377	0.675	427	0.675	477	0.675	527	0.675	577	0.675	627	0.675
378	0.675	428	0.675	478	0.675	528	0.675	578	0.675	628	0.675
379	0.675	429	0.675	479	0.675	529	0.675	579	0.675	629	0.675
380	0.675	430	0.675	480	0.675	530	0.675	580	0.675	630	0.675
381	0.675	431	0.675	481	0.675	531	0.675	581	0.675	631	0.675
382	0.675	432	0.675	482	0.675	532	0.675	582	0.675	632	0.675
383	0.675	433	0.675	483	0.675	533	0.675	583	0.675	633	0.675
384	0.675	434	0.675	484	0.675	534	0.675	584	0.675	634	0.675
385	0.675	435	0.675	485	0.675	535	0.675	585	0.675	635	0.675
386	0.675	436	0.675	486	0.675	536	0.675	586	0.675	636	0.675
387	0.675	437	0.675	487	0.675	537	0.675	587	0.675	637	0.675
388	0.675	438	0.675	488	0.675	538	0.675	588	0.675	638	0.675
389	0.675	439	0.675	489	0.675	539	0.675	589	0.675	639	0.675
390	0.675	440	0.675	490	0.675	540	0.675	590	0.675	640	0.675
391	0.675	441	0.675	491	0.675	541	0.675	591	0.675	641	0.675
392	0.675	442	0.675	492	0.675	542	0.675	592	0.675	642	0.675
393	0.675	443	0.675	493	0.675	543	0.675	593	0.675	643	0.675
394	0.675	444	0.675	494	0.675	544	0.675	594	0.675	644	0.675
395	0.675	445	0.675	495	0.675	545	0.675	595	0.675	645	0.675
396	0.675	446	0.675	496	0.675	546	0.675	596	0.675	646	0.675
397	0.675	447	0.675	497	0.675	547	0.675	597	0.675	647	0.675
398	0.675	448	0.675	498	0.675	548	0.675	598	0.675	648	0.675
399	0.675	449	0.675	499	0.675	549	0.675	599	0.675	649	0.675
400	0.675	450	0.675	500	0.675	550	0.675	600	0.675	650	0.675
401	0.675	451	0.675	501	0.675	551	0.675	601	0.675	651	0.675
402	0.675	452	0.675	502	0.675	552	0.675	602	0.675	652	0.675
403	0.675	453	0.675	503	0.675	553	0.675	603	0.675	653	0.675
404	0.675	454	0.675	504	0.675	554	0.675	604	0.675	654	0.675
405	0.675	455	0.675	505	0.675	555	0.675	605	0.675	655	0.675
406	0.675	456	0.675	506	0.675	556	0.675	606	0.675	656	0.675
407	0.675	457	0.675	507	0.675	557	0.675	607	0.675	657	0.675
408	0.675	458	0.675	508	0.675	558	0.675	608	0.675	658	0.675
409	0.675	459	0.675	509	0.675	559	0.675	609	0.675	659	0.675
410	0.675	460	0.675	510	0.675	560	0.675	610	0.675	660	0.675
411	0.675	461	0.675	511	0.675	561	0.675	611	0.675	661	0.675
412	0.675	462	0.675	512	0.675	562	0.675	612	0.675	662	0.675
413	0.675	463	0.675	513	0.675	563	0.675	613	0.675	663	0.675
414	0.675	464	0.675	514	0.675	564	0.675	614	0.675	664	0.675
415	0.675	465	0.675	515	0.675	565	0.675	615	0.675	665	0.675
416	0.675	466	0.675	516	0.675	566	0.675	616	0.675	666	0.675
417	0.675	467	0.675	517	0.675	567	0.675	617	0.675	667	0.675
418	0.675	468	0.675	518	0.675	568	0.675	618	0.675	668	0.675
419	0.675	469	0.675	519	0.675	569	0.675	619	0.675	669	0.675
420	0.675	470	0.675	520	0.675	570	0.675	620	0.675	670	0.675
421	0.675	471	0.675	521	0.675	571	0.675	621	0.675	671	0.675
422	0.675	472	0.675	522	0.675	572	0.675	622	0.675	672	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
673	0.675	723	0.675	773	0.675	823	0.675	873	0.675	923	0.675
674	0.675	724	0.675	774	0.675	824	0.675	874	0.675	924	0.675
675	0.675	725	0.675	775	0.675	825	0.675	875	0.675	925	0.675
676	0.675	726	0.675	776	0.675	826	0.675	876	0.675	926	0.675
677	0.675	727	0.675	777	0.675	827	0.675	877	0.675	927	0.675
678	0.675	728	0.675	778	0.675	828	0.675	878	0.675	928	0.675
679	0.675	729	0.675	779	0.675	829	0.675	879	0.675	929	0.675
680	0.675	730	0.675	780	0.675	830	0.675	880	0.675	930	0.675
681	0.675	731	0.675	781	0.675	831	0.675	881	0.675	931	0.675
682	0.675	732	0.675	782	0.675	832	0.675	882	0.675	932	0.675
683	0.675	733	0.675	783	0.675	833	0.675	883	0.675	933	0.675
684	0.675	734	0.675	784	0.675	834	0.675	884	0.675	934	0.675
685	0.675	735	0.675	785	0.675	835	0.675	885	0.675	935	0.675
686	0.675	736	0.675	786	0.675	836	0.675	886	0.675	936	0.675
687	0.675	737	0.675	787	0.675	837	0.675	887	0.675	937	0.675
688	0.675	738	0.675	788	0.675	838	0.675	888	0.675	938	0.675
689	0.675	739	0.675	789	0.675	839	0.675	889	0.675	939	0.675
690	0.675	740	0.675	790	0.675	840	0.675	890	0.675	940	0.675
691	0.675	741	0.675	791	0.675	841	0.675	891	0.675	941	0.675
692	0.675	742	0.675	792	0.675	842	0.675	892	0.675	942	0.675
693	0.675	743	0.675	793	0.675	843	0.675	893	0.675	943	0.675
694	0.675	744	0.675	794	0.675	844	0.675	894	0.675	944	0.675
695	0.675	745	0.675	795	0.675	845	0.675	895	0.675	945	0.675
696	0.675	746	0.675	796	0.675	846	0.675	896	0.675	946	0.675
697	0.675	747	0.675	797	0.675	847	0.675	897	0.675	947	0.675
698	0.675	748	0.675	798	0.675	848	0.675	898	0.675	948	0.675
699	0.675	749	0.675	799	0.675	849	0.675	899	0.675	949	0.675
700	0.675	750	0.675	800	0.675	850	0.675	900	0.675	950	0.675
701	0.675	751	0.675	801	0.675	851	0.675	901	0.675	951	0.675
