The Sizewell C Project

SZC Co.'s Response to the Secretary of State's Request for Further Information dated 18 March 2022: Appendix 3 - The Drainage Strategy

Part 5 of 12

Revision: 2.0

April 2022

SizewellC
Doing the power of good for Britain
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ANNEX 2A.7: SOUTHERN PARK AND RIDE DRAINAGE DESIGN NOTE

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1 INTRODUCTION

1.1.1 NNB Generation Company (SZC) Limited (SZC Co.) submitted an application for a Development Consent Order (DCO) to the Planning Inspectorate under the Planning Act 2008 for the Sizewell C Project (referred to as the 'Application') in May 2020. The Application was accepted for examination in June 2020.

1.1.2 The southern park and ride development forms part of the Application to build and operate a new nuclear power station to the north of Sizewell B.

1.1.3 SZC Co. has undertaken work to validate and develop the design of the southern park and ride that was originally submitted as part of the DCO application. This document forms one of a series of design validation and evolution documents being provided to the Examining Authority in support of the **Outline Drainage Strategy** [REP2-033] and subsequent **Drainage Strategy** submitted at Deadline 7.

1.1.4 The southern park and ride forms one of the Associated Developments (AD) which are required to mitigate traffic impacts arising from the main development site. The southern park and ride is located alongside the A12 at Wickham Market. Its function is to provide a transport hub from which construction workforce are driven to site by coach thus reducing the construction traffic needing to access the main development site. Full details of its facilities are contained in **Volume 4 Southern Park and Ride Chapter 2 Description of the Southern Park and Ride** [APP-380] and are described in summary below.

1.1.5 The site will consist of workforce parking, welfare, security and amenity buildings. The workforce parking includes car parking spaces, accessible spaces, minibus/van spaces, pick up and motorcycle spaces. It also has a Traffic Incident Management Area (TIMA). The TIMA is a holding park to which vehicles can be diverted in the event of an incident on the highway network or at the construction site.

1.1.6 The site access entrance from the B1078/A12 Hacheston slip road will be designed to Suffolk County Council's (SCC) adoptable standards but will remain unadopted.

1.1.7 The southern park and ride site will generate surface water runoff from paved areas and roofs which will require to be removed, treated as necessary and disposed.

1.1.8 The site access entrance road access from the B1078/A12 Hacheston northbound on slip road will generate surface water highway runoff which will require to be removed, treated as necessary and disposed.

1.1.9 The southern park and ride welfare facilities will generate foul water flows which will require to be removed, treated as necessary and disposed.

1.1.10 The southern park and ride facility and its associated site access entrance will remain in place and use during construction of the SZC power station. Once construction is complete the site will be closed and decommissioned. It will then return to current agricultural use.

2 PURPOSE

2.1.1 The **Outline Drainage Strategy** [REP2-033] identified at concept level the proposed drainage approach required for:

- The effective removal of highway and surface water runoff from the proposed southern park and ride and site entrance access road, together with its treatment and disposal, and
- The effective removal of foul water generated by the workforce from the proposed southern park and ride

2.1.2 The proposed drainage infrastructure was described in the concept drainage design submitted as part of the Application. This concept design was based on data and information available at that time. The design was supported by the submission of the **Southern Park and Ride Flood Risk Assessment** (FRA) [APP-117].

2.1.3 This concept drainage strategy was developed in consultation with drainage regulators and local authorities, including SCC and the Environment Agency (EA). The observations/requirements of drainage regulators were incorporated in the strategy.

2.1.4 The purpose of this technical note is to provide details of data which validates the **Outline Drainage Strategy** [REP2-033] and subsequent **Drainage Strategy** (Doc. Ref. 6.3 2A (B) submitted at Deadline 7), a description of how the proposed concept drainage infrastructure is developing and evolving and to demonstrate that it continues to provide for the effective and satisfactory drainage of the southern park and ride and its associated external road modification, without unacceptable adverse impact on the water environment, both in terms of flood risk and pollution.

2.1.5 This technical note is updated at revision 02 to address comments raised by SCC following their review of revision 01 and the Southern Park and

Ride - Updated DCO Drainage Strategy Statement February 2022 document. The comments are shown in **Appendix A**.

2.1.6 Because the Southern Park and Ride - Updated DCO Drainage Strategy Statement February 2022 document was intended to provide an update on the Drainage Strategy described in revision 01, it is included as **Appendix B.** This document contains relevant data so rather than repeat, where necessary references are made to Appendix B appendices in the body of this report.

2.1.7

3 DESCRIPTION OF DCO DRAINAGE DESIGN STRATEGY

3.1.1 The southern park and ride concept drainage strategy at DCO stage was developed by SZC Co. Proposals were developed for both the southern park and ride development site and associated site access entrance road.

3.1.2 Subject to achievable infiltration rates making infiltration a viable option, all surface water generated within the southern park and ride red line boundary, which includes the site access entrance road from the B1068/A12 slip road, would be contained within the site and discharged to ground by infiltration.

3.1.3 No surface water runoff from the site would be permitted to flow onto the B1078/A12 public highway.

3.1.4 Liaison with Anglian Water took place and it was confirmed that there are no public foul or surface water sewers near to the development site. Accordingly, the proposed infrastructure would be a local private foul water network discharging into a package sewage treatment plant. The treated effluent would discharge to ground by infiltration.

3.1.5 If the flow generation is too low or intermittent to be treated to the required standard or infiltration is not viable, then a sealed tank (cess tank) would be provided with sewage being collected and removed by tanker for offsite treatment.

3.1.6 A single remote security cabin at the site entrance would drain to a septic tank with infiltration to ground. If infiltration rates are inadequate the septic tank would be replaced by a cess tank.

3.1.7 The internal site layout showing the position of proposed drainage including swales, and infiltration basins is shown in **Plates 1** and **2** which are an

extract from Application drawing **"Chapter 2 Description of the Southern Park and Ride** Figure 2.4" [APP-382].

Plate 1: Southern park and ride internal layout showing concept drainage infrastructure to the north

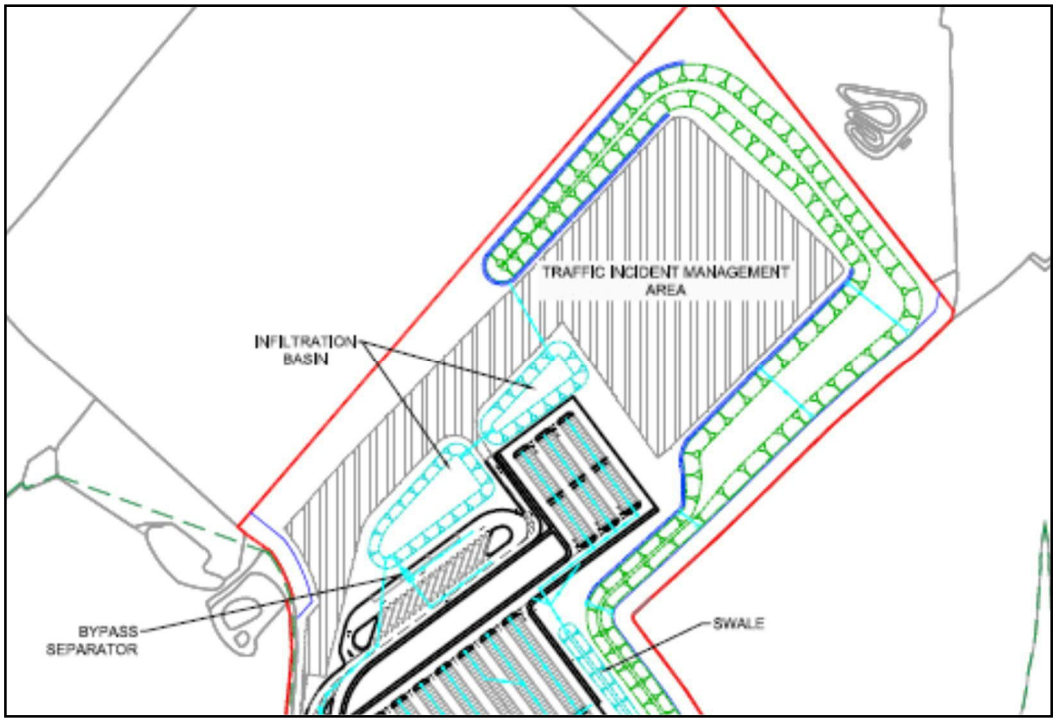
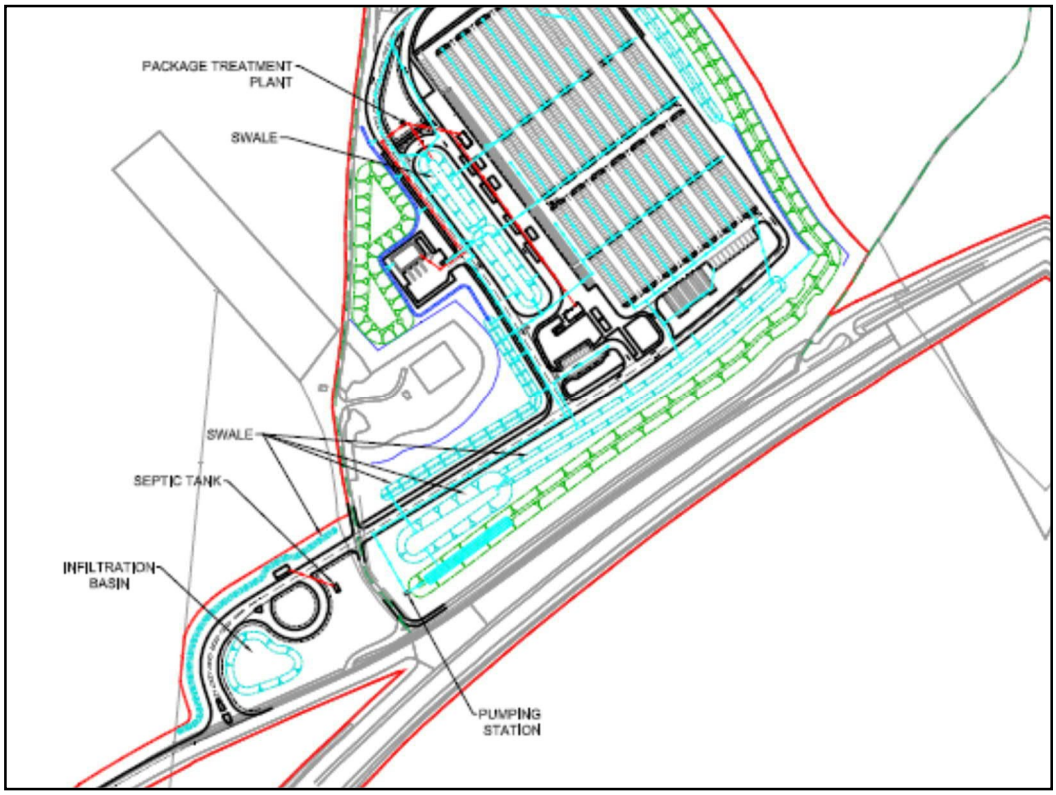
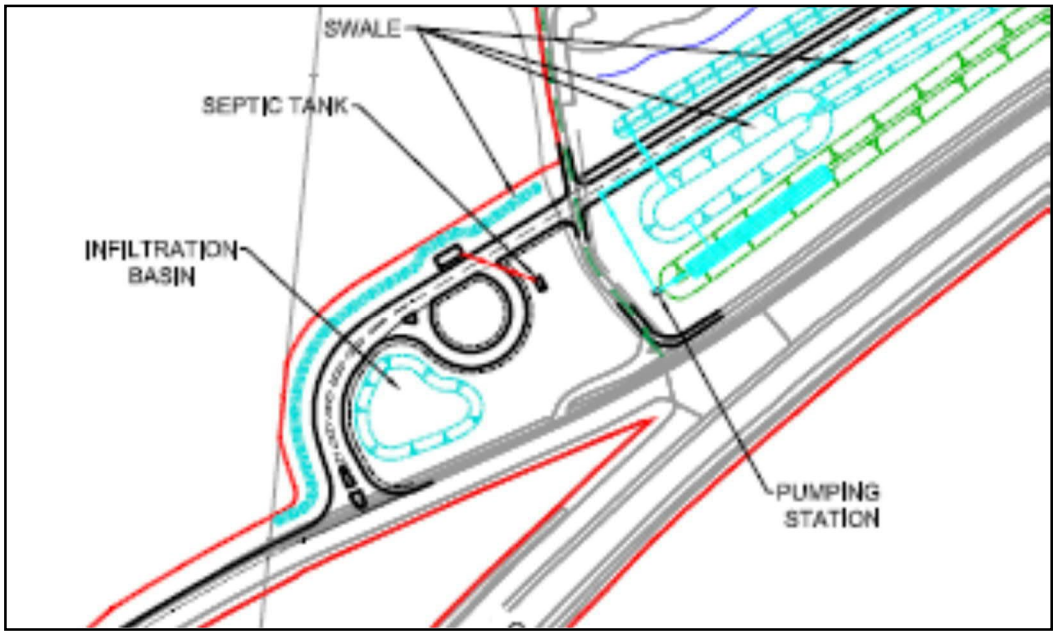


Plate 2: Southern park and ride internal layout showing concept drainage infrastructure to the south



3.1.8 The external site layout showing the road modifications with swales and infiltration basin is shown in **Plate 3**.

Plate 3: Southern park and ride access entrance road



4 EXISTING SITE AND ADJACENT HIGHWAY DRAINAGE ARRANGEMENTS

4.1.1 Subsequent to development of the initial drainage strategy some site investigation has been undertaken within the site red line boundary.

4.1.2 Except for one pond there are no obvious surface drainage features within the proposed site. Given the general topography with a reasonable fall in ground levels approximately 28-29 mAOD at the northern extent of the site to 23 mAOD adjacent to the B1078 A12 slip road and no evidence of ditches or erosion channels etc, it is assumed that surface water overland flow across the site is relatively limited, implying infiltration to ground takes place.

4.1.3 This view, that the site currently infiltrates into the existing soils, is reinforced by desktop study of predicted ground conditions and observation of the surface. Soil Index descriptions from the Institute of Hydrology Flood Studies Report indicate that superficial soil types may be suitable for infiltration. Soil was observed to be sandy in some parts of the site but more cohesive clay closer to the road at lower elevation.

4.1.4 From inspection of the B1078/A12 slip road it is noted that the road is drained by a series of highway gullies and there are manholes located in the footpath. This indicates the presence of highway drainage network. Enquiries have been made with SCC to obtain details of this drainage. Unfortunately, SCC has no asset records or local knowledge of the network. The Wickham Market bypass was constructed by the predecessor body to Highways England in 1976.

4.1.5 The EA Surface Water Flood Map predicts no effective risk of flooding of the site or the slip road and SCC also has no knowledge of flooding issues on the highway.

5 REVISED DRAINAGE DESIGN STRATEGY INPUT DATA

5.1.1 The concept design which was included in the original DCO drainage design has been modified to take account of data which has become available since the Application.

5.1.2 The new data which informs the design development is listed below:

- Ground Investigation and infiltration testing undertaken in November 2019
- Site visit and inspection of southern park and ride extent in 2020
- Site visit and inspection of southern park and ride extent on 3 August 2021
- Ground Investigation and infiltration testing undertaken in July 2021
-

6 GROUND INVESTIGATION AND INFILTRATION TESTING RESULTS

6.1.1 Four trial pits were excavated within the site at locations shown in **Plate 4**.

Plate 4: Southern park and ride site infiltration test trial hole locations

6.1.2 Infiltration testing in accordance with BRE365 (Ref. 1) was undertaken and the results are shown in **Table 1**

Table 1: Southern park and ride site infiltration test trial hole results

Location	Depth (m)	Test 1(m/s)	Test 2(m/s)
TP01	1.25	0	0
TP02	1.30	0	0
TP03	1.32	0	0
TP04	2.1	3.13×10^{-5}	3.01×10^{-5}

6.1.3 In the case of TP01, TP02 and TP03 it was recorded that there was negligible infiltration achieved in 60 hours.

6.1.4 It is not clear as to why TP01, TP02 and TP03 were excavated to a shallower depth.

6.1.5 The nature of the strata in TP01, TP02 and TP03 is stated to be stiff but slightly gravelly clay, Lowestoft Formation Diamicton. At TP04 this changes to a slightly gravely, slightly clayey Lowestoft Formation Sand and Gravel.

6.1.6 The results align with the British Geological Survey data which is noted in the **Southern Park and Ride FRA** [APP-117]. The BGS map records superficial geology for the site to be two types of the Lowestoft Formation; formed of sand and gravel in the south-western and north-eastern sections of the site, with an approximate 500m strip of diamicton running through the site centre. As shown in Figure 4 TP01, TP02 and TP03 are located in the centre of the site and TP04 is to the northeast. No trial pits were excavated in the west or southwest of the site.

6.1.7 The superficial Lowestoft Formation is underlain by Crag Formation at about 6 m below ground level. Crag Formation is described as shallow-water marine and estuarine sands, gravels, silts and clays. Crag has variable permeability but will have greater potential for infiltration.

6.1.8 In summary these results demonstrate that disposal of surface water runoff by infiltration is achievable but only at TP04 which is to the north and at higher elevation. SCC consider that an infiltration rate in excess of 1.4 x 10-6 m/s is viable for infiltration to ground.

6.1.9 At the time of visit on 3 August 2021 further ground investigation works were in progress and include additional infiltration testing. The results of the further infiltration testing are now available and discussed in **Appendix B section 4.** The borehole logs and infiltration testing results are shown in **Appendix B of Appendix B**.

6.1.10 An infiltration test result is now available for trial pit WTP217. This is located in the southwest of the site and in proximity to the proposed access road infiltration basin. In accordance with BRE365, three tests have been undertaken and all demonstrate infiltration potential. However only one delivered a full result. SCC have confirmed that they will not approve a drainage design will infiltration which is reliant on the results of WTP217.

6.1.11 If for the southern catchment area options for infiltration are to be taken forward in design then SCC will require the results of further infiltration testing, in order to approve the design.

7 REVISED SURFACE WATER CONCEPT DRAINAGE DESIGN STRATEGY – SOUTHERN PARK AND RIDE SITE

7.1.1 The arrangements for removal of surface water remain as broadly as described in document **"Environmental Statement Volume 4 Chapter 2 Description of the Southern Park and Ride"** [APP-381] but are modified to take account of the site inspections.

7.1.2 It is intended that all surface water runoff is to be contained within the site and removed by infiltration to ground. However, taking account of the proven lack of infiltration in the middle of the site, it is intended that that runoff will be removed and collected in the lowest elevation in the southwest and then pumped to the north where infiltration is viable. If the latest infiltration testing demonstrates that infiltration is viable in the southwest corner of the site as is suspected, then this would be modified to remove the pumping requirement.

7.1.3 Runoff from roofs will be drained via downpipes and gullies, as appropriate to underground carrier drains and discharge into attenuation basins and swales.

7.1.4 Runoff from the internal roads, the bus/HGV standing areas and the Traffic Incident Management Area, which must have an impermeable surface will be drained via surface outlets, gullies, linear channels and drains etc. These will discharge into underground carrier drains which will convey the runoff to the same attenuation basins and swales or in the north to infiltration basins.

7.1.5 Bypass interceptors will be installed downstream of the bus/HGV standing areas in order to remove hydrocarbon and silt contaminants which will improve the water quality of discharge to the attenuation basins, swales and infiltration basins.

7.1.6 The extensive car parking areas will have a permeable surface allowing runoff to permeate into and be temporarily stored in the sub-base. This will assist with attenuating peak flow rate, provide some storage and initial treatment of the runoff. The sub-base will allow flow to drain into the carrier drains.

7.1.7 In the centre and south parts of the site, the underground carrier drains will discharge all surface water into a series of swales and attenuation basins which will provide suitable treatment in accordance with CIRIA C753 The SuDS Manual (Ref. 2). The swale/attenuation basin network will discharge into a pumping station which will pump runoff to the infiltration basins to the north.

7.1.8 In the north part of the site, the underground carrier drains will discharge all surface water into one of two infiltration basins by gravity. The infiltration basins will provide suitable treatment in accordance with CIRIA C753 The SuDS Manual.

7.1.9 At concept design stage, the footprint for each swale and basin was based on indicative calculations using the UK SUDS Storage Estimating Tool (Ref. 3) and assuming an outfall discharge based on a rate of 2 l/s/Ha.

7.1.10 The infiltration basin storage requirements have now been updated with more detailed calculations using MicroDrainage with proven infiltration rates measured at the northern infiltration basin location. They assume discharge of local runoff discharged by gravity to the north plus pumped flows from the centre and southwest of the site.

7.1.11 The layout drawing in **Appendix A** shows the existing DCO submitted layout but superimposed with required storage volumes and footprints for infiltration and attenuation basins or underground storage. These have been determined by the hydraulic modelling calculations. The calculations are shown in **Appendix B**.

7.1.12 The attenuation storage for the central and south area is provided using underground storage. The available area and volume has been maximised. A required pump rate has been determined to ensure that the storage capacity is not exceeded.

7.1.13 The calculations allow for Option 1 shown in **Appendix A**, a discharge of 5l/s from the site entrance access road attenuation basin into the pumping station.

7.1.14 The storage requirements for the infiltration basin to the north allow for the pumped flow at 50 l/s.

7.1.15 Hydraulic calculation based requirements are summarised in **Table 2**.

Table 2: Southern park and ride site drainage attenuation and infiltration infrastructure requirements at concept design stage

Infrastructure Location	Dimensions
South central area attenuation storage tank	9,888 m^3
Entrance road Attenuation Basin	338 m^3
Pump Discharge Rate to north Infiltration Basin	50 l/sec
Average Infiltration Rate at north Infiltration Basin (TP04)	104.04 mm/hour
North Infiltration Basin	3209 m^3
North Infiltration Basin Half Drain Time	471 minutes (~8 hours)

7.1.16 It can be seen that the required volumes for the gravity and pumped catchments are linked. If the pumped flow rate is increased required storage volume in the upstream attenuation basins and swales is reduced. However, the higher pumped flow rate will increase the infiltration basin storage volume requirements to the north.

8 REVISED FOUL WATER DRAINAGE CONCEPT DESIGN STRATEGY – SOUTHERN PARK AND RIDE SITE

8.1.1 The foul water drainage strategy remains unchanged with foul water flows collected by an underground gravity pipe drainage network and discharged into a package sewage treatment plant. However, whilst previously the treated effluent would discharge to ground via infiltration through a drainfield network, the current infiltration test results demonstrate that this is not feasible. Therefore, the treated effluent is proposed to discharge into a swale and ultimately having mixed with surface water runoff will be pumped to the north infiltration basin where the treated effluent will infiltrate to ground.

8.1.2 Given that that foul water flow rates generated will be low and intermittent with a range of flow it may make the delivery of a consistent treated effluent to meet the requirements of the required environmental permit more challenging. If a suitable package plant and associated treatment infrastructure cannot be developed during preliminary design or consent to a discharge of treated effluent by infiltration to ground cannot be agreed, the alternative will be to collect the foul water sewage in an underground sealed cess tank from which it can be collected and regularly removed by tanker for treatment offsite.

8.1.3 The remote security cabin arrangement of discharge into a septic tank will remain. Solids will be collected in the tank and removed by tanker for treatment offsite. Liquid effluent will discharge to ground via a drainfield network. The drainfield typically consists of an arrangement of trenches containing perforated pipes and porous material (often gravel) covered by a layer of soil to prevent animals (and surface runoff) from reaching the wastewater distributed within those trenches.

8.1.4 During design development should it be determined that the infiltration rate is insufficient for the provision of a drainfield and therefore create a flood risk it will be necessary to collect wastewater and sewage in a cesspit from which it can be collected and regularly be removed by tanker for treatment offsite.

9 REVISED SURFACE WATER DRAINAGE CONCEPT DESIGN STRATEGY – B1078/A12 HACHESTON SLIP ROAD AND SITE ENTRANCE ACCESS ROAD

9.1.1 The surface water drainage strategy for the highway drainage remains unchanged being infiltration to ground to the extent that this is achievable. As noted in Section 5 no infiltration testing is currently available for this part of the site. Additional infiltration testing is in progress, but additional results are not currently available.

9.1.2 The level of the site entrance access road will be set to ensure that there is no additional surface water highway runoff that can discharge into the existing B1078 A12 slip road highway drain.

9.1.3 The site entrance access road will remain in SZC Co. private ownership.

9.1.4 Highway surface water runoff will discharge either by “over the edge” or kerb and gullies into a swale. The swale will include for an underlying filter drain. Since infiltration viability is unconfirmed the filter drain will discharge flow that does not infiltrate into an infiltration basin located between the slip road boundary, the access road and the vehicle roundabout.

9.1.5 The roundabout will be drained by gullies which will discharge into the infiltration basin.

9.1.6 If following infiltration testing at the infiltration basin location it is established that infiltration will not be viable, the infiltration basin will change to an attenuation basin. The basin will outfall to the pumping station with discharge to the infiltration basins to the north where viability of infiltration is proven.

9.1.7 SCC do not consider that infiltration is viable where the infiltration rate is proven to be less than 1 x 10^{-6} m/s. Hydraulic calculations have been undertaken to determine whether for available space and this infiltration rate, infiltration is viable. The results are shown as Option 2 in **Appendices A and C**. They are also summarised in **Table 3.**

Table 3: Southern park and ride site entrance drainage infiltration infrastructure requirements at concept design stage

Infrastructure Location	Dimensions
Entrance Road Infiltration Basin	596 m^3
Minimum Infiltration Rate	1 x 10^{-6} m/sec

Half Drain Time	More than 7 days

9.1.8 The results demonstrate that infiltration is not viable due to the extended half drain down time.

9.1.9 The alternative Option 1 is for an attenuation basin which will contain the required volume of runoff whilst releasing it at a controlled rate to the pumping station which will discharge flow to the north infiltration basin. This is described in more detail in Section 7.

10 FINAL SURFACE WATER DRAINAGE CONCEPT DESIGN STRATEGY OPTIONS

10.1.1 Following the evidence of potentially viable infiltration in the southwest part of the site, the concept drainage strategy options for the main part of the site and described in section 7 and the access road described in section 9 have been updated. This is described in **Appendix B section 5**.

10.1.2 The site is divided into a northern and southern catchment as shown in **Appendix C**.

10.1.3 The northern catchment will be drained by gravity to the infiltration basin located to the north where the viability of infiltration is proven. SCC has confirmed acceptance of this stating “Looks acceptable in principle as the infiltration potential is proven at this location.” Hydraulic modelling results for this catchment are shown in **Appendix D**.

10.1.4 The southern catchment consists of the site entrance access road and that part of the site which cannot be drained north by gravity to the infiltration basin.

10.1.5 If the viability of infiltration is proven in the area of the proposed infiltration basin and sufficient space temporary storage of runoff is available then the southern catchment runoff will be disposed by infiltration. In this case, the northern and southern catchments will remain separate. Hydraulic modelling results for this southern catchment are shown in **Appendix E**.

10.1.6 If infiltration is proven to be unviable then the strategy described in section 7 and 9 above will be progressed. In this case all runoff will be pumped up to the infiltration basin to the north. Hydraulic modelling results for this arrangement with a combined northern and southern catchment are shown in **Appendix F**.

10.1.7 If infiltration viability is marginal a potential option would be to drain all runoff to the infiltration basin but provide resilience in the form of a high level

overflow into a deep borehole soakaway which would discharge into the permeable crag strata located below the cohesive strata. This option would only be viable if the borehole is consented by the EA.

11 UPDATED SURFACE WATER POLLUTION MITIGATION STRATEGY

11.1.1 In addition to the provision of drainage infrastructure for the removal of surface water runoff and avoidance of unacceptable flood risk, it is also necessary to ensure that the runoff is disposed in a way that avoids pollution of the receiving water, whether watercourse or aquifer/groundwater.

11.1.2 An assessment of the ability of the proposed drainage infrastructure to mitigate pollution risk to an acceptable level has been undertaken using the CIRIA C753 SuDS Manual Simplified Index Approach methodology. A sample calculation has been shared with SCC who have confirmed acceptance of this approach.

11.1.3 Details of the calculations and results are shown in **Appendix G.** They demonstrate that there is sufficient treatment provided to mitigate pollution to an acceptable level.

12 SUMMARY AND CONCLUSION

12.1.1 The purpose of this technical note is to validate the Outline Drainage Strategy and subsequent Drainage Strategy (submitted at Deadline 7) for the southern park and ride. It describes how the concept design has needed to evolve as a result of design development and the lack of certainty as to the viability of removal of surface water runoff by infiltration across the whole site.

12.1.2 Based on the infiltration rates measured at TP04 in the northern part of the site, removal of surface water runoff and treated effluent by infiltration to ground remains viable. It is noted that the alternative options of discharge to local watercourse or sewer are not available.

12.1.3 Subject to the results of DCO examination and acceptance of the drainage design strategy principles contained in this report, the drainage designs will be developed to preliminary design stage.

12.1.4 At this stage subject to the additional infiltration test results particularly in the southwest at lowest elevation it is intended that the need to pump flow to the north for removal can be removed. However, if necessary, it can be retained. If pumping is required then back up provision in case of pump

failure will be incorporated in the design with provision of passive additional storage being the preferred option.

12.1.5 The southern park and ride facility drainage design will be based on CIRIA C753 SuDS Manual, Design and Construction Guidance for Foul and Surface Water Sewers (formerly Sewers for Adoption) (Ref. 4), and PPG4 Treatment and Disposal of Sewage where no Foul Water Sewer is Available (Ref. 5).

12.1.6 The site access entrance road will be based on Design Manual for Roads and Bridges (DMRB) (Ref. 6), Manual of Contract Documents for Highway Works (MCHW) (Ref. 7) and SCC specific guidance (Refs. 8 and 9).

12.1.7 As preliminary design progresses SZC will liaise with SCC and the EA through design review meetings to ensure acceptance of the drainage infrastructure and to ensure compliance with regulatory requirements and environmental permits.

REFERENCES

1. BRE Digest Soakaway design: DG 365 – 2016, BRE, 2016 [redacted]

2. The SUDs Manual (C753), CIRIA, 2015, ISBN 978-0-86017-760-9.

3. Surface water storage volume estimation tool, HR Wallingford, [redacted]

4. SSG Appendix C - Design and construction guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England ("the Code"). Approved Version 2.0. 10 March 2020. Water UK. [redacted]

5. Pollution Prevention Guidelines PPG4: Treatment and disposal of sewage where no foul sewer is available, Environment and Heritage Service / Scottish Environment Protection Agency / Environment Agency, July 2006. PMHO0706BJGL-E-E. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/485181/pmho0706bjgl-e-e.pdf

6. Highways Agency et al. (2009). Volume 11, Section 3, Part 10: Road Drainage and the Water Environment, HD45/09. [redacted]

7. Manual of Contract Documents for Highway Works (MCHW), Highways Agency. [redacted]

8. Design Guide, Suffolk County Council, 2000, https://www.suffolk.gov.uk/planning-waste-and-environment/planning-and-development-advice/suffolk-design-guide-for-residential-areas/

9. Sustainable Drainage Systems (SuDS) a Local Design Guide Appendix A to the Suffolk Flood Risk Management Strategy, Suffolk County Council, May 2018 [redacted]

APPENDIX A: RECORD OF SCC COMMENTS AND SZC ACTIONS

SCC Comments on Drainage Strategy shown in Appendix B	SZC Response
Southern Catchment WTP217, which has been used for design purposes, is not compliant with BRE365. Only one test was undertaken, with the subsequent two tests failing to reach 25% and therefore not achieving an infiltration rate. The design for the southern catchment is entirely reliant on the first result from WTP217 which was 2.94x10-5 (105.84mm/hr). We cannot accept a design which is entirely reliant on results of non-compliant BRE365 testing, also noting that the first test which you've used for design would be a massive overestimation compared to the subsequent two results, had they reached 25%. Also, worth noting that WTP01 & WTP03 failed as this gives further context to the above, although I note the recorded geology differs I'm not entirely sure what a 'crate basin' is, as shown in Appendix C. Northern catchment Looks acceptable in principle as the infiltration potential is proven at this location Pollution mitigation I don't think it's accurate to compare this to Northern Park and Ride. Northern Park and Ride discharges through multiple swales and basins before discharging through a positive outfall. At this location there's the potential for infiltration straight to ground without adequate treatment. It looks like most areas are proposed to pass from either swale or permeable paving and then into attenuation basins. Permeable paving shouldn't be an issue but the swales may need to be lined, especially along the access roads. This shouldn't be a problem as I note the calcs don't allow infiltration from these features anyway Plan in Appendix C still notes pumping station	

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APPENDIX B: SOUTHERN PARK AND RIDE – UPDATED DCO DRAINAGE STRATEGY

SOUTHERN PARK AND RIDE – UPDATED DCO DRAINAGE STRATEGY STATEMENT FEBRUARY 2022

1. INTRODUCTION

1.1. Sizewell Co. (SZC) is developing the design of the Southern Park and Ride (SP&R) that was submitted to the Planning Inspectorate as part of a Development Consent Order (DCO) application to build and operate a new nuclear power station to the north of Sizewell B.

1.2. The SP&R forms one of the Associated Developments (AD) which are required to mitigate traffic impacts arising from the main development site. The SP&R is located alongside the A12 at Wickham Market. Its function is to provide a transport hub from which construction workforce are driven to site by coach thus reducing the construction traffic needing to access the main development site. Full details of its facilities are contained in **Volume 4 Southern Park and Ride Chapter 2 Description of the Southern Park and Ride** [APP-380].and are described in summary below.

1.3. The SP&R Drainage Strategy was produced as one of a series of design validation and evolution documents forming part of the **Drainage Strategy** (Doc. Ref. 6.3 2A(D)/10.14) submitted at Deadline 5.

1.4. Following Examination liaison has taken place with Suffolk County Council (SCC) who having reviewed the strategy, provided comments outlining areas of concern that should be addressed in order that they can support the strategy and the proposed drainage infrastructure.

1.5. One area of SCC expressed concern was the limited infiltration testing undertaken within the site red line boundary. This was already being addressed with additional testing which took place in July 2021. The test results show that infiltration is viable in the southwest corner of the development and as a result it is proposed that the strategy is amended to remove the requirement for pumping.

2. PURPOSE

2.1 The purpose for this note is to provide infiltration test data, hydraulic modelling calculations and layout drawings required to demonstrate that a viable technically achievable drainage solution is capable of delivery within the red line boundary.

2.2 The note addresses the specific concerns raised by SCC and listed below

- Full details of infiltration testing need to be supplied
- Infiltration rates used in calculations should be applied in accordance with BR$365 using the lowest rate from three tests
- SZC need to demonstrate that there is no alternative to pumping runoff from the south to the north of the site
- If there is no alternative to pumping, then any pumped system has to be designed to accommodate a 24-hour pump failure
- The strategy is heavily reliant on underground storage tanks
- Hydraulic modelling should use FEH rainfall and allow for climate change
- No pollution assessment has been undertaken.
- Extent of catchment, such as total catchment and impermeable areas has not been clearly identified, either in test or preferably on plan.

2.3 The location of the SP&R adjacent to the A12 at Wickham Market and its layout is shown for reference in **Appendix A.**

3. DESCRIPTION OF THE DCO DRAINAGE DESIGN STRATEGY

3.1 The internal site layout showing the position of proposed drainage including swales, and infiltration basins is shown in**"Chapter 2 Description of the Southern Park and Ride** Figure 2.4" [APP-382].

3.2 Surface water runoff is removed from the surface via carrier drains which discharge into swales and infiltration basins. In car parking areas the surface has permeable paving which helps provide some water treatment and storage.

3.3 The site is split into three catchments.

3.4 A minor catchment is located at the entrance to the site and drains to an infiltration basin. It was assumed but not proven that infiltration will work.

3.5 A southern catchment discharges via drains, swales, basins and underground storage to an outfall pumping station from which flow is pumped to the infiltration basin which serves the northern catchment. The pumping station with its associated significant storage is required because infiltration is proven not to work.

3.6 A northern catchment discharges via drains, swales, basins to one of two linked infiltration basins where infiltration is proven to be viable

4. INFILTRATION DATA

4.1 Prior to the submission of the DCO Drainage Strategy SZC undertook a campaign of geotechnical investigation which included infiltration testing at four locations as shown in **Plate 1.**

Plate 1: Southern park and ride site initial infiltration test trial hole locations

4.2 These results indicated that infiltration is only viable in the north at TP04.

4.3 Subsequent to the issue of the SP&R DCO Drainage Strategy further infiltration testing has been undertaken. Both the original and more recent tests have been undertaken in accordance with the requirements of BRE365. The location of all testing and the results are shown in **Appendix B.**

4.4 Since it is now proved that infiltration is viable in parts of the south of the site, it is proposed that the pumping station is deleted and that all runoff is collected by a gravity network and disposed by infiltration to ground.

5. DESCRIPTION OF THE UPDATED DRAINAGE DESIGN STRATEGY

5.1 The DCO drainage strategy described in **Section 3** above was based on the assumption that infiltration was only proven to be viable in the north catchment. Since there is now evidence of viable infiltration in the southern part of the site the strategy is changed to remove the pumping station such that two gravity networks, one north and one south are provided.

5.2 Surface water runoff will continue to be removed by a series of carrier drains, discharging via swales and attenuation basins with all runoff discharging into the infiltration basins to the north and south for disposal by infiltration to ground.

5.3 The original catchment boundary for the north and south catchments has been reviewed in order to discharge the maximum available area by gravity to the northern infiltration basins which have a better infiltration rate. The catchment boundaries are shown in **Appendix C.**

5.4 Both the north and south catchments have been modelled at a low level of detail using MicroDrainage. This has been done in preference to use of Source Control because of the relatively complex arrangement of carrier drains, swales and attenuation basins which link to discharge into the infiltration basins. The hydraulic calculations are shown in **Appendix D.**

5.5 It is noted that given the low level of detail, the permeable paving which provides a degree of attenuation and storage is not included in modelling and thus the results are conservative.

6. POLLUTION CONTROL MEASURES

6.1 In addition to removing surface water runoff, it is necessary for the drainage network to have suitable infrastructure to control and treat runoff so that when infiltrating to ground risk of pollution to the underlying groundwater is mitigated to an acceptable level.

6.2 SCC has agreed with SZC that pollution risk and required control measures can be assessed using the CIRIA C753 SuDS Manual Simplified Index Approach. An assessment for SP&R is not currently available but will be undertaken. An assessment for NP&R has been undertaken and provided for review by SCC. In response there has been no adverse comment on the site pollution mitigation measures. Since the facilities at the two park and ride sites are comparable, it is reasonable to assume that the measures applied at the NP&R will also be effective at SP&R.

9. SUMMARY AND CONCLUSION

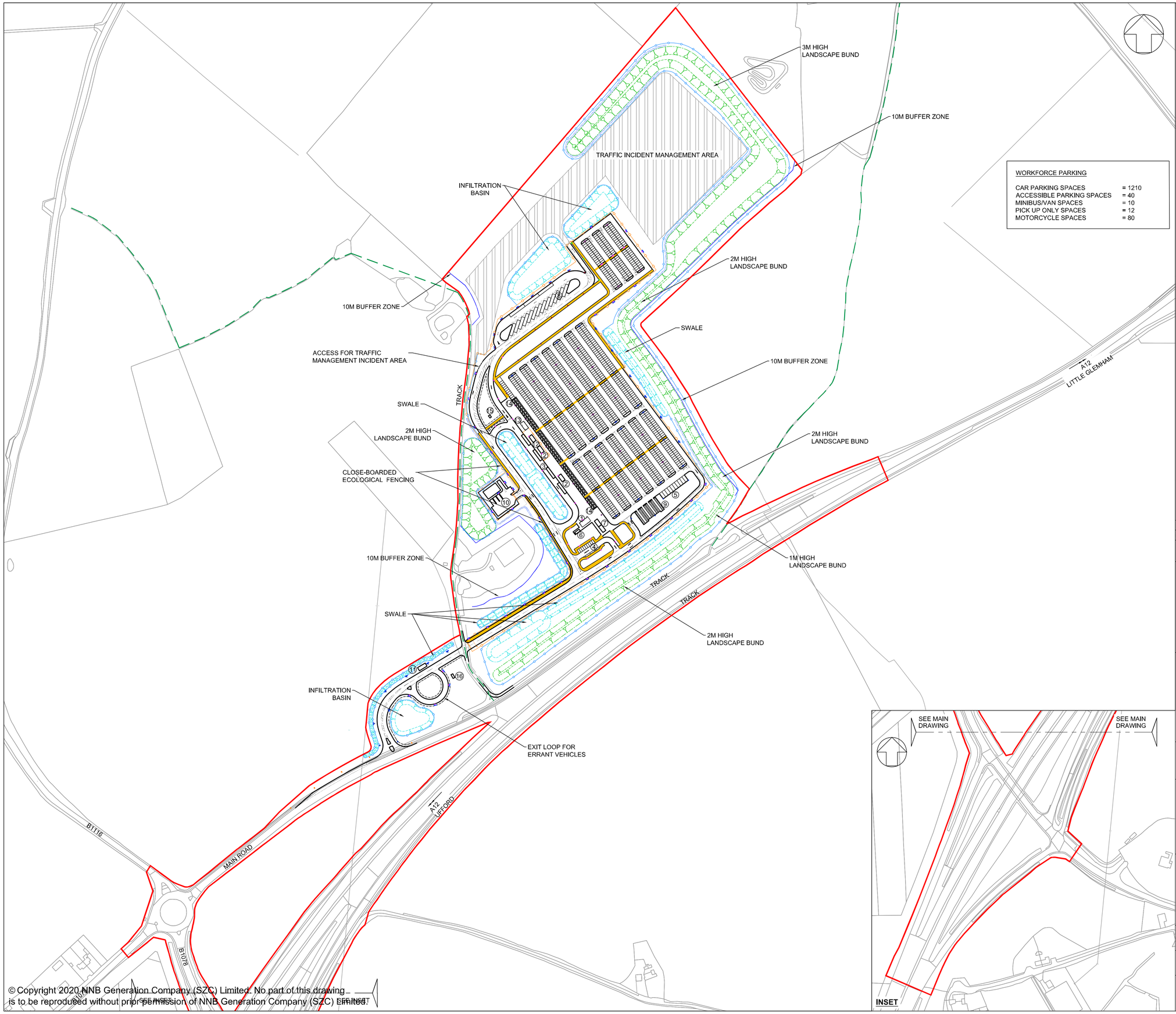
9.1 This note covers the Southern Park and Ride facility. Its purpose is to provide details of data which validate the Drainage Strategy (Doc. Ref. 6.3 2A(D)/10.14) submitted at Deadline 10.

9.2 It describes how the concept design is evolving to provide for the effective drainage of the site. It also identifies aspects which will require to be addressed as design develops to preliminary and detailed stages, as secured by Requirement 5.

9.3 At this stage it provides evidence to enable SCC to confirm that an achievable drainage solution, compliant with the Drainage Strategy, can be delivered within the red line boundary. It is intended that the specific concerns raised by SCC in 2.2 above have been addressed.

APPENDIX A

SOUTHERN PARK AND RIDE LAYOUT PLAN



WORKFORCE PARKING

CAR PARKING SPACES	= 1210
ACCESSIBLE PARKING SPACES	= 40
MINIBUS/VAN SPACES	= 10
PICK UP ONLY SPACES	= 12
MOTORCYCLE SPACES	= 80

NOTES:

1. Do not scale from this drawing. All dimensions are in metres unless noted otherwise.
2. For Lighting Column specifications see drawings SZC-SZ0204-FP-000-DRW-100011-13, 100054 and 100099.