702	0.675	752	0.675	802	0.675	852	0.675	902	0.675	952	0.675
703	0.675	753	0.675	803	0.675	853	0.675	903	0.675	953	0.675
704	0.675	754	0.675	804	0.675	854	0.675	904	0.675	954	0.675
705	0.675	755	0.675	805	0.675	855	0.675	905	0.675	955	0.675
706	0.675	756	0.675	806	0.675	856	0.675	906	0.675	956	0.675
707	0.675	757	0.675	807	0.675	857	0.675	907	0.675	957	0.675
708	0.675	758	0.675	808	0.675	858	0.675	908	0.675	958	0.675
709	0.675	759	0.675	809	0.675	859	0.675	909	0.675	959	0.675
710	0.675	760	0.675	810	0.675	860	0.675	910	0.675	960	0.675
711	0.675	761	0.675	811	0.675	861	0.675	911	0.675	961	0.675
712	0.675	762	0.675	812	0.675	862	0.675	912	0.675	962	0.675
713	0.675	763	0.675	813	0.675	863	0.675	913	0.675	963	0.675
714	0.675	764	0.675	814	0.675	864	0.675	914	0.675	964	0.675
715	0.675	765	0.675	815	0.675	865	0.675	915	0.675	965	0.675
716	0.675	766	0.675	816	0.675	866	0.675	916	0.675	966	0.675
717	0.675	767	0.675	817	0.675	867	0.675	917	0.675	967	0.675
718	0.675	768	0.675	818	0.675	868	0.675	918	0.675	968	0.675
719	0.675	769	0.675	819	0.675	869	0.675	919	0.675	969	0.675
720	0.675	770	0.675	820	0.675	870	0.675	920	0.675	970	0.675
721	0.675	771	0.675	821	0.675	871	0.675	921	0.675	971	0.675
722	0.675	772	0.675	822	0.675	872	0.675	922	0.675	972	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
973	0.675	1023	0.675	1073	0.675	1123	0.675	1173	0.675	1223	0.675
974	0.675	1024	0.675	1074	0.675	1124	0.675	1174	0.675	1224	0.675
975	0.675	1025	0.675	1075	0.675	1125	0.675	1175	0.675	1225	0.675
976	0.675	1026	0.675	1076	0.675	1126	0.675	1176	0.675	1226	0.675
977	0.675	1027	0.675	1077	0.675	1127	0.675	1177	0.675	1227	0.675
978	0.675	1028	0.675	1078	0.675	1128	0.675	1178	0.675	1228	0.675
979	0.675	1029	0.675	1079	0.675	1129	0.675	1179	0.675	1229	0.675
980	0.675	1030	0.675	1080	0.675	1130	0.675	1180	0.675	1230	0.675
981	0.675	1031	0.675	1081	0.675	1131	0.675	1181	0.675	1231	0.675
982	0.675	1032	0.675	1082	0.675	1132	0.675	1182	0.675	1232	0.675
983	0.675	1033	0.675	1083	0.675	1133	0.675	1183	0.675	1233	0.675
984	0.675	1034	0.675	1084	0.675	1134	0.675	1184	0.675	1234	0.675
985	0.675	1035	0.675	1085	0.675	1135	0.675	1185	0.675	1235	0.675
986	0.675	1036	0.675	1086	0.675	1136	0.675	1186	0.675	1236	0.675
987	0.675	1037	0.675	1087	0.675	1137	0.675	1187	0.675	1237	0.675
988	0.675	1038	0.675	1088	0.675	1138	0.675	1188	0.675	1238	0.675
989	0.675	1039	0.675	1089	0.675	1139	0.675	1189	0.675	1239	0.675
990	0.675	1040	0.675	1090	0.675	1140	0.675	1190	0.675	1240	0.675
991	0.675	1041	0.675	1091	0.675	1141	0.675	1191	0.675	1241	0.675
992	0.675	1042	0.675	1092	0.675	1142	0.675	1192	0.675	1242	0.675
993	0.675	1043	0.675	1093	0.675	1143	0.675	1193	0.675	1243	0.675
994	0.675	1044	0.675	1094	0.675	1144	0.675	1194	0.675	1244	0.675
995	0.675	1045	0.675	1095	0.675	1145	0.675	1195	0.675	1245	0.675
996	0.675	1046	0.675	1096	0.675	1146	0.675	1196	0.675	1246	0.675
997	0.675	1047	0.675	1097	0.675	1147	0.675	1197	0.675	1247	0.675
998	0.675	1048	0.675	1098	0.675	1148	0.675	1198	0.675	1248	0.675
999	0.675	1049	0.675	1099	0.675	1149	0.675	1199	0.675	1249	0.675
1000	0.675	1050	0.675	1100	0.675	1150	0.675	1200	0.675	1250	0.675
1001	0.675	1051	0.675	1101	0.675	1151	0.675	1201	0.675	1251	0.675
1002	0.675	1052	0.675	1102	0.675	1152	0.675	1202	0.675	1252	0.675
1003	0.675	1053	0.675	1103	0.675	1153	0.675	1203	0.675	1253	0.675
1004	0.675	1054	0.675	1104	0.675	1154	0.675	1204	0.675	1254	0.675
1005	0.675	1055	0.675	1105	0.675	1155	0.675	1205	0.675	1255	0.675
1006	0.675	1056	0.675	1106	0.675	1156	0.675	1206	0.675	1256	0.675
1007	0.675	1057	0.675	1107	0.675	1157	0.675	1207	0.675	1257	0.675
1008	0.675	1058	0.675	1108	0.675	1158	0.675	1208	0.675	1258	0.675
1009	0.675	1059	0.675	1109	0.675	1159	0.675	1209	0.675	1259	0.675
1010	0.675	1060	0.675	1110	0.675	1160	0.675	1210	0.675	1260	0.675
1011	0.675	1061	0.675	1111	0.675	1161	0.675	1211	0.675	1261	0.675
1012	0.675	1062	0.675	1112	0.675	1162	0.675	1212	0.675	1262	0.675
1013	0.675	1063	0.675	1113	0.675	1163	0.675	1213	0.675	1263	0.675
1014	0.675	1064	0.675	1114	0.675	1164	0.675	1214	0.675	1264	0.675
1015	0.675	1065	0.675	1115	0.675	1165	0.675	1215	0.675	1265	0.675
1016	0.675	1066	0.675	1116	0.675	1166	0.675	1216	0.675	1266	0.675
1017	0.675	1067	0.675	1117	0.675	1167	0.675	1217	0.675	1267	0.675
1018	0.675	1068	0.675	1118	0.675	1168	0.675	1218	0.675	1268	0.675
1019	0.675	1069	0.675	1119	0.675	1169	0.675	1219	0.675	1269	0.675
1020	0.675	1070	0.675	1120	0.675	1170	0.675	1220	0.675	1270	0.675
1021	0.675	1071	0.675	1121	0.675	1171	0.675	1221	0.675	1271	0.675
1022	0.675	1072	0.675	1122	0.675	1172	0.675	1222	0.675	1272	0.675

Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1273	0.675	1301	0.675	1329	0.675	1357	0.675	1385	0.675	1413	0.675
1274	0.675	1302	0.675	1330	0.675	1358	0.675	1386	0.675	1414	0.675
1275	0.675	1303	0.675	1331	0.675	1359	0.675	1387	0.675	1415	0.675
1276	0.675	1304	0.675	1332	0.675	1360	0.675	1388	0.675	1416	0.675
1277	0.675	1305	0.675	1333	0.675	1361	0.675	1389	0.675	1417	0.675
1278	0.675	1306	0.675	1334	0.675	1362	0.675	1390	0.675	1418	0.675
1279	0.675	1307	0.675	1335	0.675	1363	0.675	1391	0.675	1419	0.675
1280	0.675	1308	0.675	1336	0.675	1364	0.675	1392	0.675	1420	0.675
1281	0.675	1309	0.675	1337	0.675	1365	0.675	1393	0.675	1421	0.675
1282	0.675	1310	0.675	1338	0.675	1366	0.675	1394	0.675	1422	0.675
1283	0.675	1311	0.675	1339	0.675	1367	0.675	1395	0.675	1423	0.675
1284	0.675	1312	0.675	1340	0.675	1368	0.675	1396	0.675	1424	0.675
1285	0.675	1313	0.675	1341	0.675	1369	0.675	1397	0.675	1425	0.675
1286	0.675	1314	0.675	1342	0.675	1370	0.675	1398	0.675	1426	0.675
1287	0.675	1315	0.675	1343	0.675	1371	0.675	1399	0.675	1427	0.675
1288	0.675	1316	0.675	1344	0.675	1372	0.675	1400	0.675	1428	0.675
1289	0.675	1317	0.675	1345	0.675	1373	0.675	1401	0.675	1429	0.675
1290	0.675	1318	0.675	1346	0.675	1374	0.675	1402	0.675	1430	0.675
1291	0.675	1319	0.675	1347	0.675	1375	0.675	1403	0.675	1431	0.675
1292	0.675	1320	0.675	1348	0.675	1376	0.675	1404	0.675	1432	0.675
1293	0.675	1321	0.675	1349	0.675	1377	0.675	1405	0.675	1433	0.675
1294	0.675	1322	0.675	1350	0.675	1378	0.675	1406	0.675	1434	0.675
1295	0.675	1323	0.675	1351	0.675	1379	0.675	1407	0.675	1435	0.675
1296	0.675	1324	0.675	1352	0.675	1380	0.675	1408	0.675	1436	0.675
1297	0.675	1325	0.675	1353	0.675	1381	0.675	1409	0.675	1437	0.675
1298	0.675	1326	0.675	1354	0.675	1382	0.675	1410	0.675	1438	0.675
1299	0.675	1327	0.675	1355	0.675	1383	0.675	1411	0.675	1439	0.675
1300	0.675	1328	0.675	1356	0.675	1384	0.675	1412	0.675	1440	0.675