KEY:

- DEVELOPMENT SITE BOUNDARY
- (1) AMENITY AND WELFARE BUILDING
- (2) BUS SHELTERS
- (3) BUS STOPS
- (4) DROP OFF
- (5) VAN / MINIBUS PARKING
- (6) SMOKING SHELTER
- (7) CYCLE SHELTER
- (8) OVERNIGHT BUS PARKING
- (9) MOTORCYCLE PARKING
- (10) POSTAL CONSOLIDATION BUILDING
- (11) SECURITY BOOTH
- (12) SECURE BUS TERMINAL
- (13) SECURITY BUILDING
- (14) ACCESSIBLE PARKING
- (15) PACKAGE TREATMENT PLANT
- (16) SEPTIC TANK
- BUFFER ZONE
- SECURITY FENCE (1.8M HIGH)
- ECOLOGICAL FENCING
- GATE
- SWALE / INFILTRATION BASIN (INDICATIVE)
- LANDSCAPE BUND
- PEDESTRIAN WALKWAY
- MANUAL RISING ARM BARRIER
- EXISTING PUBLIC RIGHT OF WAY
- PROPOSED DITCH (INDICATIVE)
- PROPOSED LIGHTING COLUMNS(INDICATIVE)
- LIGHTING LANTERN DEMOUNTABLE SHIELD

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION / COMMENTS	APPROVED
01	FEB 2020	NKS	KA	DCO SUBMISSION	PJ

NOT PROTECTIVELY MARKED

PROJECT:
SIZEWELL C

DOCUMENT:
APPLICATION DRAWING - FOR APPROVAL
REGULATION 5(2)(o)

DRAWING TITLE:
SOUTHERN PARK AND RIDE
PROPOSED GENERAL ARRANGEMENT

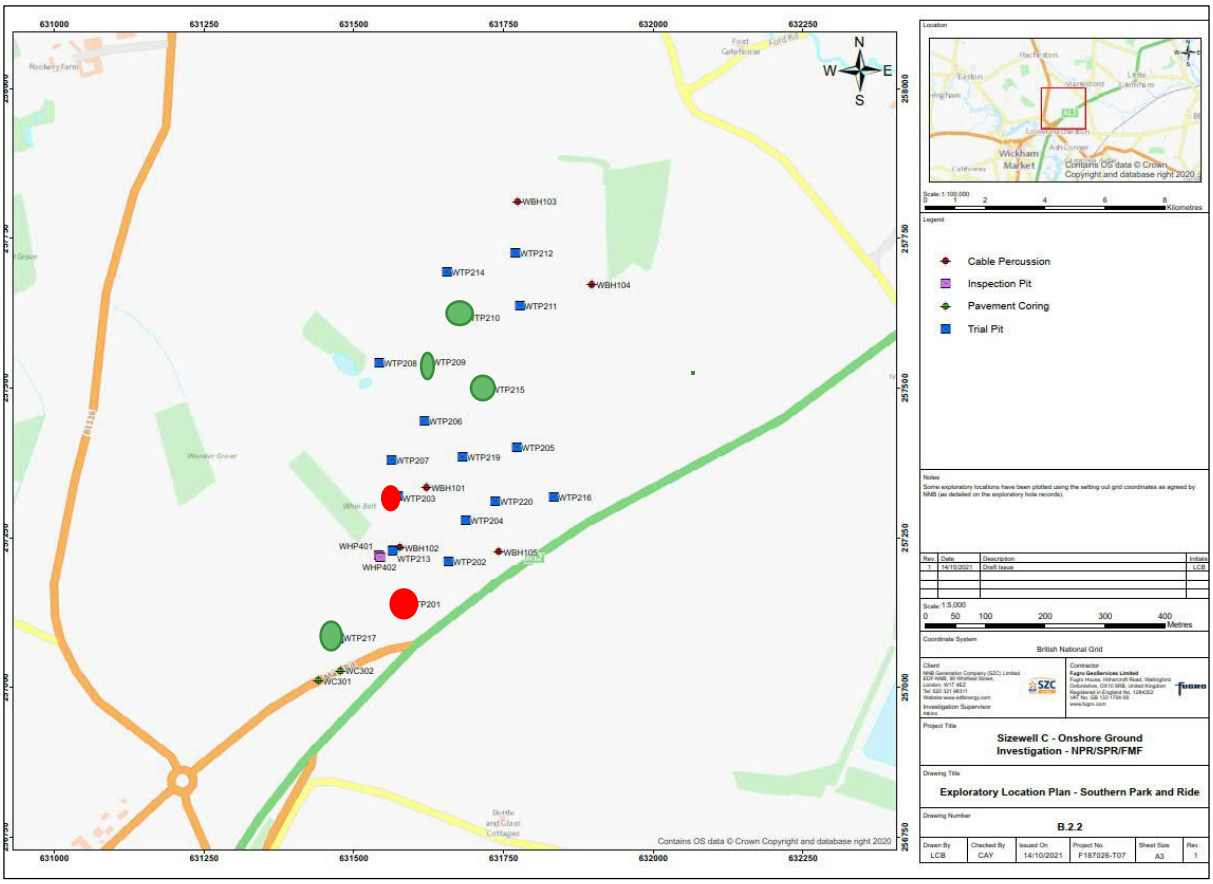
DRAWING NO:	REVISION:
SZC-SZ0204-FP-000-DRW-100009	01

DATE:	DRAWN:	SCALE:
FEB 2020	NKS	1:2000@A1

SCALE BAR:
40m 0 40 80 120m
SCALE IN METRES 1:2000

APPENDIX B

SOUTHERN PARK AND RIDE INFILTRATION TEST DATA


631000
631250
631500
631750
632000
632250
258000
257750
257500
257250
257000
256750
N
W
E
S
WBH103
WTP212
WTP214
WBH104
WTP211
WTP210
WTP208
WTP209
WTP215
WTP206
WTP207
WTP219
WTP205
WBH101
WTP203
WTP220
WTP216
WTP204
WHP401
WBH102
WTP213
WTP202
WBH105
WHP402
WTP201
WTP217
WC302
WC301
Rookery Farm
Ford Cottages
Wander Grove
Bottle and Glass Cottages
Contains OS data © Crown Copyright and database right 2020
Location
Hacheston
Easton
Marlesford
Little Glemham
Wickham Market
Ash Corner
Contains OS data © Crown Copyright and database right 2020
Scale: 1:100,000
0 2 4 6 8
Kilometres
Legend
Cable Percussion
Inspection Pit
Pavement Coring
Trial Pit
Notes
Some exploratory locations have been plotted using the setting out grid coordinates as agreed by NNB (as detailed on the exploratory hole records).
Rev. Date Description Initials
1 14/10/2021 Draft Issue LCB
Scale: 1:5,000
0 50 100 200 300 400
Metres
Coordinate System
British National Grid
Client
NNB Generation Company (SZC) Limited
EDF NNB, 90 Whitefield Street,
London, W1T 4EZ
Tel: 020 321 98231
Website www.edfenergy.com
Investigation Supervisor
Atkins
Contractor
Fugro GeoServices Limited
Fugro House, Hithercroft Road, Wallingford
Oxfordshire, OX10 9RB, United Kingdom
Registered in England No: 1264352
Tel: +44 (0) 1491 1754 00
www.fugro.com
Project Title
Sizewell C - Onshore Ground Investigation - NPR/SPR/FMF
Drawing Title
Exploratory Location Plan - Southern Park and Ride
Drawing Number
B.2.2
Drawn By LCB
Checked By CAY
Issued On 14/10/2021
Project No F187026-T07
Sheet Size A3
Rev. 1

Appendix I

Infiltration Testing

Royal HaskoningDHV

GEOSPHERE ENVIRONMENTAL

Our Ref: 4029,SK,Ltr02,JDo,GF

Your Ref: 4029,SK

Royal Haskoning DHV,
9TH Floor Manchester One,
Portland Street,
Manchester,
M1 3LF

Date: 08 November 2019.

For the attention of Mr Kwasi Amoah.

By Email

[redacted]

Dear Mr Amoah,

INFILTRATION TESTING AT LAND WICKHAM MARKET, CLOSE TO IP13 0AB.

1. Introduction

This letter report has been prepared on behalf of Mr Kwasi Amoah for Royal Haskoning DHV.

The primary objective of this ground investigation was to assess the infiltration potential of the natural soils beneath the site.

This was achieved by:

- Excavating four machine-dug trial pits across the site;
- Undertaking soakage testing in line with BRE Digest 365 guidance; and
- Undertaking infiltration calculations to allow for an assessment of the suitability of soakaways or infiltration techniques for the future development of the site.

It was understood that the proposed development will comprise an area of hardstanding to provide a temporary 'park and ride' service to facility the construction element of the 'Sizewell C' project.

A Site Location Plan, Drawing ref.4029,SK/003/Rev0, is presented at the end of this letter report in Appendix 4.

The purpose of this letter report is to provide factual data only.

2. Site Works

2.1 Methodology

This ground investigation was carried out on the basis of the practices set out in BRE Digest 365, 'Soakaway Design'. 2016, which requires, in summary, a total of three infiltration tests to be undertaken in succession over a 24-hour period or tests to be undertaken on consecutive days.

The exploratory holes were positioned through liaison with the client and other EDF stakeholders to provide a representative, site wide spread, whilst mitigating against ecological and archaeological interests within the area.

2.2 Scope

Site works were carried out between the 17 and 20 October 2019, and comprised the following:

- Excavation of four machine excavated trial pits, (TP01 to TP04), to depths ranging from 1.20m to 2.10m bgl;
- Undertaking infiltration testing in line with BRE Digest 365 guidance; and
- Undertaking infiltration calculations to allow for an assessment of the suitability of soakaways for the future development of the site.

An Exploratory Hole Location Plan, Drawing ref.4029,SK/004/Rev0, is presented at the end of this letter report in Appendix 4.

2.3 Ground Conditions Encountered

The sequence of the strata encountered during the investigation generally adheres to the geology, as cited by the British Geological Societies national geological mapping, particularly regarding the change in superficial geology from granular to cohesive.

The sequence and indicative thickness of strata are summarised in Table 1 below, with the Exploratory Hole Logs provided in Appendix 2:

Table 1 - Ground Conditions

Strata	Depth Encountered (m BGL)		Strata Thickness (m)	Location and Composition
	From	To		
Topsoil	0.00	0.17 – 0.29	0.17 – 0.29	All exploratory holes: Organic slightly clayey SAND containing flint gravel and frequent active roots.
Lowestoft Formation (Diamicton)	0.17 – 0.29	1.20 – 1.34	Proved to 1.03-1.15	TP01 – TP03: Stiff light brown and orangeish brown and grey slightly gravelly CLAY
Lowestoft Formation (Sands and Gravels)	0.26	2.10	Proved to 1.84	TP04 only: Orangeish brown and light brown, slightly clayey SAND containing flint gravel.

2.4 Groundwater

No groundwater was encountered in any of the exploratory holes during the intrusive investigation.

2.5 Infiltration Testing Results

Soil infiltration testing was undertaken in accordance with BRE 365, 2016. The results are summarised in Table 2 overleaf and are provided in full in Appendix 3, presented at the end of this letter report:

Summary of Soil Infiltration Results				
Location	**Test 1 (m/s)**	**Test 2 (m/s)**	**Test 3 (m/s)**	**Notes**
TP01	N/A	-	-	Negligible infiltration achieved in 60 hours
TP02	N/A	-	-	Negligible infiltration achieved in 60 hours
TP03	N/A	-	-	Negligible infiltration achieved in 60 hours
TP04	$3.13x10^{-5}$	$3.01x10^{-5}$	$2.53x10^{-5}$	

TP04, drained adequately and all three tests were able to be completed at this location. The other three locations, showed negligible infiltration and as such the second and third tests were unable to be completed on the same or consecutive days as per BRE365.

We trust the above is clear and acceptable. If you have any questions, please do not hesitate to contact us.

Yours sincerely,

[redacted]

James Donlin
Assistant Geo-Environmental Consultant.
Geosphere Environmental Ltd
jamesd@geosphere-environmental.co.uk

Enclosures:
Appendix 1 – Report Limitations and Conditions
Appendix 2 – Exploratory Hole Logs
Appendix 3 – Infiltration Testing Results
Appendix 4 – Drawings

GEOSPHERE ENVIRONMENTAL

APPENDICES

APPENDIX 1 – REPORT LIMITATIONS AND CONDITIONS

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report has been prepared for the sole use of the Client for the purposes described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

This report is prepared and written for the use stated herein; it should not be used for any other purposes without reference to Geosphere Environmental Limited. The report has been prepared in relation to the proposed end-use, should another end-use be intended, a further re-assessment may be required. It is likely that over time practises will improve and the relevant guidance and legislation be amended or superseded, which may necessitate a re-assessment of the site.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed onsite, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes discussed or on the possible presence of features based upon visual, verbal or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

GEOSPHERE ENVIRONMENTAL

APPENDIX 2 – EXPLORATORY HOLE LOGS

Trial Pit Logs
(TP01 to TP04)

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Brightwell, Suffolk, IP10 0BJ
Telephone: 01603 298076

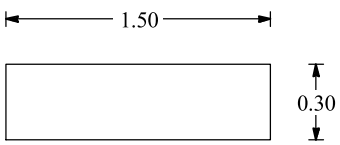
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Wickham Market	Royal Haskoning DHV	**TP01**

Job No	Date	Ground Level (m)	Coordinates ()
4029,SK	17-10-19 17-10-19		631566, 257316

Fieldwork By	Logged By	Sheet
GEL	JDo	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.17	Greyish brown slightly gravelly, slightly clayey, fine ORGANIC SAND. Gravel is fine and medium, subangular to subrounded flint. Frequent fine and medium active roots. (TOPSOIL)				
0.17-0.97	Stiff light brown and orangeish brown, slightly gravelly CLAY. Gravel is fine and medium, subrounded and subangular flint and chalk. (LOWESTOFT FORMATION DIAMICTON)				
0.97-1.20	Stiff brownish grey slightly gravelly CLAY. Gravel is fine and medium, subrounded chalk. (LOWESTOFT FORMATION DIAMICTON)				
1.20	End of exploratory hole.				



Shoring/Support: 20mm Gravel fill
Stability: Stable

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By GF

GEL AGS TP BETA 4029,SK WICKHAM MKT.GPJ GINT STD AGS 3_1.GDT 8/11/19

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Brightwell, Suffolk, IP10 0BJ
Telephone: 01603 298076

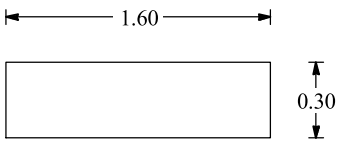
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Wickham Market	Royal Haskoning DHV	**TP02**

Job No	Date	Ground Level (m)	Coordinates ()
4029,SK	17-10-19 17-10-19		631644, 257386

Fieldwork By	Logged By	Sheet
GEL	JDo	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.29	Greyish brown slightly gravelly, slightly clayey, fine ORGANIC SAND. Gravel is fine and medium, subangular and subrounded flint. Frequent fine and medium active roots. (TOPSOIL)				
0.29-0.71	Stiff light brown and orangeish brown, slightly gravelly CLAY. Gravel is fine and medium, subangular to subrounded flint and chalk. (LOWESTOFT FORMATION DIAMICTON)				
0.71-1.34	Stiff brownish grey slightly gravelly CLAY. Gravel is fine and medium, subrounded chalk. (LOWESTOFT FORMATION DIAMICTON)				
1.34	End of exploratory hole.				



Shoring/Support: 20mm Gravel fill
Stability: Stable

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By GF

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Brightwell, Suffolk, IP10 0BJ
Telephone: 01603 298076

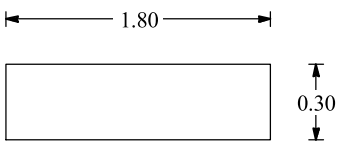
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Wickham Market	Royal Haskoning DHV	**TP03**

Job No	Date	Ground Level (m)	Coordinates ()
4029,SK	17-10-19 17-10-19		631579, 257432

Fieldwork By	Logged By	Sheet
GEL	JDo	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.24	Greyish brown slightly gravelly, slightly clayey, fine ORGANIC SAND. Gravel is fine and medium, subangular to subrounded flint. Frequent fine and medium active roots. (TOPSOIL)				
0.24-0.99	Stiff light brown and orangeish brown, slightly gravelly CLAY. Gravel is fine and medium, subrounded and subangular flint and chalk. (LOWESTOFT FORMATION DIAMICTON)				
0.99-1.30	0.92 - 1.01 Small pocket of sand on Eastern side wall 120mm in diameter.				
1.30	Stiff brownish grey slightly gravelly CLAY. Gravel is fine and medium, subrounded chalk. (LOWESTOFT FORMATION DIAMICTON)				
	End of exploratory hole.				



Shoring/Support: 20mm Gravel fill
Stability: Stable

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By GF

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road
Brightwell, Suffolk, IP10 0BJ
Telephone: 01603 298076

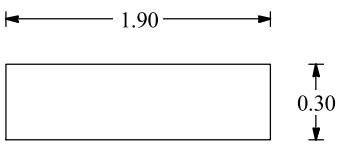
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Wickham Market	Royal Haskoning DHV	**TP04**

Job No	Date	Ground Level (m)	Coordinates ()
4029,SK	17-10-19 17-10-19		631635, 257660

Fieldwork By	Logged By	Sheet
GEL	JDo	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.26	Greyish brown slightly gravelly, slightly clayey, fine ORGANIC SAND. Gravel is fine and medium, subangular and subrounded flint with frequent fine and medium active roots. (TOPSOIL)				
0.26-0.63	Orangeish brown slightly gravelly, slightly clayey, fine to coarse SAND. Gravel is fine to coarse, subrounded and subangular flint. (LOWESTOFT FORMATION SAND AND GRAVEL)				
0.63-2.10	Light brown slightly gravelly, slightly clayey, fine SAND. Gravel is fine and medium, subangular and subrounded flint. (LOWESTOFT FORMATION SAND AND GRAVEL)				
2.10	End of exploratory hole.				



Shoring/Support: 20mm Gravel fill
Stability: Stable

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By GF

GEOSPHERE ENVIRONMENTAL

APPENDIX 3 – INFILTRATION TEST RESULTS

(TP01 to TP04)

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK,JDo,JD

Date: 08/11/2019

Project Name: Land at Wickham Market, close to IP13 0AB

Time [min]	Depth to Water [mbgl]
0	0.465
720	0.4691
1440	0.4903
2160	0.5097
2880	0.5305
3600	0.5491

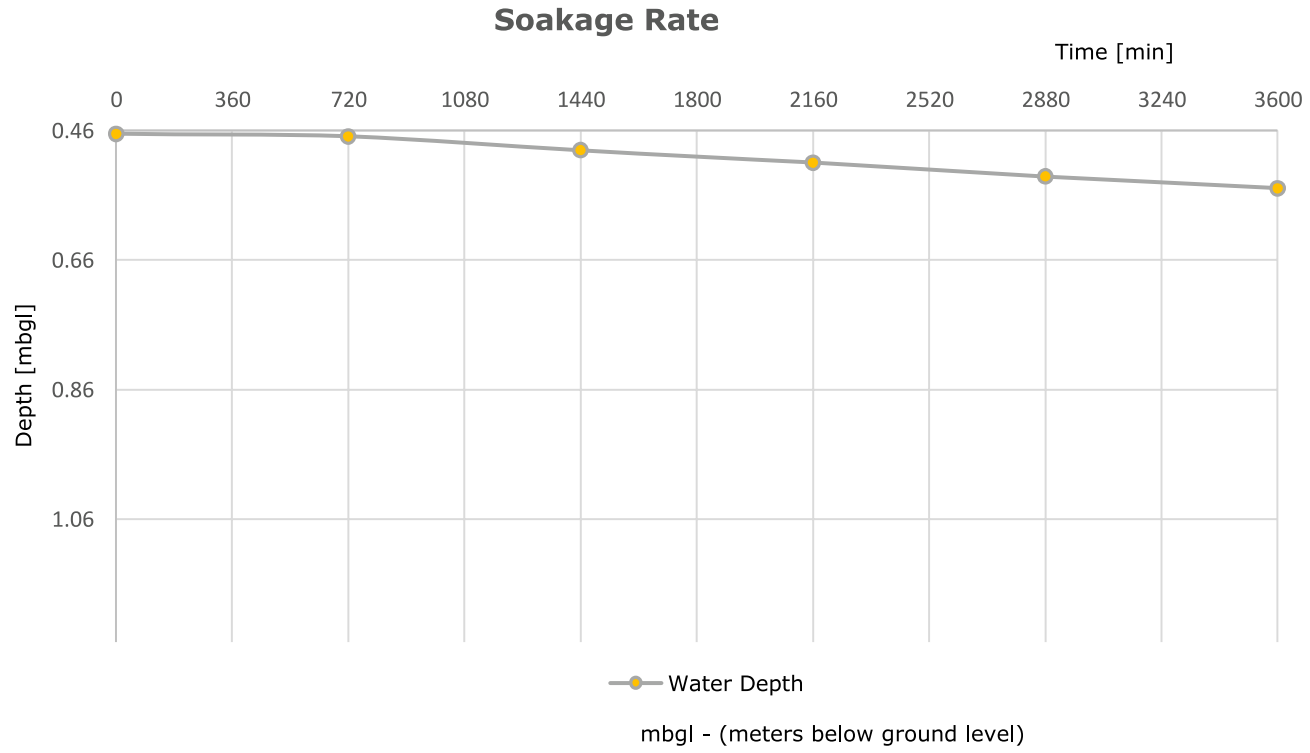
Pit Size [m]		
Length	**Width**	**Depth**
1.5	0.3	1.25

Trial Pit: TP01

Run: 1 of 1

Test Date: 17/10/2019 - 20/10/2019

Groundwater Encountered: n/a



Calculated by: JDo Checked by: GF

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

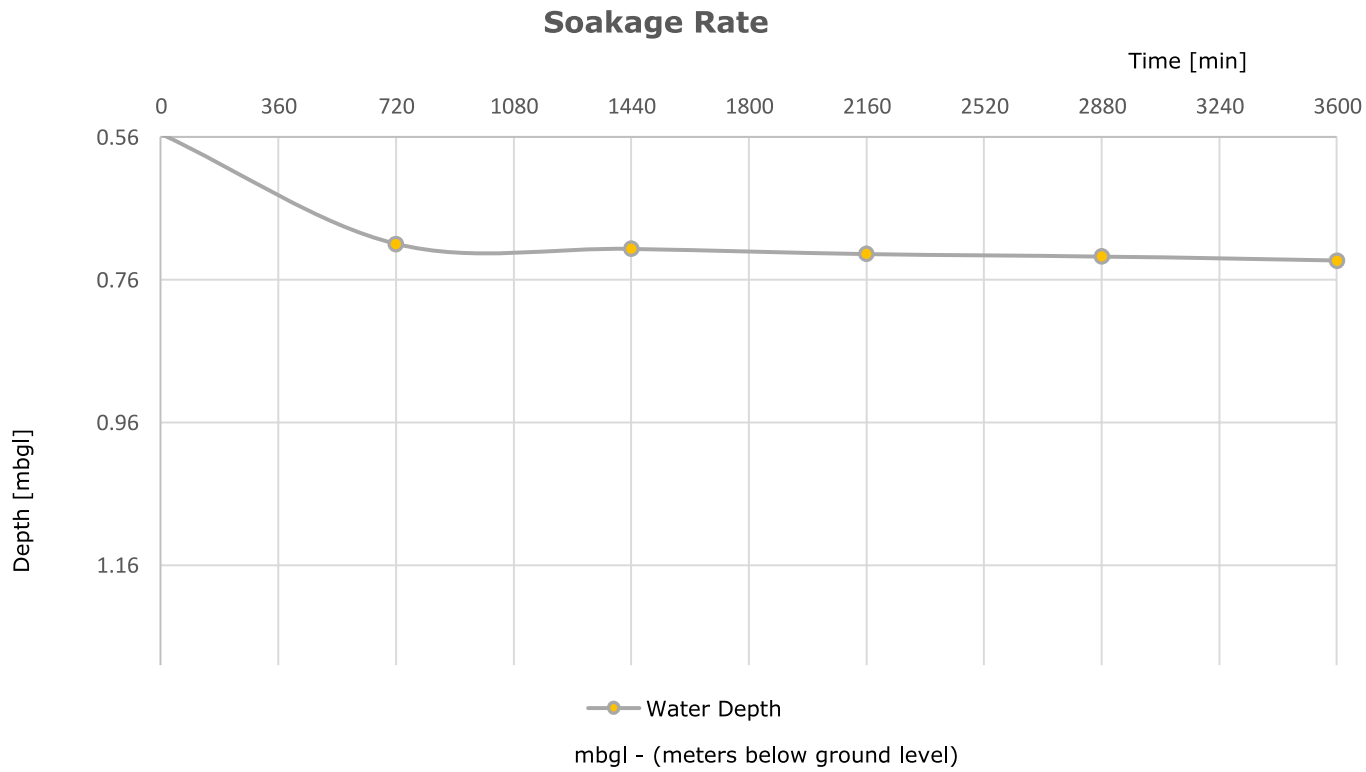
Project Number: 4029,SK,JDo,JD **Date:** 08/11/2019