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	5	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.410		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: B.SY HYDRO, DS/PN: 1.006, Volume (m³): 9.8

Unit Reference	MD-SHE-0131-1000-2000-1000
Design Head (m)	2.000
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	131
Invert Level (m)	2.100
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	10.0
Flush-Flo™	0.569	9.8
Kick-Flo®	1.167	7.8
Mean Flow over Head Range	-	8.7

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	4.7	1.200	7.9	3.000	12.1	7.000	18.1
0.200	8.3	1.400	8.5	3.500	13.0	7.500	18.7
0.300	9.2	1.600	9.0	4.000	13.9	8.000	19.3
0.400	9.6	1.800	9.5	4.500	14.7	8.500	19.9
0.500	9.8	2.000	10.0	5.000	15.4	9.000	20.5
0.600	9.8	2.200	10.5	5.500	16.2	9.500	21.0
0.800	9.6	2.400	10.9	6.000	16.8		
1.000	9.0	2.600	11.3	6.500	17.5		

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	0
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	2013
Site Location	GB 623065 309383 TG 23065 09383
Data Type	Point
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	OFF

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	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)
1.000	B.ST 01	60 minute 100 year Winter I+45%	4.500	3.918	0.929	0.000	3.687
1.001	B.ST 02	60 minute 100 year Winter I+45%	4.500	3.918	1.028	0.000	12.078
1.002	B.ST 03	60 minute 100 year Winter I+45%	4.500	3.917	1.116	0.000	11.480
1.003	B.ST 04	60 minute 100 year Winter I+45%	4.500	3.916	1.153	0.000	7.157
1.004	B.ST 05	60 minute 100 year Winter I+45%	4.500	3.914	1.190	0.000	7.339
1.005	B.ST 06	60 minute 100 year Winter I+45%	4.500	3.912	1.240	0.000	8.635
1.006	B.SY HYDRO	60 minute 100 year Winter I+45%	4.500	3.909	1.659	0.000	8.272

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	B.ST 01		8.7	SURCHARGED
1.001	B.ST 02		9.6	SURCHARGED
1.002	B.ST 03		9.3	SURCHARGED

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

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.003	B.ST 04		11.6	SURCHARGED
1.004	B.ST 05		13.5	SURCHARGED
1.005	B.ST 06		15.7	SURCHARGED
1.006	B.SY HYDRO		9.8	SURCHARGED

Appendix K – Surface Water Drainage Layout

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

SYSTEM 1- BLOCK B - FULL PLANNING
ROOF AREA: 806m2
PATIO/PATHWAYS AREA: 219m2
PERMEABLE PAVING CAR PARK 1 AREA: 476m2
PERMEABLE PAVING CAR PARK 2 AREA: 151m2
MAXIMUM OUTFALL RATE: 5.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT, VIA HYDROBRAKE

SYSTEM 1
PERMEABLE PAVING AREA 1 WITH MIN. 650mm THICK SUBBASE TO PROVIDE 30.176m3 OF ATTENUATION. FLOWS RESTRICTED USING 25mm ORIFICE PLATE FLOW CONTROL DEVICE.

SYSTEM 1
35.2m X 1.32m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 44.14m3 OF ATTENUATION VOLUME.

SYSTEM 1
PERMEABLE PAVING AREA 2 WITH MIN. 650mm THICK SUBBASE TO PROVIDE 7.765m3 OF ATTENUATION. FLOWS RESTRICTED USING 25mm ORIFICE PLATE FLOW CONTROL DEVICE.

SYSTEM 2- BLOCK C - FULL PLANNING
ROOF AREA: 485m2
PATIO/PATHWAYS AREA: 265m2
MAXIMUM OUTFALL RATE: 5.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

23.0m X 1.32m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 28.842m3 OF ATTENUATION VOLUME.

1.007 PERFORATED PIPE PASSES THROUGH FILTER MEDIUM WITHIN BIO-RETENTION SWALE TO ALLOW FLOWS TO BE CLEANSED BEFORE OUTFALL - PERFORATED PIPE AT BASE OF BIO-RETENTION FILTER MEDIUM COLLECTS WATERS AND DIRECTS TO C11

SYSTEM 3 - BLOCK D - FULL PLANNING
GREEN ROOF AREA: 570m2
CONTRIBUTING AREA: 2580m2
MAXIMUM OUTFALL RATE: 12.5 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT

71.0m X 1.32m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 89.03m3 OF ATTENUATION VOLUME

SYSTEM 4 - BLOCKS A, M, J3 AND K/L - FULL PLANNING
GREEN ROOF AREA: 1200m2
CONTRIBUTING AREA: 14850m2
MAXIMUM OUTFALL RATE: 65.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

SYSTEM 6 - BLOCKS E - OUTLINE PLANNING
CONTRIBUTING AREA: 6420m2
MAXIMUM OUTFALL RATE: 30.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

ROOF FOR BLOCK H SHALL COMPRISE SOME AREA OF GREEN ROOF WHICH HAS NOT BEEN DETAILED AT THIS OUTLINE STAGE. HYDRAULIC CALCULATIONS ASSUME ALL AREA WITHIN THE CATCHMENT IS IMPERMEABLE FOR ROBUSTNESS.