Project Name: Land at Wickham Market, close to IP13 0AB

Time [min]	Depth to Water [mbgl]
0	0.56
720	0.71
1440	0.72
2160	0.72
2880	0.73
3600	0.73

Pit Size [m]		
Length	**Width**	**Depth**
1.6	0.3	1.30

Trial Pit: TP02
Run: 1 of 1
Test Date: 17/10/2019 - 20/10/2019
Groundwater Encountered: n/a



Calculated by: JDo Checked by: GF

TPSK02 / 03-10-18 / V2

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

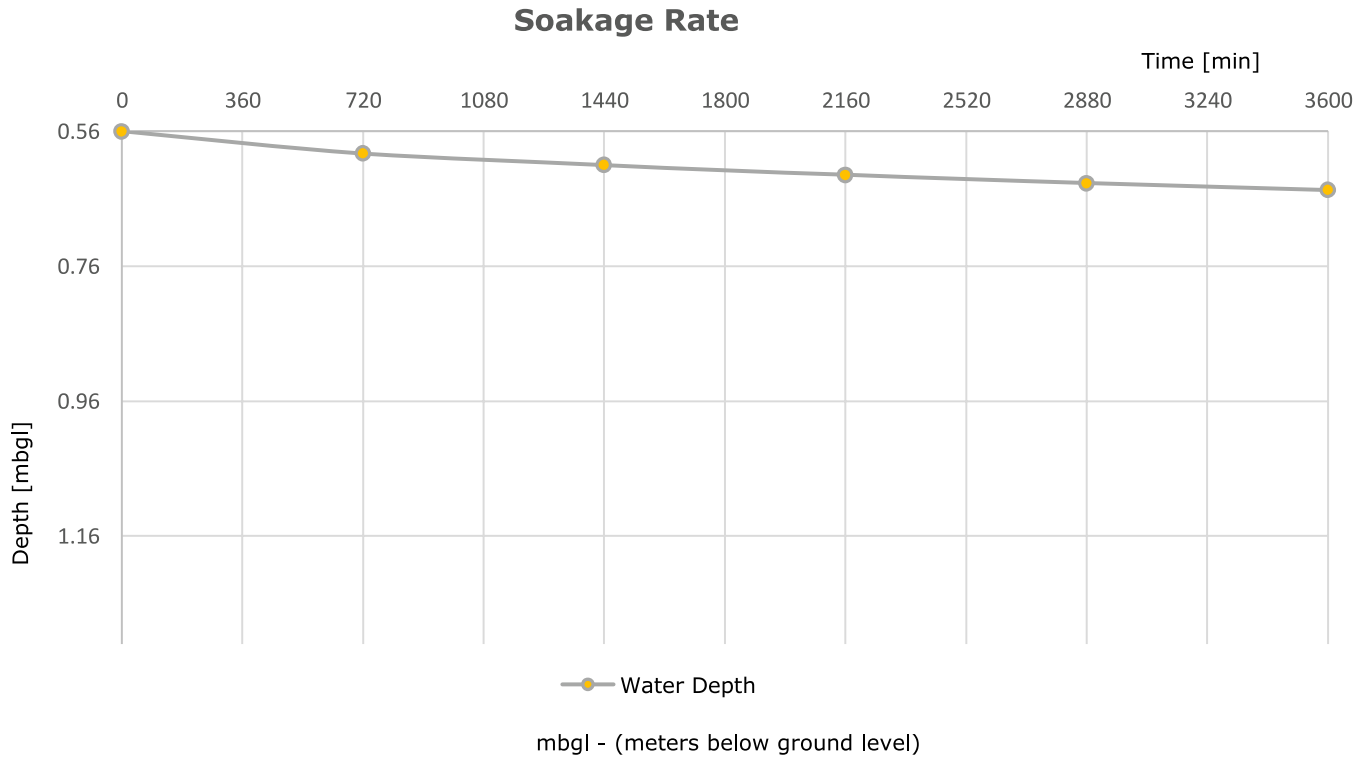
Project Number: 4029,SK,JDo,JD **Date:** 08/11/2019

Project Name: Land at Wickham Market, close to IP13 0AB

Time [min]	Depth to Water [mbgl]
0	0.56
720	0.59
1440	0.61
2160	0.62
2880	0.64
3600	0.65

Pit Size [m]		
Length	**Width**	**Depth**
1.8	0.3	1.32

Trial Pit: TP03
Run: 1 of 1
Test Date: 17/10/2019 - 20/10/2019
Groundwater Encountered: n/a



Calculated by: JDo Checked by: GF

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Project Name: Wickham Market

Date: 01/11/2019

Time [min]	Depth to Water [mbgl]
0	0.950
1	1.045
2	1.115
3	1.180
4	1.230
5	1.275
10	1.480
15	1.645
17	1.700
18	1.740
19	1.770
20	1.800
21	1.820

Pit Size [m]		
Length	Width	Depth
1.90	0.30	2.10

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.813
h_{25}	[m]	1.238
h_{75}-h_{25}	[m]	0.575
time		
t_{75}	[s]	1260.00
t_{25}	[s]	246.00
t_{75} - t_{25}	[s]	1014.00
effective volume		
v_{75-25}	[m^3]	0.098
effective area		
ap_{50}	[m^2]	3.100
soil infiltration rate		
f	[m/s]	3.13E-05

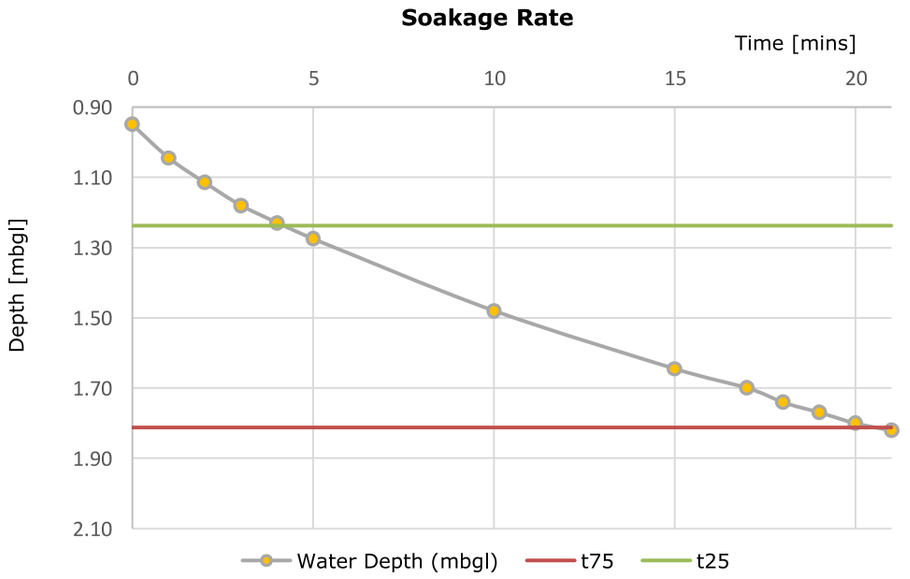
Trial Pit TP04

Run 1 of 3

Test Date 17/10/2019

Groundwater Encountered: N/A

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

Checked by: GF

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 01/11/2019

Project Name: Wickham Market

Time [min]	Depth to Water [mbgl]
0	1.250
1	1.280
2	1.325
3	1.360
4	1.400
5	1.440
10	1.610
15	1.750
18	1.820
19	1.850
20	1.865
22	1.890

Pit Size [m]		
Length	Width	Depth
1.90	0.30	2.10

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.888
h_{25}	[m]	1.463
h_{75}-h_{25}	[m]	0.425
time		
t_{75}	[s]	1320.00
t_{25}	[s]	330.00
t_{75} - t_{25}	[s]	990.00
effective volume		
v_{75-25}	[m^3]	0.073
effective area		
ap_{50}	[m^2]	2.440
soil infiltration rate		
f	[m/s]	3.01E-05

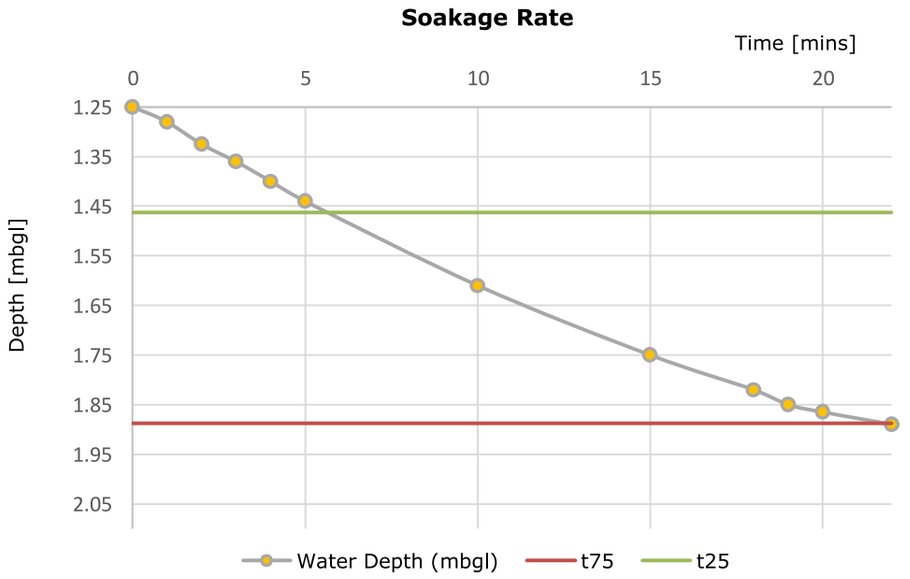
Trial Pit TP04

Run 2 of 3

Test Date 17/10/2019

Groundwater Encountered: N/A

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

Checked by: GF

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 01/11/2019

Project Name: Wickham Market

Time [min]	Depth to Water [mbgl]
0	1.250
1	1.290
2	1.330
3	1.360
4	1.390
5	1.420
10	1.545
15	1.690
20	1.790
22	1.825
25	1.87
30	1.94

Pit Size [m]		
Length	Width	Depth
1.90	0.30	2.10

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.888
h_{25}	[m]	1.463
h_{75}-h_{25}	[m]	0.425
time		
t_{75}	[s]	1578.00
t_{25}	[s]	402.00
t_{75} - t_{25}	[s]	1176.00
effective volume		
v_{75-25}	[m^3]	0.073
effective area		
ap_{50}	[m^2]	2.440
soil infiltration rate		
f	[m/s]	2.53E-05

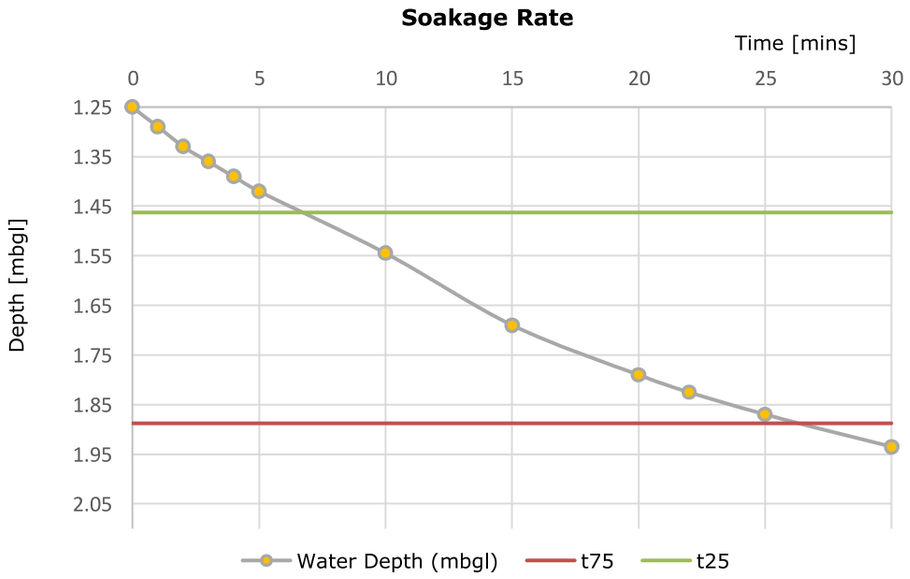
Trial Pit TP04

Run 3 of 3

Test Date 17/10/2019

Groundwater Encountered: N/A

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

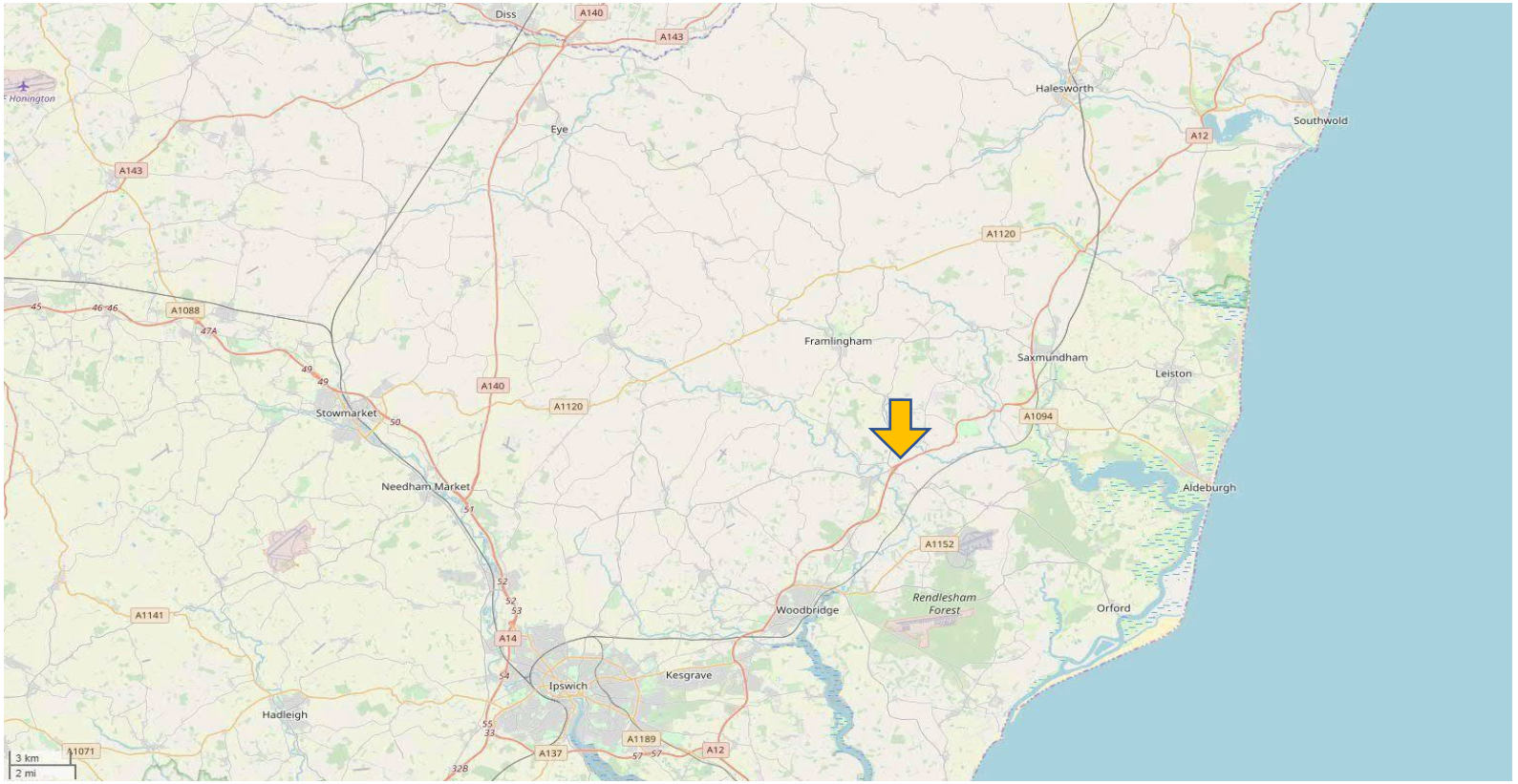
Checked by: GF

GEOSPHERE ENVIRONMENTAL

APPENDIX 4 – DRAWINGS

Site Location Plan - Drawing ref. 4029,SK/003/Rev0

Exploratory Hole Location Plan – Drawing ref. 4029,SK/004/Rev0



GEOSPHERE ENVIRONMENTAL

LEGEND

Site Location

SOURCE

© OpenStreetMap contributors

PROJECT

Land at IP17 3PL, IP13 0AB and IP10 0BP

TITLE

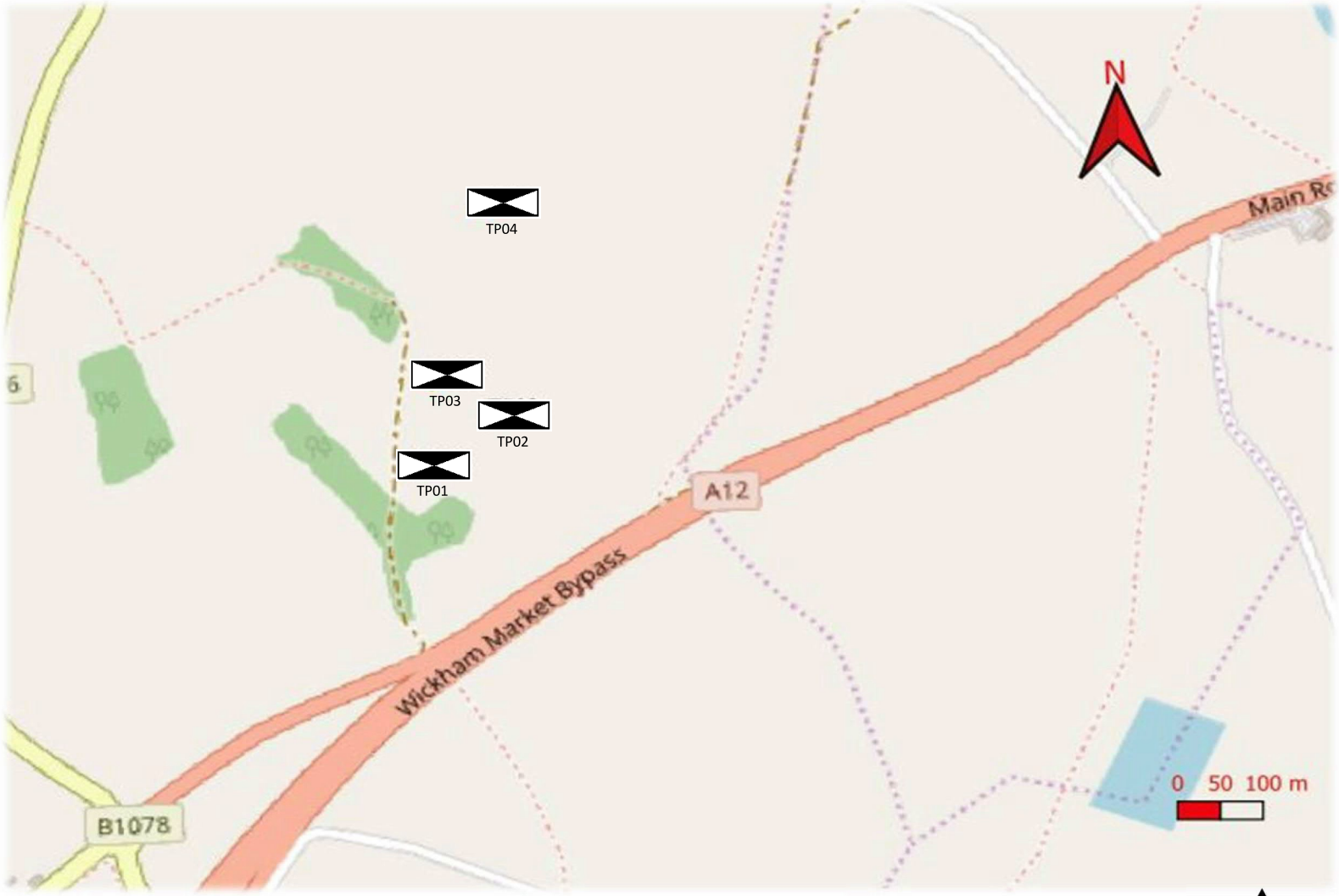
Site Location Plan - Wickham Market

DRAWING NUMBER

4029,SK/003/Rev0

SCALE	DATE
As marked	08/11/2019
DRAWN BY	**CHECKED BY**
JDo	GF

N



GEOSPHERE ENVIRONMENTAL

LEGEND

Trial Pit Location

SOURCE

© OpenStreetMap contributors

PROJECT

Land at IP17 3PL, IP13 0AB and IP10 0BP

TITLE

Exploratory Hole Location Plan - Wickham Market

DRAWING NUMBER

4029,SK/004/Rev0

SCALE	DATE
As marked	08/11/2019
DRAWN BY	**CHECKED BY**
JDo	GF

GEOSPHERE ENVIRONMENTAL

Ec Ecology.

Fr Flood Risk.

Ge Geotechnical.

En Environmental.

Kw Knotweed.

GEOSPHERE ENVIRONMENTAL LTD

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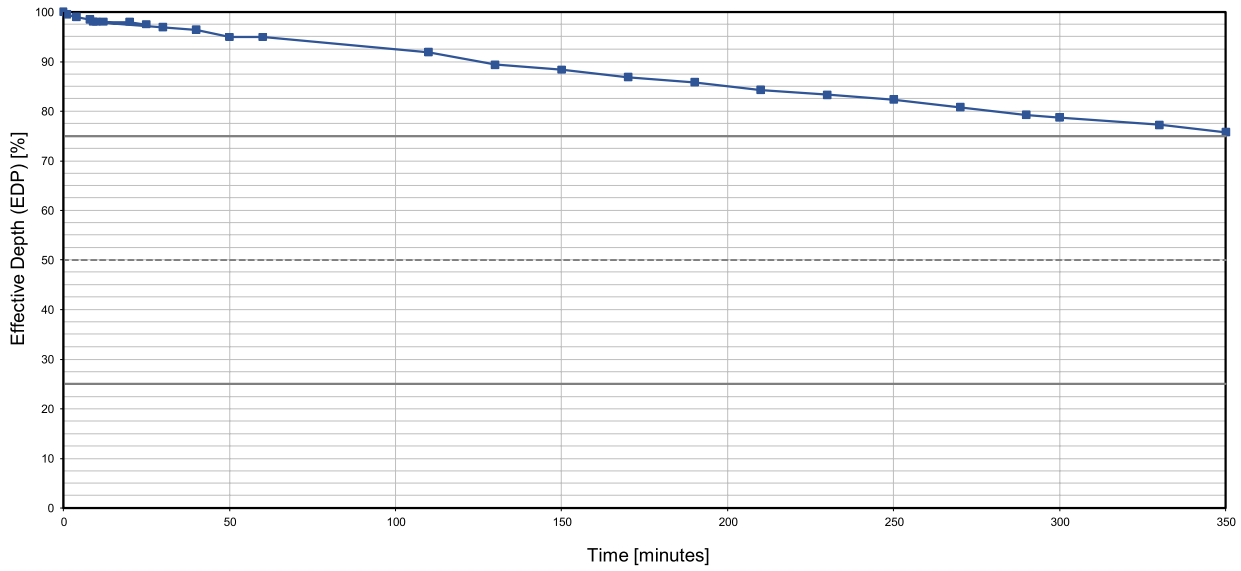
Sizewell C Associated Development: Northern and Southern Park and Ride, and Freight Mangement Facility Sites

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	8/1/2021	Operator	Ushie	Pit Depth	2.50 m	Location ID	WTP201



Test 1			Test 2			Test 3		
Start Time =	10:00		Start Time =			Start Time =		
Test Top =	0.52	m BGL	Test Top =		m BGL	Test Top =		m BGL
Test Base =	2.50	m BGL	Test Base =		m BGL	Test Base =		m BGL
75% EDP =	1.02	m BGL	75% EDP =		m BGL	75% EDP =		m BGL
50% EDP =	1.51	m BGL	50% EDP =		m BGL	50% EDP =		m BGL
25% EDP =	2.01	m BGL	25% EDP =		m BGL	25% EDP =		m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
0:00:00		0.52	100								
0:01:00		0.53	99								
0:04:00		0.54	99								
0:08:00		0.55	98								
0:09:00		0.56	98								
0:12:00		0.56	98								
0:20:00		0.56	98								
0:25:00		0.57	97								
0:10:00		0.56	98								
0:30:00		0.58	97								
0:40:00		0.59	96								
0:50:00		0.62	95								
1:00:00		0.62	95								
1:50:00		0.68	92								
2:10:00		0.73	89								
2:30:00		0.75	88								
2:50:00		0.78	87								
3:10:00		0.80	86								
3:30:00		0.83	84								
3:50:00		0.85	83								
4:10:00		0.87	82								
4:30:00		0.90	81								
4:50:00		0.93	79								
5:00:00		0.94	79								
5:30:00		0.97	77								
5:50:00		1.00	76								

Datum (-ve denotes AGL) = 0.00 m BGL.
Ground Level taken as Datum.