EDWARD STREET
NEW BOTOLPH STREET
Block B
Block C
Block D
Block A
Block M
Block E OUTLINE
Residential Entrance
Marketing Suite
Commercial Unit
Resi Entrance Lobby
Commercial Units
+300mm rise for flood defence
Ramp down to Basement Parking (Foot Print of Block A) FFL+825mm

FULL PLANNING SURFACE WATER DRAINAGE SYSTEM
OUTLINE PLANNING SURFACE WATER DRAINAGE SYSTEM
PROPOSED ADOPTED SURFACE WATER SEWER DIVERSION
EXISTING SURFACE WATER SEWER TO REMAIN
PROPOSED ADOPTED FOUL WATER SEWER DIVERSION
PROPOSED GREEN ROOF
PROPOSED BIORETENTION SWALE OR TREE PIT

REV	DATE	BY	DESCRIPTION	CHK	APD

DRAWING STATUS: PLANNING APPLICATION

EAS
Unit 23, The Maltings, Stanstead Abbotts, Hertfordshire, SG12 8HG
Tel: 01920 871777
www.eastp.co.uk

CLIENT: WESTON HOMES

ARCHITECT:

PROJECT: ANGLIA SQUARE, NORWICH, NORFOLK

TITLE: REV A SUBMISSION
SURFACE WATER DRAINAGE LAYOUT
SHEET 1 OF 4

SCALE @ A1	DESIGN / DRAWN	DATE
1:200	MD	13.07.2022
PROJECT No: 3831	DRAWING No: DR-001	

SYSTEM 2 – BLOCK C – FULL PLANNING
ROOF AREA: 485m2
PATIO/PATHWAYS AREA: 265m2
MAXIMUM OUTFALL RATE: 5.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

Block C

+4950mm Resi Entrance Lobby / Commercial Unit

1.007 PERFORATED PIPE PASSES THROUGH FILTER MEDIUM WITHIN BIO-RETENTION SWALE TO ALLOW FLOWS TO BE CLEANSED BEFORE OUTFALL – PERFORATED PIPE AT BASE OF BIO-RETENTION FILTER MEDIUM COLLECTS WATERS AND DIRECTS TO C11

23.0m X 1.30m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 28.842m3 OF ATTENUATION VOLUME.

+300mm rise for flood defence

EDWARD STREET

+4500mm

+5400mm Resi Unit

Commercial Unit

+5400mm Resi Unit

+4950mm Resi Entrance Lobby

+5400mm Resi Unit

Ramp down to Basement Parking (Foot Print of Block A) FFL+825mm

+4500mm Commercial Unit

Block A

+4050mm Commercial Unit

+4050mm Commercial Unit

+4050mm Resi Entrance Lobby

+4050mm Commercial Units

Block M

+4050mm Commercial Unit

SYSTEM 1 – BLOCKS A, M, J3 AND K/L – FULL PLANNING
GREEN ROOF AREA: 1200m2
CONTRIBUTING AREA: 14850m2
MAXIMUM OUTFALL RATE: 65.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

+4500mm Commercial Unit

+4500mm Residential Unit

+4500mm Resi Entrance

+4500mm Resi Unit

+4500mm Resi Unit

Block H OUTLINE

+4050mm Commercial Unit

+4500mm Resi Entrance

SYSTEM 9 – BLOCK H – OUTLINE PLANNING
CONTRIBUTING AREA: 3460m2
MAXIMUM OUTFALL RATE: 24.5 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

ROOF FOR BLOCK H SHALL COMPRISE SUM AREA OF GREEN ROOF WHICH HAS NOT BEEN DETAILED AT THIS OUTLINE STAGE. HYDRAULIC CALCULATIONS ASSUME ALL AREA WITHIN THE CATCHMENT IS IMPERMEABLE FOR WORST CASE

+4050mm Resi Units

+4050mm

SYSTEM 4 – BLOCKS J3, M, J3 AND K/L – FULL PLANNING
GREEN ROOF AREA: 1200m2
CONTRIBUTING AREA: 14850m2
MAXIMUM OUTFALL RATE: 65.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

+300mm rise for flood defence

+4050mm

+4050mm Resi Entrance Lobby

+2850mm Service Yard

CALCULATIONS DO NOT INCLUDE EXISTING BUILDING

HYDRO-INTERNATIONAL 2.44 DOWNSTREAM DEFENDER (10 MANAGE FLOWS UP TO 425 L/S) OR SIMILAR

SYSTEM 4 307.2m X 1.32m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 487.37m3 OF ATTENUATION VOLUME.