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

Contract No. F187026

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	8/1/2021	Operator	Ushie	Pit Depth	2.50 m	Location ID	WTP201

Test Details

Datum (-ve denotes AGL) =	0.00 m BGL	Well Screen	
		Well screen not used	
Pit Length =	3.60 m	Filter Material	
Pit Width =	0.80 m	Assumed Solid Fraction =	57.13 %
Pit Depth =	2.50 m BGL	Assumed Porosity =	42.87 %

Weather: Sunny

Geology: Stiff orange CLAY with chalk gravel

Remarks

Test 1 rand for 5:30 hours and did not quite reach 75 % effective depth. Test 2 and 3 were cancelled by the Investigation Supervisor.

Infiltration rate was not able to be calculated.

Calculation

	Test 1		Test 2		Test 3	
Start Time =	10:00		Start Time =		Start Time =	
Test Top =	0.52	m BGL	Test Top =	m BGL	Test Top =	m BGL
Test Base =	2.50	m BGL	Test Base =	m BGL	Test Base =	m BGL
EDP =	1.98	m	EDP =	m	EDP =	m
75% EDP =	1.02	m BGL	75% EDP =	m BGL	75% EDP =	m BGL
50% EDP =	1.51	m BGL	50% EDP =	m BGL	50% EDP =	m BGL
25% EDP =	2.01	m BGL	25% EDP =	m BGL	25% EDP =	m BGL
V =	5.70	m^3	V =	m^3	V =	m^3
Vg =	1.97	m^3	Vg =	m^3	Vg =	m^3
Vp =	3.73	m^3	Vp =	m^3	Vp =	m^3
Vp75-25 =	1.86	m^3	Vp75-25 =	m^3	Vp75-25 =	m^3
ap =	11.59	m^2	ap =	m^2	ap =	m^2
Tp75 =		s	Tp75 =	s	Tp75 =	s
Tp25 =		s	Tp25 =	s	Tp25 =	s
Infiltration Rate, f =		m/s	Infiltration Rate, f =	m/s	Infiltration Rate, f =	m/s

Notes: Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of the pit.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

NNB GENERATION COMPANY (SZC) LIMITED
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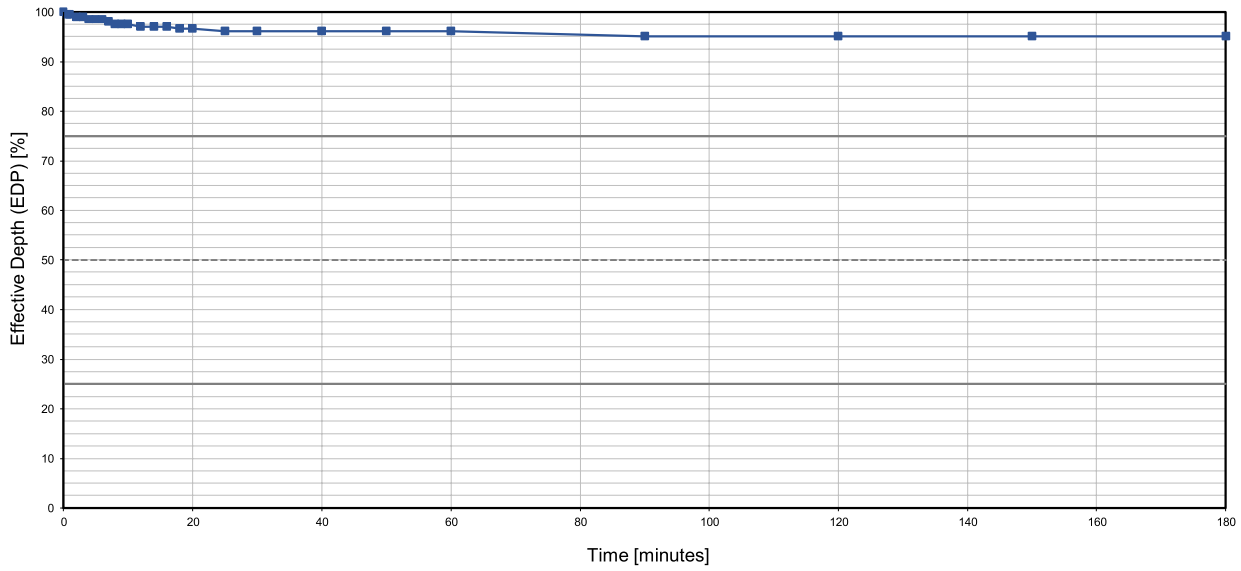
SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	8/3/2021	Operator	JL	Pit Depth	2.50 m	Location ID	WTP203



	Test 1		Test 2		Test 3	
Start Time =	9:40		Start Time =		Start Time =	
Test Top =	0.42	m BGL	Test Top =	m BGL	Test Top =	m BGL
Test Base =	2.50	m BGL	Test Base =	m BGL	Test Base =	m BGL
75% EDP =	0.94	m BGL	75% EDP =	m BGL	75% EDP =	m BGL
50% EDP =	1.46	m BGL	50% EDP =	m BGL	50% EDP =	m BGL
25% EDP =	1.98	m BGL	25% EDP =	m BGL	25% EDP =	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
0:00:00		0.42	100								
0:00:30		0.43	100								
0:01:00		0.43	100								
0:02:00		0.44	99								
0:03:00		0.44	99								
0:04:00		0.45	99								
0:05:00		0.45	99								
0:06:00		0.45	99								
0:07:00		0.46	98								
0:08:00		0.47	98								
0:09:00		0.47	98								
0:10:00		0.47	98								
0:12:00		0.48	97								
0:14:00		0.48	97								
0:16:00		0.48	97								
0:18:00		0.49	97								
0:20:00		0.49	97								
0:25:00		0.50	96								
0:30:00		0.50	96								
0:40:00		0.50	96								
0:50:00		0.50	96								
1:00:00		0.50	96								
1:30:00		0.52	95								
2:00:00		0.52	95								
2:30:00		0.52	95								
3:00:00		0.52	95								

Datum (-ve denotes AGL) = 0.00 m BGL.
Ground Level taken as Datum.

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

Contract No. F187026

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	8/3/2021	Operator	JL	Pit Depth	2.50 m	Location ID	WTP203

Test Details

Datum (-ve denotes AGL) =	0.00	m BGL	Well Screen Well screen not used
Pit Length =	2.70	m	Filter Material
Pit Width =	0.55	m	Filter not used
Pit Depth =	2.50	m BGL	

Weather: Hot

Geology: CLAY over SAND

Remarks

Test 2 and 3 were cancelled by the Investgation Supervisor.

Test 1 did not reach 75 % effective depth, infitration rate could not be calculated.

Calculation

	Test 1		Test 2		Test 3	
Start Time =	9:40		Start Time =		Start Time =	
Test Top =	0.42	m BGL	Test Top =	m BGL	Test Top =	m BGL
Test Base =	2.50	m BGL	Test Base =	m BGL	Test Base =	m BGL
EDP =	2.08	m	EDP =	m	EDP =	m
75% EDP =	0.94	m BGL	75% EDP =	m BGL	75% EDP =	m BGL
50% EDP =	1.46	m BGL	50% EDP =	m BGL	50% EDP =	m BGL
25% EDP =	1.98	m BGL	25% EDP =	m BGL	25% EDP =	m BGL
V =	3.09	m^3	V =	m^3	V =	m^3
Vg =		m^3	Vg =	m^3	Vg =	m^3
Vp =		m^3	Vp =	m^3	Vp =	m^3
Vp75-25 =	1.54	m^3	Vp75-25 =	m^3	Vp75-25 =	m^3
ap =	8.25	m^2	ap =	m^2	ap =	m^2
Tp75 =		s	Tp75 =	s	Tp75 =	s
Tp25 =		s	Tp25 =	s	Tp25 =	s
Infiltration Rate, f =		m/s	Infiltration Rate, f =	m/s	Infiltration Rate, f =	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of the pit.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

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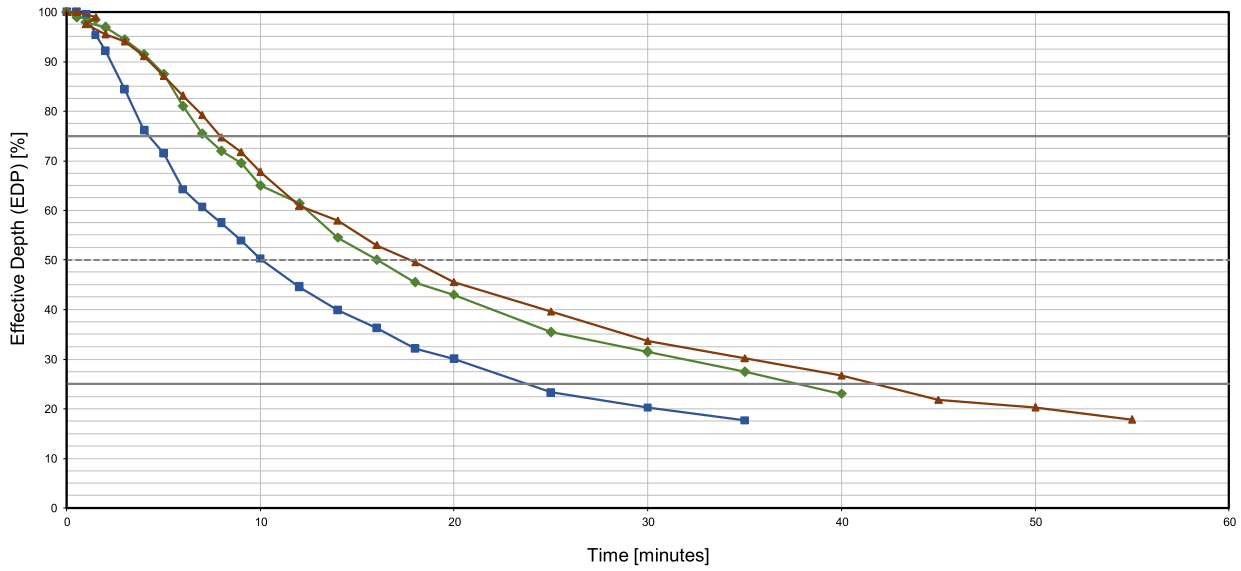
Sizewell C Associated Developments: Nothern and Southern Park and Ride, and Frieght Management Facility Sites

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	8/4/2021	Operator	HS	Pit Depth	2.50 m	Location ID	WTP209



Test 1			Test 2			Test 3		
Start Time =	11:41		Start Time =	12:18		Start Time =	13:10	
Test Top =	0.57	m BGL	Test Top =	0.50	m BGL	Test Top =	0.48	m BGL
Test Base =	2.50	m BGL	Test Base =	2.50	m BGL	Test Base =	2.50	m BGL
75% EDP =	1.05	m BGL	75% EDP =	1.00	m BGL	75% EDP =	0.99	m BGL
50% EDP =	1.54	m BGL	50% EDP =	1.50	m BGL	50% EDP =	1.49	m BGL
25% EDP =	2.02	m BGL	25% EDP =	2.00	m BGL	25% EDP =	2.00	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
0:00:00	1.47	0.57	100	0:00:00	1.40	0.50	100	0:00:00	1.38	0.48	100
0:00:30	1.47	0.57	100	0:00:30	1.42	0.52	99	0:00:30	1.38	0.48	100
0:01:00	1.48	0.58	99	0:01:30	1.43	0.53	99	0:01:30	1.40	0.50	99
0:01:30	1.56	0.66	95	0:01:00	1.44	0.54	98	0:01:00	1.43	0.53	98
0:02:00	1.62	0.72	92	0:02:00	1.46	0.56	97	0:02:00	1.47	0.57	96
0:03:00	1.77	0.87	84	0:03:00	1.51	0.61	95	0:03:00	1.50	0.60	94
0:04:00	1.93	1.03	76	0:04:00	1.57	0.67	92	0:04:00	1.56	0.66	91
0:05:00	2.02	1.12	72	0:05:00	1.65	0.75	88	0:05:00	1.64	0.74	87
0:06:00	2.16	1.26	64	0:06:00	1.78	0.88	81	0:06:00	1.72	0.82	83
0:07:00	2.23	1.33	61	0:07:00	1.89	0.99	76	0:07:00	1.80	0.90	79
0:08:00	2.29	1.39	58	0:08:00	1.96	1.06	72	0:08:00	1.89	0.99	75
0:09:00	2.36	1.46	54	0:09:00	2.01	1.11	70	0:09:00	1.95	1.05	72
0:10:00	2.43	1.53	50	0:10:00	2.10	1.20	65	0:10:00	2.03	1.13	68
0:12:00	2.54	1.64	45	0:12:00	2.17	1.27	62	0:12:00	2.17	1.27	61
0:14:00	2.63	1.73	40	0:14:00	2.31	1.41	55	0:14:00	2.23	1.33	58
0:16:00	2.70	1.80	36	0:16:00	2.40	1.50	50	0:16:00	2.33	1.43	53
0:18:00	2.78	1.88	32	0:18:00	2.49	1.59	46	0:18:00	2.40	1.50	50
0:20:00	2.82	1.92	30	0:20:00	2.54	1.64	43	0:20:00	2.48	1.58	46
0:25:00	2.95	2.05	23	0:25:00	2.69	1.79	36	0:25:00	2.60	1.70	40
0:30:00	3.01	2.11	20	0:30:00	2.77	1.87	32	0:30:00	2.72	1.82	34
0:35:00	3.06	2.16	18	0:35:00	2.85	1.95	28	0:35:00	2.79	1.89	30
				0:40:00	2.94	2.04	23	0:40:00	2.86	1.96	27
								0:45:00	2.96	2.06	22
								0:50:00	2.99	2.09	20
								0:55:00	3.04	2.14	18

Datum (-ve denotes AGL) = -0.90 m BGL.

Water depth measurements were taken from the Datum Level chosen on field, then converted to referencing Ground Level for calculations.

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

Contract No. F187026

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	8/4/2021	Operator	HS	Pit Depth	2.50 m	Location ID	WTP209

Test Details

Datum (-ve denotes AGL) =	-0.90 m BGL	Well Screen	
		Well screen not used	
Pit Length =	3.20 m	Filter Material	
Pit Width =	0.90 m	Assumed Solid Fraction =	57.13 %
Pit Depth =	2.50 m BGL	Assumed Porosity =	42.87 %

Weather: Warm, dry, clear, light wind

Geology: Gravelly SAND

Remarks

Calculation

Test 1			Test 2			Test 3		
Start Time =	11:41		Start Time =	12:18		Start Time =	13:10	
Test Top =	0.57	m BGL	Test Top =	0.50	m BGL	Test Top =	0.48	m BGL
Test Base =	2.50	m BGL	Test Base =	2.50	m BGL	Test Base =	2.50	m BGL
EDP =	1.93	m	EDP =	2.00	m	EDP =	2.02	m
75% EDP =	1.05	m BGL	75% EDP =	1.00	m BGL	75% EDP =	0.99	m BGL
50% EDP =	1.54	m BGL	50% EDP =	1.50	m BGL	50% EDP =	1.49	m BGL
25% EDP =	2.02	m BGL	25% EDP =	2.00	m BGL	25% EDP =	2.00	m BGL
V =	5.56	m^3	V =	5.76	m^3	V =	5.82	m^3
Vg =	3.46	m^3	Vg =	3.46	m^3	Vg =	3.46	m^3
Vp =	2.10	m^3	Vp =	2.30	m^3	Vp =	2.36	m^3
Vp75-25 =	1.05	m^3	Vp75-25 =	1.15	m^3	Vp75-25 =	1.18	m^3
ap =	10.79	m^2	ap =	11.08	m^2	ap =	11.16	m^2
Tp75 =	240	s	Tp75 =	450	s	Tp75 =	480	s
Tp25 =	1410	s	Tp25 =	2250	s	Tp25 =	2520	s
Infiltration Rate, f =	8.33E-05	m/s	Infiltration Rate, f =	5.78E-05	m/s	Infiltration Rate, f =	5.19E-05	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of the pit.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$

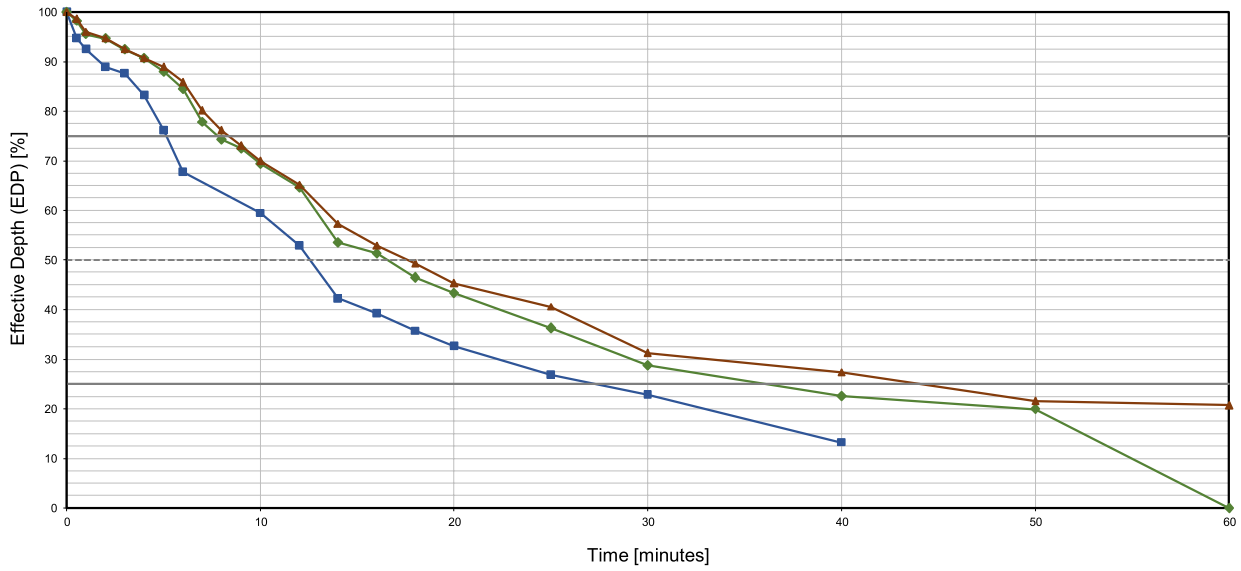
Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

NNB GENERATION COMPANY (SZC) LIMITED
Sizewell C Associated Developments: Northern and Southern Park and Ride, and Freight Management Facility Sites

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	8/4/2021	Operator	AD	Pit Depth	3.50 m	Location ID	WTP210



Test 1			Test 2			Test 3		
Start Time =	9:26		Start Time =	10:10		Start Time =	11:15	
Test Top =	1.23	m BGL	Test Top =	1.24	m BGL	Test Top =	1.23	m BGL
Test Base =	3.50	m BGL	Test Base =	3.50	m BGL	Test Base =	3.50	m BGL
75% EDP =	1.80	m BGL	75% EDP =	1.81	m BGL	75% EDP =	1.80	m BGL
50% EDP =	2.37	m BGL	50% EDP =	2.37	m BGL	50% EDP =	2.37	m BGL
25% EDP =	2.93	m BGL	25% EDP =	2.94	m BGL	25% EDP =	2.93	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
0:00:00		1.23	100	0:00:00		1.24	100	0:00:00		1.23	100
0:00:30		1.35	95	0:00:30		1.28	98	0:00:30		1.26	99
0:01:00		1.40	93	0:01:00		1.34	96	0:01:00		1.32	96
0:02:00		1.48	89	0:02:00		1.36	95	0:02:00		1.35	95
0:03:00		1.51	88	0:03:00		1.41	92	0:03:00		1.40	93
0:04:00		1.61	83	0:04:00		1.45	91	0:04:00		1.44	91
0:05:00		1.77	76	0:05:00		1.51	88	0:05:00		1.48	89
0:06:00		1.96	68	0:06:00		1.59	85	0:06:00		1.55	86
0:10:00		2.15	59	0:07:00		1.74	78	0:07:00		1.68	80
0:12:00		2.30	53	0:08:00		1.82	74	0:08:00		1.77	76
0:14:00		2.54	42	0:09:00		1.86	73	0:09:00		1.84	73
0:16:00		2.61	39	0:10:00		1.93	69	0:10:00		1.91	70
0:18:00		2.69	36	0:12:00		2.04	65	0:12:00		2.02	65
0:20:00		2.76	33	0:14:00		2.29	54	0:14:00		2.20	57
0:25:00		2.89	27	0:16:00		2.34	51	0:16:00		2.30	53
0:30:00		2.98	23	0:18:00		2.45	46	0:18:00		2.38	49
0:40:00		3.20	13	0:20:00		2.52	43	0:20:00		2.47	45
				0:25:00		2.68	36	0:25:00		2.58	41
				0:30:00		2.85	29	0:30:00		2.79	31
				0:40:00		2.99	23	0:40:00		2.88	27
				0:50:00		3.05	20	0:50:00		3.01	22
				1:00:00				1:00:00		3.03	21

Datum (-ve denotes AGL) = 0.00 m BGL.
Ground Level taken as Datum.