+4050mm

Block K / L

+3525mm

MAGDALEN STREET

FULL PLANNING SURFACE WATER DRAINAGE SYSTEM
OUTLINE PLANNING SURFACE WATER DRAINAGE SYSTEM
PROPOSED ADOPTED SURFACE WATER SEWER DIVERSION
EXISTING SURFACE WATER SEWER TO REMAIN
PROPOSED ADOPTED FOUL WATER SEWER DIVERSION
PROPOSED GREEN ROOF
PROPOSED BIORETENTION SWALE OR TREE PIT

REV	DATE	BY	DESCRIPTION	CHK	APD

DRAWING STATUS: PLANNING APPLICATION

EAS
Unit 23, The Maltings, Stanstead Abbotts, Hertfordshire, SG12 8HG
Tel: 01920 871777
www.eastp.co.uk

CLIENT: WESTON HOMES

ARCHITECT:

PROJECT: ANGLIA SQUARE, NORWICH, NORFOLK

TITLE: REV A SUBMISSION SURFACE WATR DRAINAGE LAYOUT SHEET 2 OF 4

SCALE @ A3	DESIGN / DRAWN	DATE
1:200	MO	13.07.2022

PROJECT No:	DRAWING No:
3831	DR–002

Block E OUTLINE

ROOF FOR BLOCK E SHALL COMPRISE SOME AREA OF GREEN ROOF WHICH HAS NOT BEEN DETAILED AT THIS OUTLINE STAGE. HYDRAULIC CALCULATIONS ASSUME ALL AREA WITHIN THE CATCHMENT IS IMPERMEABLE FOR ROBUSTNESS

SYSTEM 6 – BLOCKS E – OUTLINE PLANNING
CONTRIBUTING AREA: 6420m2
MAXIMUM OUTFALL RATE: 30.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

SYSTEM 6
166.4m X 1.98m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 312.99m3 OF ATTENUATION VOLUME.

SYSTEM 5 – BOTOLPH STREET – FULL PLANNING
CONTRIBUTING AREA: 1630m2
MAXIMUM OUTFALL RATE: 10.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA HYDROBRAKE

SYSTEM 5
OVER-SIZED PIPE ATTENATION SYSTEM PROVIDING 58.65m3 OF ATTENUATION VOLUME

SYSTEM 9 – BLOCK H – OUTLINE PLANNING
CONTRIBUTING AREA: 3460m2
MAXIMUM OUTFALL RATE: 24.5 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

SYSTEM 9
112.0m X 1.32m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 140.45m3 OF ATTENUATION VOLUME.

SYSTEM 4 – BLOCKS A, M, J3 AND K/L – FULL PLANNING
GREEN ROOF AREA: 1200m2
CONTRIBUTING AREA: 1485m2
MAXIMUM OUTFALL RATE: 65.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

SYSTEM 4
307.2m X 1.32m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 487.37m3 OF ATTENUATION VOLUME.

Block H OUTLINE

Block F OUTLINE

ROOF FOR BLOCK F SHALL COMPRISE SOME AREA OF GREEN ROOF WHICH HAS NOT BEEN DETAILED AT THIS OUTLINE STAGE. HYDRAULIC CALCULATIONS ASSUME ALL AREA WITHIN THE CATCHMENT IS IMPERMEABLE FOR ROBUSTNESS

SYSTEM 7 – BLOCK F – OUTLINE PLANNING
CONTRIBUTING AREA: 4460m2
MAXIMUM OUTFALL RATE: 20.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

SYSTEM 7
112.6m X 1.98m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 211.8m3 OF ATTENUATION VOLUME.

CALCULATIONS DO NOT INCLUDE EXISTING BUILDING

Block G OUTLINE

ROOF FOR BLOCK G SHALL COMPRISE SOME AREA OF GREEN ROOF WHICH HAS NOT BEEN DETAILED AT THIS OUTLINE STAGE. HYDRAULIC CALCULATIONS ASSUME ALL AREA WITHIN THE CATCHMENT IS IMPERMEABLE FOR ROBUSTNESS

Block J OUTLINE

ROOF FOR BLOCK J SHALL COMPRISE SOME AREA OF GREEN ROOF WHICH HAS NOT BEEN DETAILED AT THIS OUTLINE STAGE. HYDRAULIC CALCULATIONS ASSUME ALL AREA WITHIN THE CATCHMENT IS IMPERMEABLE FOR ROBUSTNESS

SYSTEM 8 – BLOCKS G AND J – OUTLINE PLANNING
CONTRIBUTING AREA: 9640m2
MAXIMUM OUTFALL RATE: 70.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP

SYSTEM 8
195.8m X 1.67m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 310.63m3 OF ATTENUATION VOLUME.

+4950mm
+4500mm
+4050mm
+3525mm
Commercial Unit
Residential Entrance
Residential Units
Car Park
Entrance
Resi Units
Resi Entrance
Resi Unit
Resi Town Houses
PITT STREET
ST CRISPINS ROAD
no entry

FULL PLANNING SURFACE WATER DRAINAGE SYSTEM
OUTLINE PLANNING SURFACE WATER DRAINAGE SYSTEM
PROPOSED ADOPTED SURFACE WATER SEWER DIVERSION
EXISTING SURFACE WATER SEWER TO REMAIN
PROPOSED ADOPTED FOUL WATER SEWER DIVERSION
PROPOSED GREEN ROOF
PROPOSED BIORETENTION SWALE OR TREE PIT

REV	DATE	BY	DESCRIPTION	CHK	APD

DRAWING STATUS: PLANNING APPLICATION

EAS
Unit 23, The Maltings, Stanstead Abbotts, Hertfordshire, SG12 8HG
Tel: 01920 877777
www.eastp.co.uk

CLIENT: WESTON HOMES

ARCHITECT:

PROJECT: ANGLIA SQUARE, NORWICH, NORFOLK

TITLE: REV A SUBMISSION
SURFACE WATR DRAINAGE LAYOUT
SHEET 3 OF 4

SCALE @ A1	DESIGN / DRAWN	DATE
1:200	MD	13.07.2022

PROJECT No:	DRAWING No:
3831	DR–003

Block A
Block M
Block H OUTLINE
Block G OUTLINE
Block J OUTLINE
Block K / L
Block J3
MAGDALEN STREET
Commercial Unit +4050mm
Residential Entrance +4050mm
Residential Units +4050mm
Residential Entrance Lobby +3525mm
Car Park +4050mm
Houses
+4050mm Resi Entrance Lobby
+2850mm Service Yard
+3525mm
SYSTEM 4 307.2m X 1.32m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 487.37m3 OF ATTENUATION VOLUME.
SYSTEM 9 112.0m X 1.32m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 140.45m3 OF ATTENUATION VOLUME.
SYSTEM 9 – BLOCK H – OUTLINE PLANNING CONTRIBUTING AREA: 3460m2 MAXIMUM OUTFALL RATE: 24.5 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP
SYSTEM 4 – BLOCKS K, L, J3 AND K/L – FULL PLANNING GREEN ROOF AREA: 1200m2 CONTRIBUTING AREA: 14850m2 MAXIMUM OUTFALL RATE: 65.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP
SYSTEM 8 195.8m X 1.67m DEEP GEOCELLULAR ATTENUATION DEVICE PROVIDING 310.63m3 OF ATTENUATION VOLUME.
SYSTEM 8 – BLOCKS C AND J – OUTLINE PLANNING CONTRIBUTING AREA: 9640m2 MAXIMUM OUTFALL RATE: 70.0 L/S FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100YR PLUS 45% CLIMATE CHANGE EVENT VIA PUMP
ROOF FOR BLOCK H SHALL COMPRISE SOME AREA OF GREEN ROOF WHICH HAS NOT BEEN DETAILED AT THIS OUTLINE STAGE. HYDRAULIC CALCULATIONS ASSUME ALL AREA WITHIN THE CATCHMENT IS IMPERMEABLE FOR ROBUSTNESS
ROOF FOR BLOCK G SHALL COMPRISE SOME AREA OF GREEN ROOF WHICH HAS NOT BEEN DETAILED AT THIS OUTLINE STAGE. HYDRAULIC CALCULATIONS ASSUME ALL AREA WITHIN THE CATCHMENT IS IMPERMEABLE FOR ROBUSTNESS
ROOF FOR BLOCK J SHALL COMPRISE SOME AREA OF GREEN ROOF WHICH HAS NOT BEEN DETAILED AT THIS OUTLINE STAGE. HYDRAULIC CALCULATIONS ASSUME ALL AREA WITHIN THE CATCHMENT IS IMPERMEABLE FOR ROBUSTNESS
FULL PLANNING SURFACE WATER DRAINAGE SYSTEM
OUTLINE PLANNING SURFACE WATER DRAINAGE SYSTEM
PROPOSED ADOPTED SURFACE WATER SEWER DIVERSION
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PROPOSED ADOPTED FOUL WATER SEWER DIVERSION
PROPOSED GREEN ROOF
PROPOSED BIORETENTION SWALE OR TREE PIT
REV | DATE | BY | DESCRIPTION | CHK | APD
DRAWING STATUS: PLANNING APPLICATION
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Unit 23, The Maltings, Stanstead Abbotts, Hertfordshire, SG12 8HG Tel: 01920 871777 www.eas1p.co.uk
CLIENT: WESTON HOMES
ARCHITECT:
PROJECT: ANGLIA SQUARE, NORWICH, NORFOLK
TITLE: REV A SUBMISSION SURFACE WATR DRAINAGE LAYOUT SHEET 4 OF 4
SCALE @ A0: 1:200
DESIGN / DRAWN: MD
DATE: 13.07.2022
PROJECT No: 3831
DRAWING No: DR-004

Appendix L – Anglian Water Diversion Information

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

Louisa Wade

From: Fewell Darren A <dFewell@anglianwater.co.uk>
Sent: 17 May 2017 17:18
To: Louisa Wade
Cc: Doneghan Grace
Subject: Proposed Retail Development - Anglia Square Norwich - Development in Close Proximity to Anglian Water Public Sewer Apparatus

Hi Louisa,

Proposed Retail Development – Anglia Square Norwich – Development in Proximity to Anglian Water Public Sewer Apparatus

Further to our detailed phone discussion this afternoon, regarding your overall scope of development proposed at the above site, I am (as requested) just dropping you a line to briefly clarify the main points of our discussion.

I trust this helps with the planning and early design stages Louisa, but if you need anything else then please come back to us and we will do our best to assist you.