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

Contract No. F181377

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	8/4/2021	Operator	AD	Pit Depth	3.50 m	Location ID	WTP210

Test Details

Datum (-ve denotes AGL) =	0.00	m BGL	Well Screen Well screen not used
Pit Length =	4.00	m	Filter Material
Pit Width =	0.65	m	Filter not used
Pit Depth =	3.50	m BGL	
Weather	Warm, dry		
Geology	SAND		
Remarks			

Calculation

Test 1			Test 2			Test 3		
Start Time =	9:26		Start Time =	10:10		Start Time =	11:15	
Test Top =	1.23	m BGL	Test Top =	1.24	m BGL	Test Top =	1.23	m BGL
Test Base =	3.50	m BGL	Test Base =	3.50	m BGL	Test Base =	3.50	m BGL
EDP =	2.27	m	EDP =	2.26	m	EDP =	2.27	m
75% EDP =	1.80	m BGL	75% EDP =	1.81	m BGL	75% EDP =	1.80	m BGL
50% EDP =	2.37	m BGL	50% EDP =	2.37	m BGL	50% EDP =	2.37	m BGL
25% EDP =	2.93	m BGL	25% EDP =	2.94	m BGL	25% EDP =	2.93	m BGL
V =	5.90	m^3	V =	5.88	m^3	V =	5.90	m^3
Vg =		m^3	Vg =		m^3	Vg =		m^3
Vp =		m^3	Vp =		m^3	Vp =		m^3
Vp75-25 =	2.95	m^3	Vp75-25 =	2.94	m^3	Vp75-25 =	2.95	m^3
ap =	13.16	m^2	ap =	13.11	m^2	ap =	13.16	m^2
Tp75 =	300	s	Tp75 =	480	s	Tp75 =	540	s
Tp25 =	1620	s	Tp25 =	2160	s	Tp25 =	2640	s
Infiltration Rate, f =	1.70E-04	m/s	Infiltration Rate, f =	1.33E-04	m/s	Infiltration Rate, f =	1.07E-04	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of the pit.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$

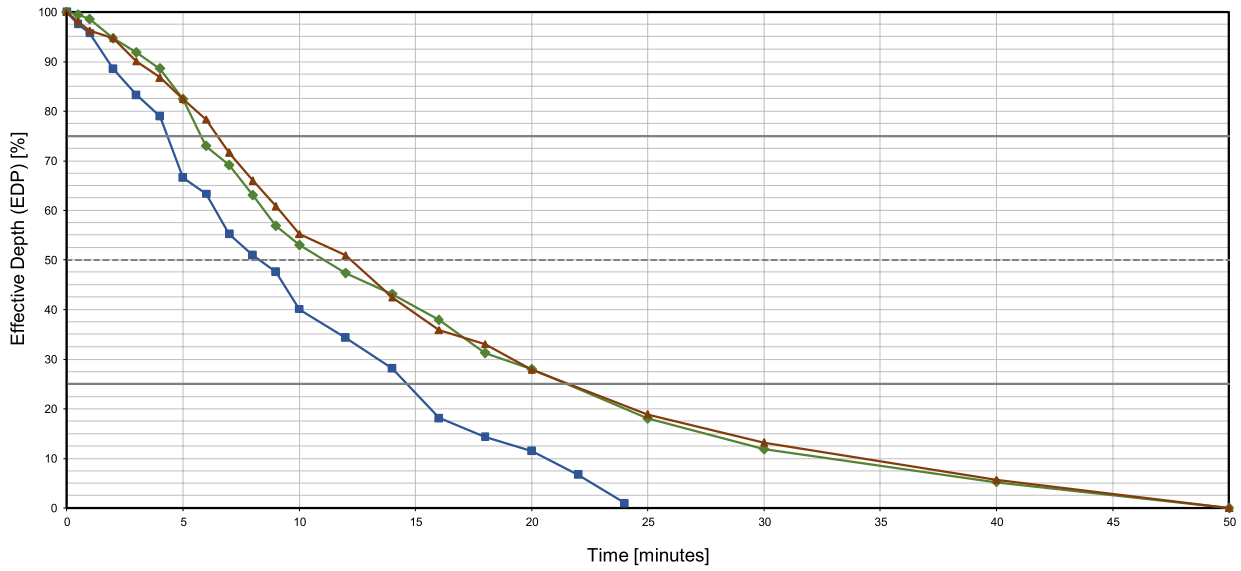
Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

NNB GENERATION COMPANY (SZC) LIMITED
Sizewell C Associated Devlopments: Northernand Southern Park and Ride, and Freight Management Facility Sites

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	8/5/2021	Operator	AH	Pit Depth	2.60 m	Location ID	WTP215



Test 1			Test 2			Test 3		
Start Time =	10:42		Start Time =	11:39		Start Time =	12:30	
Test Top =	0.50	m BGL	Test Top =	0.49	m BGL	Test Top =	0.48	m BGL
Test Base =	2.60	m BGL	Test Base =	2.60	m BGL	Test Base =	2.60	m BGL
75% EDP =	1.03	m BGL	75% EDP =	1.02	m BGL	75% EDP =	1.01	m BGL
50% EDP =	1.55	m BGL	50% EDP =	1.55	m BGL	50% EDP =	1.54	m BGL
25% EDP =	2.08	m BGL	25% EDP =	2.07	m BGL	25% EDP =	2.07	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
0:00:00		0.50	100	0:00:00		0.49	100	0:00:00		0.48	100
0:00:30		0.55	98	0:00:30		0.50	100	0:00:30		0.52	98
0:01:00		0.59	96	0:01:00		0.52	99	0:01:00		0.56	96
0:02:00		0.74	89	0:02:00		0.60	95	0:02:00		0.59	95
0:03:00		0.85	83	0:03:00		0.66	92	0:03:00		0.69	90
0:04:00		0.94	79	0:04:00		0.73	89	0:04:00		0.76	87
0:05:00		1.20	67	0:05:00		0.86	82	0:05:00		0.85	83
0:06:00		1.27	63	0:06:00		1.06	73	0:06:00		0.94	78
0:07:00		1.44	55	0:07:00		1.14	69	0:07:00		1.08	72
0:08:00		1.53	51	0:08:00		1.27	63	0:08:00		1.20	66
0:09:00		1.60	48	0:09:00		1.40	57	0:09:00		1.31	61
0:10:00		1.76	40	0:10:00		1.48	53	0:10:00		1.43	55
0:12:00		1.88	34	0:12:00		1.60	47	0:12:00		1.52	51
0:14:00		2.01	28	0:14:00		1.69	43	0:14:00		1.70	42
0:16:00		2.22	18	0:16:00		1.80	38	0:16:00		1.84	36
0:18:00		2.30	14	0:18:00		1.94	31	0:18:00		1.90	33
0:20:00		2.36	11	0:20:00		2.01	28	0:20:00		2.01	28
0:22:00		2.46	7	0:25:00		2.22	18	0:25:00		2.20	19
0:24:00		2.58	1	0:30:00		2.35	12	0:30:00		2.32	13
				0:40:00		2.49	5	0:40:00		2.48	6
				0:50:00		2.60	0	0:50:00		2.60	0

Datum (-ve denotes AGL) = 0.00 m BGL.
Ground Level taken as Datum.

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

Contract No. F187026

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	8/5/2021	Operator	AH	Pit Depth	2.60 m	Location ID	WTP215

Test Details

Datum (-ve denotes AGL) =	0.00 m BGL	Well Screen	
		Well screen not used	
Pit Length =	6.00 m	Filter Material	
Pit Width =	0.80 m	Assumed Solid Fraction =	57.13 %
Pit Depth =	2.60 m BGL	Assumed Porosity =	42.87 %

Weather: Hot

Geology: SAND and GRAVEL

Remarks

Due to fast sakaway during test 1, reading intervals were increased.

Calculation

Test 1			Test 2			Test 3		
Start Time =	10:42		Start Time =	11:39		Start Time =	12:30	
Test Top =	0.50	m BGL	Test Top =	0.49	m BGL	Test Top =	0.48	m BGL
Test Base =	2.60	m BGL	Test Base =	2.60	m BGL	Test Base =	2.60	m BGL
EDP =	2.10	m	EDP =	2.11	m	EDP =	2.12	m
75% EDP =	1.03	m BGL	75% EDP =	1.02	m BGL	75% EDP =	1.01	m BGL
50% EDP =	1.55	m BGL	50% EDP =	1.55	m BGL	50% EDP =	1.54	m BGL
25% EDP =	2.08	m BGL	25% EDP =	2.07	m BGL	25% EDP =	2.07	m BGL
V =	10.08	m^3	V =	10.13	m^3	V =	10.18	m^3
Vg =	4.94	m^3	Vg =	4.94	m^3	Vg =	4.94	m^3
Vp =	5.14	m^3	Vp =	5.19	m^3	Vp =	5.24	m^3
Vp75-25 =	2.57	m^3	Vp75-25 =	2.60	m^3	Vp75-25 =	2.62	m^3
ap =	19.08	m^2	ap =	19.15	m^2	ap =	19.22	m^2
Tp75 =	270	s	Tp75 =	345	s	Tp75 =	390	s
Tp25 =	870	s	Tp25 =	1290	s	Tp25 =	1290	s
Infiltration Rate, f =	2.25E-04	m/s	Infiltration Rate, f =	1.43E-04	m/s	Infiltration Rate, f =	1.51E-04	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of the pit.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

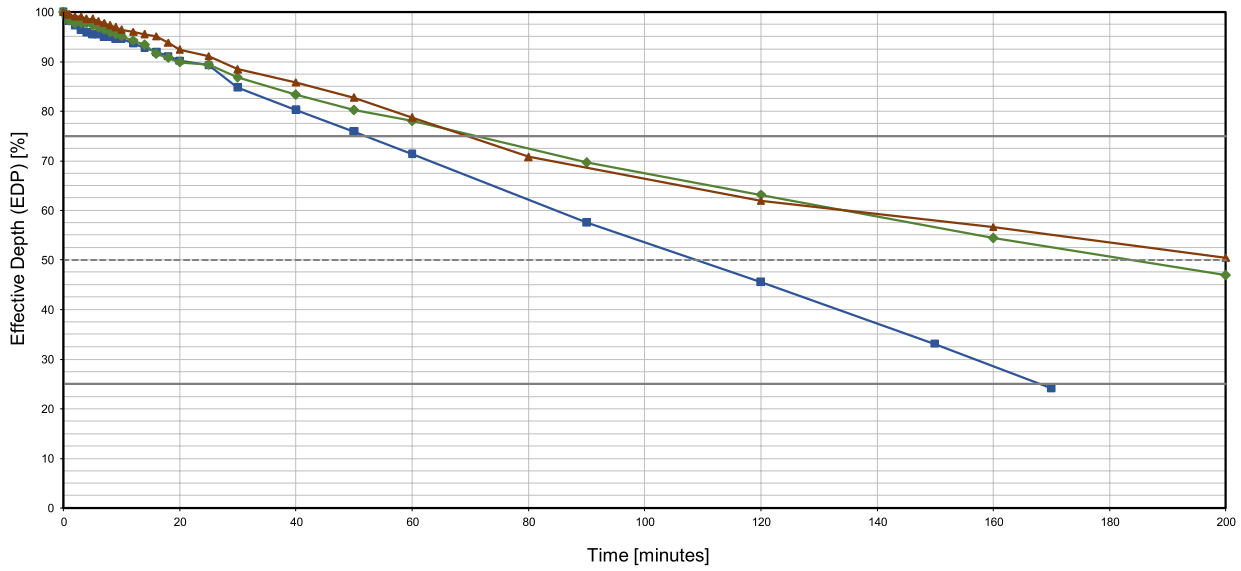
NNB GENERATION COMPANY (SZC) LIMITED

Sizewell C Associated Developments: Nothern and Southern Park and Ride, and Frieght Management Faciliy Sites

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	7/27/2021	Operator	AH	Pit Depth	2.50 m	Location ID	WTP217



Test 1			Test 2			Test 3		
Start Time =	11:50		Start Time =	13:50		Start Time =	9:35	
Test Top =	0.26	m BGL	Test Top =	0.22	m BGL	Test Top =	0.24	m BGL
Test Base =	2.50	m BGL	Test Base =	2.50	m BGL	Test Base =	2.50	m BGL
75% EDP =	0.82	m BGL	75% EDP =	0.79	m BGL	75% EDP =	0.81	m BGL
50% EDP =	1.38	m BGL	50% EDP =	1.36	m BGL	50% EDP =	1.37	m BGL
25% EDP =	1.94	m BGL	25% EDP =	1.93	m BGL	25% EDP =	1.94	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
0:00:00		0.26	100	0:00:00		0.22	100	0:00:00		0.24	100
0:00:30		0.28	99	0:00:30		0.24	99	0:00:30		0.25	100
0:01:00		0.30	98	0:01:00		0.26	98	0:01:00		0.25	100
0:02:00		0.32	97	0:02:00		0.27	98	0:02:00		0.26	99
0:03:00		0.34	96	0:03:00		0.27	98	0:03:00		0.26	99
0:04:00		0.35	96	0:04:00		0.27	98	0:04:00		0.27	99
0:05:00		0.36	96	0:05:00		0.28	97	0:05:00		0.27	99
0:06:00		0.36	96	0:06:00		0.29	97	0:06:00		0.28	98
0:07:00		0.37	95	0:07:00		0.30	96	0:07:00		0.29	98
0:08:00		0.37	95	0:08:00		0.31	96	0:08:00		0.30	97
0:09:00		0.38	95	0:09:00		0.32	96	0:09:00		0.31	97
0:10:00		0.38	95	0:10:00		0.33	95	0:10:00		0.32	96
0:12:00		0.40	94	0:12:00		0.35	94	0:12:00		0.33	96
0:14:00		0.42	93	0:14:00		0.37	93	0:14:00		0.34	96
0:16:00		0.44	92	0:16:00		0.41	92	0:16:00		0.35	95
0:18:00		0.46	91	0:18:00		0.43	91	0:18:00		0.38	94
0:20:00		0.48	90	0:20:00		0.45	90	0:20:00		0.41	92
0:25:00		0.50	89	0:25:00		0.46	89	0:25:00		0.44	91
0:30:00		0.60	85	0:30:00		0.52	87	0:30:00		0.50	88
0:40:00		0.70	80	0:40:00		0.60	83	0:40:00		0.56	86
0:50:00		0.80	76	0:50:00		0.67	80	0:50:00		0.63	83
1:00:00		0.90	71	1:00:00		0.72	78	1:00:00		0.72	79
1:30:00		1.21	58	1:30:00		0.91	70	1:20:00		0.90	71
2:00:00		1.48	46	2:00:00		1.06	63	2:00:00		1.10	62
2:30:00		1.76	33	2:40:00		1.26	54	2:40:00		1.22	57
2:50:00		1.96	24	3:20:00 AM		1.43	47	3:20:00 AM		1.36	50

Datum (-ve denotes AGL) = 0.00 m BGL.
Ground Level taken as Datum.

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

Contract No. F187026

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	7/27/2021	Operator	AH	Pit Depth	2.50 m	Location ID	WTP217

Test Details

Datum (-ve denotes AGL) =	0.00 m BGL	Well Screen	
		Well screen not used	
Pit Length =	4.00 m	Filter Material	
Pit Width =	2.00 m	Assumed Solid Fraction =	57.13 %
Pit Depth =	2.50 m BGL	Assumed Porosity =	42.87 %

Weather: Hot

Geology: Gravelly SAND

Remarks

Test 2 and 3 past 75 % effective depth but did not pass 25 % effective depth, Infiltration rate was not calculated for these tests.

Calculation

Test 1			Test 2			Test 3		
Start Time =	11:50		Start Time =	13:50		Start Time =	9:35	
Test Top =	0.26	m BGL	Test Top =	0.22	m BGL	Test Top =	0.24	m BGL
Test Base =	2.50	m BGL	Test Base =	2.50	m BGL	Test Base =	2.50	m BGL
EDP =	2.24	m	EDP =	2.28	m	EDP =	2.26	m
75% EDP =	0.82	m BGL	75% EDP =	0.79	m BGL	75% EDP =	0.81	m BGL
50% EDP =	1.38	m BGL	50% EDP =	1.36	m BGL	50% EDP =	1.37	m BGL
25% EDP =	1.94	m BGL	25% EDP =	1.93	m BGL	25% EDP =	1.94	m BGL
V =	17.92	m^3	V =	18.24	m^3	V =	18.08	m^3
Vg =	9.14	m^3	Vg =	9.14	m^3	Vg =	9.14	m^3
Vp =	8.78	m^3	Vp =	9.10	m^3	Vp =	8.94	m^3
Vp75-25 =	4.39	m^3	Vp75-25 =	4.55	m^3	Vp75-25 =	4.47	m^3
ap =	21.44	m^2	ap =	21.68	m^2	ap =	21.56	m^2
Tp75 =	3120	s	Tp75 =		s	Tp75 =		s
Tp25 =	10080	s	Tp25 =		s	Tp25 =		s
Infiltration Rate, f =	2.94E-05	m/s	Infiltration Rate, f =		m/s	Infiltration Rate, f =		m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of the pit.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

APPENDIX C

SOUTHERN PARK AND RIDE CATCHMENT PLAN

UK PROTECTIVE MARKING:
Not Protectively Marked

NOTES:
1. Do not scale from this drawing. All dimensions are in metres unless noted otherwise.

KEY

- PIPE
- CRATE BASIN
- BASIN
- INFILTRATION BASIN
- SWALE
- S:9.001 NORTHERN NETWORK
- S3.001 SOUTHERN NETWORK

NOT FOR CONSTRUCTION

NOT FOR APPROVAL

REV.	DATE	PREPARED BY	CHECKED BY	STATUS	REASONS FOR REVISION	APPROVED BY
K	21.02.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
J	31.01.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
I	20.01.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
H	12.11.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
G	06.11.19	NKS	KA	S3	BUFFER ZONE SOUTH OF INFILTRATION TRIMMED	PJ
F	31.10.19	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING TEAM REVIEW	PJ
E	25.09.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
D	02.08.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
C	24.07.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
B	09.07.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
A	01.07.19	NKS	KA	S3	FIRST ISSUE	PJ

NNB GenCo
EDF ENERGY

1st partner: EDF ENERGY
2nd partner: NNB GENCO

CONTRACTOR COMPANY TRADE NAME : ROYAL HASKONINGDHV

CONTRACTOR REF. No. PB7869

CONTRACT NUMBER : SZ0204

CONTRACTOR WBS CODE : N/A

QRA RELATED Yes ☐ No ☒

APPLICABILITY:
1: Document related to Unit 1
2: Document related to Unit 2
9: Document that applies to buildings/systems common to Unit 1 & 2
0: Documents that relate exclusively to buildings or systems that are common to the whole site (e.g. parking, ancillary buildings...)

NUCL/REP/EPR/UKX							
HPC (doc: HK)				SZC (doc: SZ)			
0	1	2	9	0	1	2	9

BUILDING
000

SYSTEM
000

SCALE
1:2000

SIZE A1

PAGE
1/1

DESCRIPTION

SIZEWELL C
SOUTHERN PARK AND RIDE SITE
DRAINAGE LAYOUT

DOCUMENT REFERENCE No.

SZC	SZ0204	FP	000	DRW	100053
Project	Contract No. / Orig. Co	Asset / Zone	System / Building	Doc. type	Chrono No.

DOCUMENT SUB -TYPE
N/A

EDF CLASSIFICATION CODE
N/A

SUBCONTRACTOR COMPANY TRADE NAME
N/A

SUBCONTRACTOR DOCUMENT REF. No
N/A

This pattern must be entirely readable
For A0 and A1 : ABERPFTHLIJOOCGQUVWMNSZXKY
zsaeocmuvnwxirlkhbdpqgyjlt 71423855690
0 1 2 3 4 5 6 7 8 9 10

INTELLECTUAL PROPERTY:
O-Property of Owner

NNB:

EDF:
NNB GenCo © 2018

UK PROTECTIVE MARKING:
Not Protectively Marked

EDF ACCESSIBILITY:
INTERNE ☐ RESTREINT ☐ CONFIDENTIEL ☐

APPENDIX D

SOUTHERN PARK AND RIDE HYDRAULIC CALCULATIONS

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Network North

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Network North

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	1.740	4-8	1.754	8-12	0.481	12-16	0.481	16-20	0.239

Total Area Contributing (ha) = 4.695

Total Pipe Volume (m^3) = 233.983

Network Design Table for Network North

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S8.000	65.683	0.272	241.5	0.382	15.00	0.0	0.600	o	600	Pipe/Conduit	
S8.001	83.632	0.261	320.4	0.453	0.00	0.0	0.600	o	600	Pipe/Conduit	
S8.002	77.351	0.351	220.4	0.418	0.00	0.0	0.600	o	600	Pipe/Conduit	
S9.000	25.003	0.083	301.2	0.033	15.00	0.0	0.600	o	375	Pipe/Conduit	
S9.001	68.374	0.373	183.2	0.322	0.00	0.0	0.600	o	375	Pipe/Conduit	
S10.000	111.255	0.411	270.7	0.668	15.00	0.0	0.600	o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S8.000	50.00	15.70	27.230	0.382	0.0	0.0	0.0	1.56	441.8	51.8
S8.001	50.00	16.73	26.958	0.835	0.0	0.0	0.0	1.35	383.1	113.1
S8.002	50.00	17.52	26.697	1.253	0.0	0.0	0.0	1.64	462.7	169.7
S9.000	50.00	15.40	27.575	0.033	0.0	0.0	0.0	1.04	114.7	4.5
S9.001	50.00	16.25	27.492	0.355	0.0	0.0	0.0	1.34	147.5	48.1
S10.000	50.00	16.37	27.455	0.668	0.0	0.0	0.0	1.36	293.7	90.4

Network Design Table for Network North

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S9.002	55.841	0.623	89.7	0.338	0.00	0.0	0.600	o	525	Pipe/Conduit	
S8.003	42.921	0.086	500.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S8.004	37.349	0.232	160.9	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S11.000	106.953	0.396	270.1	0.720	15.00	0.0	0.600	o	750	Pipe/Conduit	
S11.001	83.803	0.281	298.2	0.665	0.00	0.0	0.600	o	600	Pipe/Conduit	
S11.002	65.930	0.220	299.7	0.697	0.00	0.0	0.600	o	600	Pipe/Conduit	
S8.005	5.015	0.010	501.5	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S8.006	3.000	0.006	500.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S9.002	50.00	16.76	26.969	1.360	0.0	0.0	0.0	2.37	512.3	184.2
S8.003	50.00	18.13	26.196	2.613	0.0	0.0	0.0	1.17	417.0	353.9
S8.004	50.00	18.43	26.110	2.613	0.0	0.0	0.0	2.06	738.5	353.9
S11.000	50.00	16.05	26.850	0.720	0.0	0.0	0.0	1.70	750.1	97.5
S11.001	50.00	17.04	26.454	1.385	0.0	0.0	0.0	1.40	397.2	187.6
S11.002	50.00	17.83	26.173	2.082	0.0	0.0	0.0	1.40	396.3	281.9
S8.005	50.00	18.49	25.653	4.695	0.0	0.0	0.0	1.39	885.8	635.8
S8.006	50.00	18.53	25.643	4.695	0.0	0.0	0.0	1.39	887.1	635.8

Manhole Schedules for Network North

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)	Backdrop (mm)
S12	28.530	1.300	Open Manhole	1500	S8.000	27.230	600				
S13	28.840	1.882	Open Manhole	1500	S8.001	26.958	600	S8.000	26.958	600	
S14	28.620	1.923	Open Manhole	1500	S8.002	26.697	600	S8.001	26.697	600	
S16	28.950	1.375	Open Manhole	2400	S9.000	27.575	375				
S17	28.920	1.428	Open Manhole	1350	S9.001	27.492	375	S9.000	27.492	375	
S18	28.930	1.475	Open Manhole	1500	S10.000	27.455	525				
S18	28.770	1.801	Open Manhole	1500	S9.002	26.969	525	S9.001	27.119	375	
								S10.000	27.044	525	75
S31	28.810	2.614	Open Manhole	1500	S8.003	26.196	675	S8.002	26.346	600	75
								S9.002	26.346	525	
S32	28.910	2.800	Open Manhole	1500	S8.004	26.110	675	S8.003	26.110	675	
S19	28.180	1.330	Open Manhole	1800	S11.000	26.850	750				
S20	28.180	1.726	Open Manhole	1800	S11.001	26.454	600	S11.000	26.454	750	
S21	28.870	2.697	Open Manhole	1500	S11.002	26.173	600	S11.001	26.173	600	
S22	28.358	2.705	Open Manhole	1800	S8.005	25.653	900	S8.004	25.878	675	
								S11.002	25.953	600	
S23	28.700	3.057	Open Manhole	1800	S8.006	25.643	900	S8.005	25.643	900	
S	28.800	3.163	Open Manhole	0		OUTFALL		S8.006	25.637	900	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S12	628.840	688.752	628.840	688.752	Required	
S13	599.300	747.417	599.300	747.417	Required	
S14	660.875	804.010	660.875	804.010	Required	
S16	734.002	793.114	734.002	793.114	Required	
S17	721.277	814.636	721.277	814.636	Required	
S18	843.928	943.506	843.928	943.506	Required	
S18	776.403	855.085	776.403	855.085	Required	
S31	720.595	853.171	720.595	853.171	Required	
S32	691.261	884.505	691.261	884.505	Required	
S19	893.648	992.437	893.648	992.437	Required	

Manhole Schedules for Network North

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S20	786.703	991.119	786.703	991.119	Required	
S21	703.296	982.983	703.296	982.983	Required	
S22	709.114	917.310	709.114	917.310	Required	
S23	714.103	917.815	714.103	917.815	Required	
S	716.611	919.462			No Entry	

PIPELINE SCHEDULES for Network North

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)
S8.000	o	600	S12	28.530	27.230	0.700	Open Manhole	1500
S8.001	o	600	S13	28.840	26.958	1.282	Open Manhole	1500
S8.002	o	600	S14	28.620	26.697	1.323	Open Manhole	1500
S9.000	o	375	S16	28.950	27.575	1.000	Open Manhole	2400
S9.001	o	375	S17	28.920	27.492	1.053	Open Manhole	1350
S10.000	o	525	S18	28.930	27.455	0.950	Open Manhole	1500
S9.002	o	525	S18	28.770	26.969	1.276	Open Manhole	1500
S8.003	o	675	S31	28.810	26.196	1.939	Open Manhole	1500
S8.004	o	675	S32	28.910	26.110	2.125	Open Manhole	1500
S11.000	o	750	S19	28.180	26.850	0.580	Open Manhole	1800
S11.001	o	600	S20	28.180	26.454	1.126	Open Manhole	1800
S11.002	o	600	S21	28.870	26.173	2.097	Open Manhole	1500
S8.005	o	900	S22	28.358	25.653	1.805	Open Manhole	1800
S8.006	o	900	S23	28.700	25.643	2.157	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)
S8.000	65.683	241.5	S13	28.840	26.958	1.282	Open Manhole	1500
S8.001	83.632	320.4	S14	28.620	26.697	1.323	Open Manhole	1500
S8.002	77.351	220.4	S31	28.810	26.346	1.864	Open Manhole	1500
S9.000	25.003	301.2	S17	28.920	27.492	1.053	Open Manhole	1350
S9.001	68.374	183.2	S18	28.770	27.119	1.276	Open Manhole	1500
S10.000	111.255	270.7	S18	28.770	27.044	1.201	Open Manhole	1500
S9.002	55.841	89.7	S31	28.810	26.346	1.939	Open Manhole	1500
S8.003	42.921	500.0	S32	28.910	26.110	2.125	Open Manhole	1500
S8.004	37.349	160.9	S22	28.358	25.878	1.805	Open Manhole	1800
S11.000	106.953	270.1	S20	28.180	26.454	0.976	Open Manhole	1800
S11.001	83.803	298.2	S21	28.870	26.173	2.097	Open Manhole	1500
S11.002	65.930	299.7	S22	28.358	25.953	1.805	Open Manhole	1800
S8.005	5.015	501.5	S23	28.700	25.643	2.157	Open Manhole	1800
S8.006	3.000	500.0	S	28.800	25.637	2.263	Open Manhole	0

Area Summary for Network North

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
8.000	User	-	100	0.382	0.382	0.382
8.001	User	-	100	0.453	0.453	0.453
8.002	User	-	100	0.418	0.418	0.418
9.000	User	-	100	0.033	0.033	0.033
9.001	User	-	100	0.322	0.322	0.322
10.000	User	-	50	1.335	0.668	0.668
9.002	User	-	100	0.338	0.338	0.338
8.003	-	-	100	0.000	0.000	0.000
8.004	-	-	100	0.000	0.000	0.000
11.000	-	-	100	0.720	0.720	0.720
11.001	User	-	50	1.330	0.665	0.665
11.002	User	-	40	1.742	0.697	0.697
8.005	-	-	100	0.000	0.000	0.000
8.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				7.073	4.695	4.695

Network Classifications for Network North

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S8.000	S12	600	0.700	1.282	Unclassified	1500	0	0.700	Unclassified
S8.001	S13	600	1.282	1.323	Unclassified	1500	0	1.282	Unclassified
S8.002	S14	600	1.323	1.864	Unclassified	1500	0	1.323	Unclassified
S9.000	S16	375	1.000	1.053	Unclassified	2400	0	1.000	Unclassified
S9.001	S17	375	1.053	1.276	Unclassified	1350	0	1.053	Unclassified
S10.000	S18	525	0.950	1.201	Unclassified	1500	0	0.950	Unclassified
S9.002	S18	525	1.276	1.939	Unclassified	1500	0	1.276	Unclassified
S8.003	S31	675	1.939	2.125	Unclassified	1500	0	1.939	Unclassified
S8.004	S32	675	1.805	2.125	Unclassified	1500	0	2.125	Unclassified
S11.000	S19	750	0.580	0.976	Unclassified	1800	0	0.580	Unclassified
S11.001	S20	600	1.126	2.097	Unclassified	1800	0	1.126	Unclassified
S11.002	S21	600	1.805	2.097	Unclassified	1500	0	2.097	Unclassified
S8.005	S22	900	1.805	2.157	Unclassified	1800	0	1.805	Unclassified
S8.006	S23	900	2.157	2.263	Unclassified	1800	0	2.157	Unclassified

Free Flowing Outfall Details for Network North

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S8.006	S	28.800	25.637	0.000	0	0

Simulation Criteria for Network North

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

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

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location GB 640286 267538 TM 40286 67538		Cv (Winter)	0.840
Data Type	Point	Storm Duration (mins)	30

Online Controls for Network North

Weir Manhole: S23, DS/PN: S8.006, Volume (m³): 9.8

Discharge Coef 0.544 Width (m) 1.800 Invert Level (m) 28.700

Storage Structures for Network North

Infiltration Basin Manhole: S23, DS/PN: S8.006

Invert Level (m) 25.643 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.18600 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.18600

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3349.9	3.000	5220.0

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	30 Winter	2	+0%	100/15 Summer				27.341	-0.489	0.000	0.08
S8.001	S13	15 Winter	2	+0%	100/15 Summer				27.154	-0.404	0.000	0.22
S8.002	S14	15 Winter	2	+0%	100/15 Summer				26.920	-0.377	0.000	0.29
S9.000	S16	15 Winter	2	+0%	100/15 Summer				27.642	-0.308	0.000	0.03
S9.001	S17	15 Winter	2	+0%	100/15 Summer				27.635	-0.232	0.000	0.31
S10.000	S18	30 Winter	2	+0%	100/15 Summer				27.611	-0.369	0.000	0.19
S9.002	S18	15 Winter	2	+0%	100/15 Summer				27.155	-0.339	0.000	0.27
S8.003	S31	15 Winter	2	+0%	30/15 Summer				26.613	-0.258	0.000	0.69
S8.004	S32	15 Winter	2	+0%	100/15 Summer				26.406	-0.379	0.000	0.40
S11.000	S19	30 Winter	2	+0%	100/15 Summer				26.996	-0.604	0.000	0.08
S11.001	S20	15 Winter	2	+0%	100/15 Summer				26.699	-0.355	0.000	0.34
S11.002	S21	15 Winter	2	+0%	30/15 Winter				26.493	-0.280	0.000	0.55
S8.005	S22	15 Winter	2	+0%	30/15 Summer				26.289	-0.264	0.000	0.84
S8.006	S23	240 Winter	2	+0%	100/480 Winter				25.821	-0.722	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		30.9	OK	
S8.001	S13		78.4	OK	
S8.002	S14		123.8	OK	
S9.000	S16		3.0	OK	
S9.001	S17		43.1	OK	
S10.000	S18		53.4	OK	
S9.002	S18		124.5	OK	
S8.003	S31		242.9	OK	
S8.004	S32		241.2	OK	
S11.000	S19		58.0	OK	
S11.001	S20		124.6	OK	
S11.002	S21		195.9	OK	
S8.005	S22		429.7	OK	
S8.006	S23		0.0	OK	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 0.750
Site Location	GB 640286 267538 TM 40286 67538		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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	30 Winter	30	+0%	100/15 Summer				27.399	-0.431	0.000	0.18
S8.001	S13	15 Winter	30	+0%	100/15 Summer				27.293	-0.265	0.000	0.55
S8.002	S14	15 Winter	30	+0%	100/15 Summer				27.141	-0.156	0.000	0.67
S9.000	S16	15 Winter	30	+0%	100/15 Summer				27.767	-0.183	0.000	0.08
S9.001	S17	15 Winter	30	+0%	100/15 Summer				27.764	-0.103	0.000	0.83
S10.000	S18	30 Winter	30	+0%	100/15 Summer				27.698	-0.282	0.000	0.44
S9.002	S18	15 Winter	30	+0%	100/15 Summer				27.283	-0.211	0.000	0.66
S8.003	S31	15 Winter	30	+0%	30/15 Summer				26.988	0.117	0.000	1.59
S8.004	S32	15 Winter	30	+0%	100/15 Summer				26.759	-0.026	0.000	0.91
S11.000	S19	30 Winter	30	+0%	100/15 Summer				27.086	-0.514	0.000	0.19
S11.001	S20	15 Winter	30	+0%	100/15 Summer				26.940	-0.114	0.000	0.69
S11.002	S21	15 Winter	30	+0%	30/15 Winter				26.816	0.043	0.000	1.06
S8.005	S22	15 Winter	30	+0%	30/15 Summer				26.565	0.012	0.000	1.83
S8.006	S23	360 Winter	30	+0%	100/480 Winter				26.058	-0.485	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		69.9	OK	
S8.001	S13		194.6	OK	
S8.002	S14		283.9	OK	
S9.000	S16		8.2	OK	
S9.001	S17		114.9	OK	
S10.000	S18		121.1	OK	
S9.002	S18		303.5	OK	
S8.003	S31		558.0	SURCHARGED	
S8.004	S32		553.0	OK	
S11.000	S19		132.0	OK	
S11.001	S20		250.7	OK	
S11.002	S21		377.7	SURCHARGED	
S8.005	S22		931.9	SURCHARGED	
S8.006	S23		0.0	OK	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	15 Winter	100	+40%	100/15 Summer				28.164	0.334	0.000	0.35
S8.001	S13	15 Winter	100	+40%	100/15 Summer				28.138	0.580	0.000	0.74
S8.002	S14	15 Winter	100	+40%	100/15 Summer				28.006	0.709	0.000	1.03
S9.000	S16	15 Winter	100	+40%	100/15 Summer				28.404	0.454	0.000	0.23
S9.001	S17	15 Winter	100	+40%	100/15 Summer				28.407	0.540	0.000	1.32
S10.000	S18	30 Winter	100	+40%	100/15 Summer				28.341	0.361	0.000	0.83
S9.002	S18	15 Winter	100	+40%	100/15 Summer				28.148	0.654	0.000	0.83
S8.003	S31	15 Winter	100	+40%	30/15 Summer				27.679	0.808	0.000	2.23
S8.004	S32	15 Winter	100	+40%	100/15 Summer				27.271	0.486	0.000	1.27
S11.000	S19	30 Winter	100	+40%	100/15 Summer				28.062	0.462	0.000	0.38
S11.001	S20	30 Winter	100	+40%	100/15 Summer				28.015	0.961	0.000	1.18
S11.002	S21	30 Winter	100	+40%	30/15 Winter				27.630	0.857	0.000	1.80
S8.005	S22	15 Winter	100	+40%	30/15 Summer				26.888	0.335	0.000	2.76
S8.006	S23	600 Winter	100	+40%	100/480 Winter				26.575	0.032	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		140.3	SURCHARGED	
S8.001	S13		259.1	SURCHARGED	
S8.002	S14		435.5	SURCHARGED	
S9.000	S16		22.9	SURCHARGED	
S9.001	S17		183.8	SURCHARGED	
S10.000	S18		230.1	SURCHARGED	
S9.002	S18		383.8	SURCHARGED	
S8.003	S31		783.8	SURCHARGED	
S8.004	S32		775.3	SURCHARGED	
S11.000	S19		261.2	FLOOD RISK	
S11.001	S20		430.7	FLOOD RISK	
S11.002	S21		642.6	SURCHARGED	
S8.005	S22		1406.1	SURCHARGED	
S8.006	S23		0.0	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Network South

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Network South

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	1.160	4-8	1.722	8-12	2.335	12-16	1.815	16-20	0.920	20-24	0.744	24-28	0.414	28-32	0.172

Total Area Contributing (ha) = 9.281

Total Pipe Volume (m^3) = 5873.770

Network Design Table for Network South

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	64.797	0.386	167.9	0.246	15.00	0.0	0.600		o	300	Pipe/Conduit	
S2.000	65.687	0.274	239.7	0.263	15.00	0.0	0.600		o	300	Pipe/Conduit	
S3.000	66.073	0.330	200.2	0.441	15.00	0.0	0.600		o	375	Pipe/Conduit	
S3.001	44.777	0.384	116.6	0.104	0.00	0.0	0.045	3 \=/		1500	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	15.89	27.025	0.246	0.0	0.0	0.0	1.21	85.6	33.3
S2.000	50.00	16.08	27.000	0.263	0.0	0.0	0.0	1.01	71.5	35.6
S3.000	50.00	15.86	27.590	0.441	0.0	0.0	0.0	1.28	141.0	59.7
S3.001	50.00	17.36	27.260	0.545	0.0	0.0	0.0	0.50	146.0	73.8

Network Design Table for Network South

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.001	33.181	0.138	240.4	0.000	0.00	0.0		0.045	3 \=/	1500	1:3 Swale	
S1.001	45.813	0.153	299.4	0.152	0.00	0.0		0.045	o	750	Pipe/Conduit	
S4.000	57.183	0.340	168.2	0.178	15.00	0.0	0.600		o	300	Pipe/Conduit	
S1.002	45.813	0.153	299.4	0.198	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.003	26.883	0.074	361.8	0.318	0.00	0.0	0.600		o	600	Pipe/Conduit	
S1.004	102.802	0.390	263.9	0.573	0.00	0.0		0.045	3 \=/	1500	1:3 Swale	
S1.005	104.957	0.210	499.8	0.606	0.00	0.0		0.045	o	1500	Pipe/Conduit	
S1.006	44.603	0.308	145.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S5.000	60.711	0.430	141.2	0.313	15.00	0.0	0.600		o	300	Pipe/Conduit	
S5.001	38.530	0.385	100.0	0.103	0.00	0.0	0.600		o	300	Pipe/Conduit	
S6.000	90.297	0.324	279.0	0.441	15.00	0.0	0.600		o	375	Pipe/Conduit	
S6.001	60.861	0.609	99.9	0.513	0.00	0.0	0.600		o	600	Pipe/Conduit	
S7.000	88.800	0.888	100.0	0.344	15.00	0.0	0.600		o	300	Pipe/Conduit	
S6.002	43.575	0.436	99.9	0.223	0.00	0.0	0.600		o	600	Pipe/Conduit	
S8.000	76.277	1.140	66.9	0.521	15.00	0.0	0.600		o	450	Pipe/Conduit	
S8.001	44.044	0.440	100.1	0.292	0.00	0.0	0.600		o	450	Pipe/Conduit	
S5.002	12.369	0.025	494.8	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S5.003	30.392	0.062	490.2	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S5.004	42.116	0.084	501.4	0.456	0.00	0.0		0.045	4 \=/	600	1:4 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.001	50.00	18.95	26.726	0.808	0.0	0.0	0.0	0.35	101.7«	109.4
S1.001	50.00	20.76	25.988	1.206	0.0	0.0	0.0	0.42	185.9	163.2
S4.000	50.00	15.79	27.325	0.178	0.0	0.0	0.0	1.21	85.5	24.1
S1.002	50.00	21.42	26.486	1.581	0.0	0.0	0.0	1.17	186.0«	214.1
S1.003	50.00	21.77	26.183	1.899	0.0	0.0	0.0	1.27	360.3	257.2
S1.004	50.00	26.93	26.109	2.472	0.0	0.0	0.0	0.33	97.0«	334.7
S1.005	50.00	30.00	24.369	3.078	0.0	0.0	0.0	0.52	913.4	416.8
S1.006	50.00	30.00	24.159	3.078	0.0	0.0	0.0	2.02	571.2	416.8
S5.000	50.00	15.77	27.025	0.313	0.0	0.0	0.0	1.32	93.4	42.4
S5.001	50.00	16.17	26.595	0.416	0.0	0.0	0.0	1.57	111.1	56.3
S6.000	50.00	16.39	27.300	0.441	0.0	0.0	0.0	1.08	119.3	59.8
S6.001	50.00	16.81	26.751	0.955	0.0	0.0	0.0	2.44	688.8	129.3
S7.000	50.00	15.94	28.000	0.344	0.0	0.0	0.0	1.57	111.1	46.6
S6.002	50.00	17.11	26.142	1.521	0.0	0.0	0.0	2.44	688.8	206.0
S8.000	50.00	15.51	27.250	0.521	0.0	0.0	0.0	2.49	395.8	70.6
S8.001	50.00	15.87	26.487	0.813	0.0	0.0	0.0	2.03	323.2	110.2
S5.002	50.00	17.30	25.632	2.751	0.0	0.0	0.0	1.09	307.6«	372.5
S5.003	50.00	17.76	25.607	2.751	0.0	0.0	0.0	1.09	309.1«	372.5
S5.004	50.00	21.09	25.545	3.207	0.0	0.0	0.0	0.21	38.0«	434.3

. | Souther Park and Ride
. | Attenuation Model
. | Network South

Date 07/02/2022 | Designed by Dan James
File SPR DRawnet OP8 1.MDX | Checked by Derek Lord
XP Solutions | Network 2019.1

Network Design Table for Network South

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S5.005	109.837	1.373	80.0	1.106	0.00	0.0		0.045	3 \=/	600	1:3 Swale	
S5.006	42.249	0.422	100.1	0.174	0.00	0.0	0.600		o	600	Pipe/Conduit	
S1.007	22.494	0.278	80.9	0.199	0.00	0.0	0.600		o	1050	Pipe/Conduit	
S1.008	18.911	0.057	331.8	0.104	0.00	0.0	0.600		o	1050	Pipe/Conduit	
S1.009	11.370	0.574	19.8	0.206	0.00	0.0	0.600		o	1050	Pipe/Conduit	
S1.010	61.289	0.255	240.3	0.158	0.00	0.0	0.600		o	1050	Pipe/Conduit	
S1.011	33.560	0.673	49.9	0.226	0.00	0.0	0.600		o	1050	Pipe/Conduit	
S9.000	83.677	0.209	400.4	0.256	15.00	0.0		0.045	3 \=/	1500	1:3 Swale	
S10.000	50.967	1.593	32.0	0.233	15.00	0.0		0.045	3 \=/	1500	1:3 Swale	
S9.001	53.969	1.250	43.2	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
S1.012	37.603	0.125	300.8	0.333	0.00	0.0	0.600		o	1200	Pipe/Conduit	
S1.013	8.803	0.425	20.7	0.000	0.00	0.0	0.600		o	1200	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S5.005	50.00	24.47	25.558	4.313	0.0	0.0	0.0	0.54	85.3«	584.1
S5.006	50.00	24.76	24.185	4.487	0.0	0.0	0.0	2.43	688.2	607.6
S1.007	50.00	30.00	23.388	7.764	0.0	0.0	0.0	3.83	3318.9	1051.4
S1.008	50.00	30.00	23.110	7.868	0.0	0.0	0.0	1.89	1633.4	1065.5
S1.009	50.00	30.00	23.219	8.074	0.0	0.0	0.0	7.76	6720.9	1093.4
S1.010	50.00	30.00	22.640	8.232	0.0	0.0	0.0	2.22	1921.0	1114.8
S1.011	50.00	30.00	22.285	8.459	0.0	0.0	0.0	4.89	4230.8	1145.4
S9.000	50.00	20.18	23.480	0.256	0.0	0.0	0.0	0.27	78.8	34.7
S10.000	50.00	15.89	24.790	0.233	0.0	0.0	0.0	0.95	278.7	31.6
S9.001	50.00	20.37	23.197	0.489	0.0	0.0	0.0	4.78	3038.2	66.2
S1.012	50.00	30.00	21.612	9.281	0.0	0.0	0.0	2.15	2433.6	1256.8
S1.013	50.00	30.00	21.487	9.281	0.0	0.0	0.0	8.24	9315.9	1256.8