- Any re-development areas falling within 3m of the existing public sewer apparatus, but remaining only *'built near'* the public sewers, and maintaining a similar level of clearance and access to that already enjoyed, would in principle be acceptable to us, subject to your clients satisfying themselves that the new foundation designs for the affected new buildings were specifically designed to avoid transferring loading onto the adjacent public sewer apparatus.
- Any areas falling within 3 metres would simply need to comply with usual Part H4 Building Regulations requirements in respect of 'Building Near' public sewer apparatus, and Anglian Water has published self-approval criteria on our website, but the principles of proceeding as outlined in my guidance above would in principle be satisfactory.
- So the designers for the new foundations would need to site survey the affected public sewers to make sure that when considering the relative invert depth of that affected sewer, and the clearance provided to the building structure, that no loading would be transferred on a 45 degree 'angle of repose' design principle.
- Based on drawing A03-P2-052 rev F 'Ground Floor Retail Plan' , the only area that would appear to require direct *consideration* of formal diversion of our apparatus would be the existing 675mm dia SW public sewer, and the existing 225mm dia Foul public sewer that runs immediately south of unit A1.01 (675mm SWS Section close to SW MH's 0453 through to 0456 approx & 225mm FWS Section close to Foul MH's 0405 through to 0408).
- We discussed the principle of it being diverted clear of the retail units footprint but being designed to fall *centrally* within the remaining pedestrian access/walkway areas so that clearance is maximised on either side of the sewers to the buildings.
- This section of drainage could therefore be considered for diversion clear of the footprint of the new retail units, subject to full planning approval, and the correct application being made to Anglian Water under Section 185 of the Water Industry Act 1991, where upon the design would be considered on its individual design merits at that time, but I can confirm that the principle of us being prepared to consider such a diversion to keep the apparatus clear of the building footprint is established.
- The development around retail unit G1.03 would appear to suggest that it may result in a direct build over of our existing foul and surface water manholes/sewers that currently appear to run clear of the existing retail footprint.
- Anglian Water could consider formally devesting the affected sections of public sewer into your clients own private ownership under a Section 116 devesting notice, but they would need to apply to us as the 'owners' of the affected premises served by that drainage, and formally request it is devested into their own private ownership, and they would also need to demonstrate to us that there were no affected 3rd parties connected to the section of public sewer in question, that would otherwise be adversely affected by any proposal to remove (or make redundant) said affected section of public sewer, and they would need to show that the public sewer and its existing connections were *only serving* their own existing retail premises, and this would be done by detailed site survey of the existing drainage with follow up drainage drawings provided, and provision of a CCTV survey with all existing sewer connections identified to us in terms of what they serve and who owns those connections.
- Once a formal devesting was applied for, and we successfully reached a stage whereby we had approved the proposals, and had issued notice under Section 116, then at that point your clients could physically remove the offending sections of apparatus from the ground in order to allow the new building to be constructed without hindrance.

- The existing foul and surface water sewers shown as passing across your 'residential refuse' and 'retail refuse' areas between the Iceland store and retail unit G1.01, which link back towards Anglia Square, are mapped and recorded as *'private'* sewer apparatus and thus are still considered private apparatus accordingly, and Anglian Water would not have any further comment to make regarding any impact the development may have on that section of drainage as the apparatus is not considered to be Anglian Water owned, but any future development, and foundation design arrangements would obviously just need to take any reasonable design allowances and standard construction precautions to prevent risk of damage occurring.

I trust this summarises things but let us know if you need anything else,

Regards
Darren Fewell
Drainage Engineer
Anglian Water Services Ltd

Appendix M – Anglian Water Sewer Flooding Email

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

Marianna Dyason

From: Marianna Dyason
Sent: 11 July 2022 13:32
To: Marianna Dyason
Subject: FW: Sewer flooding record query

From: Planning Liaison <planningliaison@anglianwater.co.uk>
Sent: 22 June 2022 08:06
To: James Cahuzac <james.cahuzac@eastp.co.uk>
Subject: RE: Sewer flooding record query

Good morning James,

Thank you for your email.

We are no able to send over individual instances of flooding, as this is confidential information.

Anglian Water is able to confirm that there have been instances of flooding within the vicinity of the proposed development. It is also possible that other flooding may have occurred that we do not have records of, other organisations such as the Local Authority, Internal Drainage Board or the Environment Agency may have records. We recommend you submit a pre planning application form to enable Anglian Water to advise you of any suitable connection points for the proposed development and identify any mitigation that would be required. Further details including the application form can be found on our website.

Kind regards,
Charlotte

Pre-development Team
Team: 07929 786 955

Anglian Water Services Limited
Thorpe Wood House, Thorpe Wood, Peterborough, Cambridgeshire, PE3 6WT

From: James Cahuzac <james.cahuzac@eastp.co.uk>
Sent: 21 June 2022 11:55

To: Planning Liaison <planningliaison@anglianwater.co.uk>
Subject: Sewer flooding record query

EXTERNAL MAIL **- Please be aware this mail is from an external sender - THINK BEFORE YOU CLICK**

Dear Sir/Madam,

I am working on a project in Norwich at postcode NR3 1DY and there is a concern regarding sewer flood risk. Would it be possible to have the updated DG5 records for this area please?

Kind regards,
James

James Cahuzac
Civil Engineer
Unit 23, The Maltings, Roydon Road, Stanstead Abbotts, Hertfordshire, SG12 8HG
Tel: 01920 871777
Web: www.eastp.co.uk

TRANSPORT ASSESSMENT, TRAFFIC MODELLING, FLOOD RISK ASSESSMENT,
FLOOD MODELLING, DETAILED HIGHWAY AND DRAINAGE DESIGN.

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