Manhole Schedules for Network South

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)
S1	28.450	1.425	Open Manhole	1200	S1.000	27.025	300				
S15	28.370	1.370	Open Manhole	1200	S2.000	27.000	300				
S17	28.890	1.300	Open Manhole	1350	S3.000	27.590	375				
S4	28.950	1.690	Open Manhole	10000	S3.001	27.260	1500	S3.000	27.260	375	
S3	28.660	1.934	Open Manhole	10000	S2.001	26.726	1500	S2.000	26.726	300	
								S3.001	26.876	1500	150
S1	28.580	2.592	Open Manhole	10000	S1.001	25.988	750	S1.000	26.639	300	201
								S2.001	26.588	1500	
S3	28.750	1.425	Open Manhole	1200	S4.000	27.325	300				
S3	28.440	2.605	Open Manhole	1800	S1.002	26.486	450	S1.001	25.835	750	
								S4.000	26.985	300	349
S2	28.440	2.257	Open Manhole	1500	S1.003	26.183	600	S1.002	26.333	450	
S3	28.480	2.371	Open Manhole	10000	S1.004	26.109	1500	S1.003	26.109	600	
S7	26.000	1.631	Junction		S1.005	24.369	1500	S1.004	25.719	1500	
S4	26.000	1.841	Open Manhole	2400	S1.006	24.159	600	S1.005	24.159	1500	
S10	28.450	1.425	Open Manhole	1200	S5.000	27.025	300				
S11	28.020	1.425	Open Manhole	1200	S5.001	26.595	300	S5.000	26.595	300	
S11	28.530	1.230	Open Manhole	1350	S6.000	27.300	375				
S14	27.940	1.189	Open Manhole	1500	S6.001	26.751	600	S6.000	26.976	375	
S17	29.300	1.300	Open Manhole	1200	S7.000	28.000	300				
S6	28.190	2.048	Open Manhole	1500	S6.002	26.142	600	S6.001	26.142	600	
								S7.000	27.112	300	670
S8	28.750	1.500	Open Manhole	1350	S8.000	27.250	450				
S9	27.610	1.500	Open Manhole	1350	S8.001	26.487	450	S8.000	26.110	450	
S7	27.276	1.644	Open Manhole	1500	S5.002	25.632	600	S5.001	26.210	300	278
								S6.002	25.706	600	74
								S8.001	26.047	450	265
S8	27.550	1.943	Open Manhole	1500	S5.003	25.607	600	S5.002	25.607	600	
S9	27.530	1.985	Open Manhole	1500	S5.004	25.545	600	S5.003	25.545	600	
S10	26.720	1.259	Junction		S5.005	25.558	600	S5.004	25.461	600	
S11	25.520	1.335	Open Manhole	1500	S5.006	24.185	600	S5.005	24.185	600	
S5	24.752	1.364	Open Manhole	2400	S1.007	23.388	1050	S1.006	23.851	600	13
								S5.006	23.763	600	
S6	25.270	2.160	Open Manhole	2400	S1.008	23.110	1050	S1.007	23.110	1050	
S7	24.650	1.597	Open Manhole	1950	S1.009	23.219	1050	S1.008	23.053	1050	
S8	24.600	1.960	Open Manhole	1950	S1.010	22.640	1050	S1.009	22.645	1050	5
S9	24.410	2.125	Open Manhole	1950	S1.011	22.285	1050	S1.010	22.385	1050	100
S24	24.830	1.350	Junction		S9.000	23.480	1500				
S25	26.140	1.350	Junction		S10.000	24.790	1500				
S25	24.250	1.053	Open Manhole	1500	S9.001	23.197	900	S9.000	23.271	1500	
								S10.000	23.197	1500	
S24	23.500	1.888	Open Manhole	2100	S1.012	21.612	1200	S1.011	21.612	1050	
								S9.001	21.947	900	35
S27	23.330	1.843	Open Manhole	2100	S1.013	21.487	1200	S1.012	21.487	1200	
S	22.500	1.438	Open Manhole	0		OUTFALL		S1.013	21.062	1200	

Manhole Schedules for Network South

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	766.688	646.471	766.688	646.471	Required	
S15	733.145	680.684	733.145	680.684	Required	
S17	706.309	717.886	706.309	717.886	Required	
S4	759.876	756.568	759.876	756.568	Required	
S3	785.749	720.023	785.749	720.023	Required	
S1	808.558	695.924	808.558	695.924	Required	
S3	792.261	616.505	792.261	616.505	Required	
S3	832.667	656.967	832.667	656.967	Required	
S2	856.777	618.011	856.777	618.011	Required	
S3	837.553	599.219	837.553	599.219	Required	
S7	758.350	533.681			No Entry	
S4	669.902	477.176	669.902	477.176	Required	
S10	765.558	648.208	765.558	648.208	Required	
S11	716.535	612.395	716.535	612.395	Required	
S11	703.066	714.468	703.066	714.468	Required	
S14	622.595	673.505	622.595	673.505	Required	
S17	732.154	679.979	732.154	679.979	Required	
S6	661.261	626.505	661.261	626.505	Required	
S8	791.458	615.308	791.458	615.308	Required	
S9	726.595	575.172	726.595	575.172	Required	

Manhole Schedules for Network South

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S7	685.142	590.056	685.142	590.056	Required	
S8	691.595	579.505	691.595	579.505	Required	
S9	665.639	563.695	665.639	563.695	Required	
S10	688.262	528.172			No Entry	
S11	596.261	468.172	596.261	468.172	Required	
S5	634.453	450.106	634.453	450.106	Required	
S6	616.141	437.043	616.141	437.043	Required	
S7	628.511	422.738	628.511	422.738	Required	
S8	620.381	414.789	620.381	414.789	Required	
S9	569.361	380.828	569.361	380.828	Required	
S24	564.595	446.172			No Entry	
S25	475.389	353.495			No Entry	
S25	494.262	400.839	494.262	400.839	Required	
S24	537.915	369.104	537.915	369.104	Required	
S27	503.262	354.505	503.262	354.505	Required	
S	495.230	350.902			No Entry	

PIPELINE SCHEDULES for Network South

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)
S1.000	o	300	S1	28.450	27.025	1.125	Open Manhole	1200
S2.000	o	300	S15	28.370	27.000	1.070	Open Manhole	1200
S3.000	o	375	S17	28.890	27.590	0.925	Open Manhole	1350
S3.001	3 \=/	1500	S4	28.950	27.260	1.540	Open Manhole	10000
S2.001	3 \=/	1500	S3	28.660	26.726	1.784	Open Manhole	10000
S1.001	o	750	S1	28.580	25.988	1.842	Open Manhole	10000
S4.000	o	300	S3	28.750	27.325	1.125	Open Manhole	1200
S1.002	o	450	S3	28.440	26.486	1.504	Open Manhole	1800
S1.003	o	600	S2	28.440	26.183	1.657	Open Manhole	1500
S1.004	3 \=/	1500	S3	28.480	26.109	2.221	Open Manhole	10000
S1.005	o	1500	S7	26.000	24.369	0.131	Junction	
S1.006	o	600	S4	26.000	24.159	1.241	Open Manhole	2400
S5.000	o	300	S10	28.450	27.025	1.125	Open Manhole	1200
S5.001	o	300	S11	28.020	26.595	1.125	Open Manhole	1200
S6.000	o	375	S11	28.530	27.300	0.855	Open Manhole	1350
S6.001	o	600	S14	27.940	26.751	0.589	Open Manhole	1500
S7.000	o	300	S17	29.300	28.000	1.000	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)
S1.000	64.797	167.9	S1	28.580	26.639	1.641	Open Manhole	10000
S2.000	65.687	239.7	S3	28.660	26.726	1.634	Open Manhole	10000
S3.000	66.073	200.2	S4	28.950	27.260	1.315	Open Manhole	10000
S3.001	44.777	116.6	S3	28.660	26.876	1.634	Open Manhole	10000
S2.001	33.181	240.4	S1	28.580	26.588	1.842	Open Manhole	10000
S1.001	45.813	299.4	S3	28.440	25.835	1.855	Open Manhole	1800
S4.000	57.183	168.2	S3	28.440	26.985	1.155	Open Manhole	1800
S1.002	45.813	299.4	S2	28.440	26.333	1.657	Open Manhole	1500
S1.003	26.883	361.8	S3	28.480	26.109	1.771	Open Manhole	10000
S1.004	102.802	263.9	S7	26.000	25.719	0.131	Junction	
S1.005	104.957	499.8	S4	26.000	24.159	0.341	Open Manhole	2400
S1.006	44.603	145.0	S5	24.752	23.851	0.301	Open Manhole	2400
S5.000	60.711	141.2	S11	28.020	26.595	1.125	Open Manhole	1200
S5.001	38.530	100.0	S7	27.276	26.210	0.766	Open Manhole	1500
S6.000	90.297	279.0	S14	27.940	26.976	0.589	Open Manhole	1500
S6.001	60.861	99.9	S6	28.190	26.142	1.448	Open Manhole	1500
S7.000	88.800	100.0	S6	28.190	27.112	0.778	Open Manhole	1500

PIPELINE SCHEDULES for Network South

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)
S6.002	o	600	S6	28.190	26.142	1.448	Open Manhole	1500
S8.000	o	450	S8	28.750	27.250	1.050	Open Manhole	1350
S8.001	o	450	S9	27.610	26.487	0.673	Open Manhole	1350
S5.002	o	600	S7	27.276	25.632	1.044	Open Manhole	1500
S5.003	o	600	S8	27.550	25.607	1.343	Open Manhole	1500
S5.004	4 \=/	600	S9	27.530	25.545	1.835	Open Manhole	1500
S5.005	3 \=/	600	S10	26.720	25.558	1.012	Junction	
S5.006	o	600	S11	25.520	24.185	0.735	Open Manhole	1500
S1.007	o	1050	S5	24.752	23.388	0.314	Open Manhole	2400
S1.008	o	1050	S6	25.270	23.110	1.110	Open Manhole	2400
S1.009	o	1050	S7	24.650	23.219	0.381	Open Manhole	1950
S1.010	o	1050	S8	24.600	22.640	0.910	Open Manhole	1950
S1.011	o	1050	S9	24.410	22.285	1.075	Open Manhole	1950
S9.000	3 \=/	1500	S24	24.830	23.480	1.200	Junction	
S10.000	3 \=/	1500	S25	26.140	24.790	1.200	Junction	
S9.001	o	900	S25	24.250	23.197	0.153	Open Manhole	1500
S1.012	o	1200	S24	23.500	21.612	0.688	Open Manhole	2100
S1.013	o	1200	S27	23.330	21.487	0.643	Open Manhole	2100

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)
S6.002	43.575	99.9	S7	27.276	25.706	0.970	Open Manhole	1500
S8.000	76.277	66.9	S9	27.610	26.110	1.050	Open Manhole	1350
S8.001	44.044	100.1	S7	27.276	26.047	0.779	Open Manhole	1500
S5.002	12.369	494.8	S8	27.550	25.607	1.343	Open Manhole	1500
S5.003	30.392	490.2	S9	27.530	25.545	1.385	Open Manhole	1500
S5.004	42.116	501.4	S10	26.720	25.461	1.109	Junction	
S5.005	109.837	80.0	S11	25.520	24.185	1.185	Open Manhole	1500
S5.006	42.249	100.1	S5	24.752	23.763	0.389	Open Manhole	2400
S1.007	22.494	80.9	S6	25.270	23.110	1.110	Open Manhole	2400
S1.008	18.911	331.8	S7	24.650	23.053	0.547	Open Manhole	1950
S1.009	11.370	19.8	S8	24.600	22.645	0.905	Open Manhole	1950
S1.010	61.289	240.3	S9	24.410	22.385	0.975	Open Manhole	1950
S1.011	33.560	49.9	S24	23.500	21.612	0.838	Open Manhole	2100
S9.000	83.677	400.4	S25	24.250	23.271	0.829	Open Manhole	1500
S10.000	50.967	32.0	S25	24.250	23.197	0.903	Open Manhole	1500
S9.001	53.969	43.2	S24	23.500	21.947	0.653	Open Manhole	2100
S1.012	37.603	300.8	S27	23.330	21.487	0.643	Open Manhole	2100
S1.013	8.803	20.7	S	22.500	21.062	0.238	Open Manhole	0

Area Summary for Network South

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.246	0.246	0.246
2.000	User	-	100	0.263	0.263	0.263
3.000	User	-	100	0.441	0.441	0.441
3.001	User	-	50	0.209	0.104	0.104
2.001	-	-	100	0.000	0.000	0.000
1.001	User	-	100	0.152	0.152	0.152
4.000	User	-	100	0.178	0.178	0.178
1.002	User	-	100	0.198	0.198	0.198
1.003	User	-	100	0.175	0.175	0.175
	User	-	100	0.142	0.142	0.318
1.004	User	-	100	0.573	0.573	0.573
1.005	User	-	100	0.606	0.606	0.606
1.006	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.313	0.313	0.313
5.001	User	-	100	0.103	0.103	0.103
6.000	User	-	100	0.441	0.441	0.441
6.001	User	-	75	0.684	0.513	0.513
7.000	User	-	100	0.344	0.344	0.344
6.002	User	-	100	0.223	0.223	0.223
8.000	User	-	100	0.282	0.282	0.282
	User	-	100	0.239	0.239	0.521
8.001	User	-	100	0.292	0.292	0.292
5.002	-	-	100	0.000	0.000	0.000
5.003	-	-	100	0.000	0.000	0.000
5.004	User	-	100	0.456	0.456	0.456
5.005	User	-	100	0.813	0.813	0.813
	User	-	100	0.294	0.294	1.106
5.006	User	-	100	0.174	0.174	0.174
1.007	User	-	100	0.199	0.199	0.199
1.008	User	-	100	0.104	0.104	0.104
1.009	User	-	100	0.206	0.206	0.206
1.010	User	-	100	0.158	0.158	0.158
1.011	User	-	100	0.226	0.226	0.226
9.000	User	-	100	0.256	0.256	0.256
10.000	User	-	100	0.233	0.233	0.233
9.001	-	-	100	0.000	0.000	0.000
1.012	User	-	100	0.333	0.333	0.333
1.013	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				9.556	9.281	9.281

Network Classifications for Network South

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S1.000	S1	300	1.125	1.641	Unclassified	1200	0	1.125	Unclassified
S2.000	S15	300	1.070	1.634	Unclassified	1200	0	1.070	Unclassified
S3.000	S17	375	0.925	1.315	Unclassified	1350	0	0.925	Unclassified
S3.001	S4	1500	1.540	1.634	Unclassified	10000	0	1.540	Unclassified
S2.001	S3	1500	1.784	1.842	Unclassified	10000	0	1.784	Unclassified
S1.001	S1	750	1.842	1.855	Unclassified	10000	0	1.842	Unclassified
S4.000	S3	300	1.125	1.155	Unclassified	1200	0	1.125	Unclassified
S1.002	S3	450	1.504	1.657	Unclassified	1800	0	1.504	Unclassified
S1.003	S2	600	1.657	1.771	Unclassified	1500	0	1.657	Unclassified
S1.004	S3	1500	0.131	2.221	Unclassified	10000	0	2.221	Unclassified
S1.005	S7	1500	0.131	0.341	Unclassified				Junction
S1.006	S4	600	0.301	1.241	Unclassified	2400	0	1.241	Unclassified
S5.000	S10	300	1.125	1.125	Unclassified	1200	0	1.125	Unclassified
S5.001	S11	300	0.766	1.125	Unclassified	1200	0	1.125	Unclassified
S6.000	S11	375	0.589	0.855	Unclassified	1350	0	0.855	Unclassified
S6.001	S14	600	0.589	1.448	Unclassified	1500	0	0.589	Unclassified
S7.000	S17	300	0.778	1.000	Unclassified	1200	0	1.000	Unclassified
S6.002	S6	600	0.970	1.448	Unclassified	1500	0	1.448	Unclassified
S8.000	S8	450	1.050	1.050	Unclassified	1350	0	1.050	Unclassified
S8.001	S9	450	0.673	0.779	Unclassified	1350	0	0.673	Unclassified
S5.002	S7	600	1.044	1.343	Unclassified	1500	0	1.044	Unclassified
S5.003	S8	600	1.343	1.385	Unclassified	1500	0	1.343	Unclassified
S5.004	S9	600	1.109	1.835	Unclassified	1500	0	1.835	Unclassified
S5.005	S10	600	1.012	1.185	Unclassified				Junction
S5.006	S11	600	0.389	0.735	Unclassified	1500	0	0.735	Unclassified
S1.007	S5	1050	0.314	1.110	Unclassified	2400	0	0.314	Unclassified
S1.008	S6	1050	0.547	1.110	Unclassified	2400	0	1.110	Unclassified
S1.009	S7	1050	0.381	0.905	Unclassified	1950	0	0.381	Unclassified
S1.010	S8	1050	0.910	0.975	Unclassified	1950	0	0.910	Unclassified
S1.011	S9	1050	0.838	1.075	Unclassified	1950	0	1.075	Unclassified
S9.000	S24	1500	0.829	1.200	Unclassified				Junction
S10.000	S25	1500	0.903	1.200	Unclassified				Junction
S9.001	S25	900	0.153	0.653	Unclassified	1500	0	0.153	Unclassified
S1.012	S24	1200	0.643	0.688	Unclassified	2100	0	0.688	Unclassified
S1.013	S27	1200	0.238	0.643	Unclassified	2100	0	0.643	Unclassified

Free Flowing Outfall Details for Network South

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.013	S	22.500	21.062	0.000	0	0

Simulation Criteria for Network South

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Return Period (years) 100

Synthetic Rainfall Details

FEH Rainfall Version	2013	Winter Storms	Yes
Site Location	GB 640286 267538 TM 40286 67538	Cv (Summer)	0.750
Data Type	Point	Cv (Winter)	0.840
Summer Storms	Yes	Storm Duration (mins)	30

Online Controls for Network South

Hydro-Brake® Optimum Manhole: S6, DS/PN: S6.002, Volume (m³): 26.6

Unit Reference	MD-SHE-0128-7500-1000-7500
Design Head (m)	1.000
Design Flow (l/s)	7.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	128
Invert Level (m)	26.142
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	7.5	Kick-Flo®	0.656	6.2
Flush-Flo™	0.297	7.5	Mean Flow over Head Range	-	6.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.6	0.800	6.8	2.000	10.4	4.000	14.4	7.000	18.9
0.200	7.3	1.000	7.5	2.200	10.9	4.500	15.3	7.500	19.5
0.300	7.5	1.200	8.2	2.400	11.3	5.000	16.1	8.000	20.1
0.400	7.4	1.400	8.8	2.600	11.8	5.500	16.8	8.500	20.7
0.500	7.2	1.600	9.4	3.000	12.6	6.000	17.5	9.000	21.3
0.600	6.7	1.800	9.9	3.500	13.5	6.500	18.2	9.500	21.9

Hydro-Brake® Optimum Manhole: S7, DS/PN: S5.002, Volume (m³): 24.2

Unit Reference	MD-SHE-0163-1500-1800-1500
Design Head (m)	1.800
Design Flow (l/s)	15.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	163
Invert Level (m)	25.632
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	15.0	Kick-Flo®	1.111	11.9
Flush-Flo™	0.523	15.0	Mean Flow over Head Range	-	13.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.8	0.800	14.5	2.000	15.8	4.000	21.9	7.000	28.7
0.200	12.9	1.000	13.3	2.200	16.5	4.500	23.2	7.500	29.7
0.300	14.2	1.200	12.4	2.400	17.2	5.000	24.4	8.000	30.6
0.400	14.8	1.400	13.3	2.600	17.9	5.500	25.6	8.500	31.5
0.500	15.0	1.600	14.2	3.000	19.1	6.000	26.7	9.000	32.4
0.600	15.0	1.800	15.0	3.500	20.6	6.500	27.7	9.500	33.3

Hydro-Brake® Optimum Manhole: S6, DS/PN: S1.008, Volume (m³): 27.2

Unit Reference	MD-SHE-0517-2000-1800-2000
Design Head (m)	1.800
Design Flow (l/s)	200.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	517
Invert Level (m)	23.110
Minimum Outlet Pipe Diameter (mm)	Site Specific Design (Contact Hydro International)
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	200.0	Kick-Flo®	1.398	176.8
Flush-Flo™	0.788	200.0	Mean Flow over Head Range	-	161.7

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)	Depth (m)	Flow (l/s)
0.100	12.8	0.800	200.0	2.000	210.6	4.000	295.6	7.000	389.2
0.200	47.4	1.000	197.4	2.200	220.6	4.500	313.2	7.500	402.6
0.300	96.6	1.200	190.6	2.400	230.2	5.000	329.8	8.000	415.6
0.400	151.4	1.400	177.2	2.600	239.4	5.500	345.7	8.500	428.2
0.500	192.0	1.600	188.8	3.000	256.7	6.000	360.8	9.000	440.4
0.600	196.9	1.800	200.0	3.500	276.9	6.500	375.2	9.500	452.3

Hydro-Brake® Optimum Manhole: S8, DS/PN: S1.010, Volume (m³): 14.0

Unit Reference	MD-SHE-0217-3000-2400-3000
Design Head (m)	2.400
Design Flow (l/s)	30.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	217
Invert Level (m)	22.640
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.400	30.0	Kick-Flo®	1.468	23.7
Flush-Flo™	0.690	30.0	Mean Flow over Head Range	-	26.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.3	0.800	29.9	2.000	27.5	4.000	38.3	7.000	50.2
0.200	21.2	1.000	29.2	2.200	28.7	4.500	40.6	7.500	51.9
0.300	26.7	1.200	27.9	2.400	30.0	5.000	42.7	8.000	53.6
0.400	28.5	1.400	25.2	2.600	31.1	5.500	44.7	8.500	55.2
0.500	29.4	1.600	24.7	3.000	33.4	6.000	46.6	9.000	56.7
0.600	29.9	1.800	26.1	3.500	35.9	6.500	48.4	9.500	58.2

Weir Manhole: S27, DS/PN: S1.013, Volume (m³): 46.5

Discharge Coef 0.544 Width (m) 1.500 Invert Level (m) 23.030

Storage Structures for Network South

Tank or Pond Manhole: S6, DS/PN: S6.002

Invert Level (m) 26.142

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	509.0	1.600	1389.0

Tank or Pond Manhole: S7, DS/PN: S5.002

Invert Level (m) 25.632

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	870.0	1.500	1700.0

Tank or Pond Manhole: S6, DS/PN: S1.008

Invert Level (m) 23.110

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1073.0	1.550	1643.0

Cellular Storage Manhole: S8, DS/PN: S1.010

Invert Level (m) 22.640 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	2640.0	0.0	1.700	2640.0	0.0	1.701	0.0	0.0

Infiltration Basin Manhole: S27, DS/PN: S1.013

Invert Level (m) 21.487 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.10584 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.10584

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1908.7	1.500	3193.5

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	30 Winter	2	+0%	100/15 Summer				27.125	-0.200	0.000
S2.000	S15	30 Winter	2	+0%	100/15 Summer				27.115	-0.185	0.000
S3.000	S17	30 Winter	2	+0%	100/15 Winter				27.722	-0.243	0.000
S3.001	S4	30 Winter	2	+0%					27.334	-1.616	0.000
S2.001	S3	30 Winter	2	+0%					26.840	-1.820	0.000
S1.001	S1	120 Summer	2	+0%	30/15 Summer				26.738	0.000	0.000
S4.000	S3	30 Winter	2	+0%					27.410	-0.215	0.000
S1.002	S3	120 Summer	2	+0%	100/15 Summer				26.707	-0.229	0.000
S1.003	S2	120 Summer	2	+0%					26.419	-0.364	0.000
S1.004	S3	120 Summer	2	+0%					26.277	-2.203	0.000
S1.005	S7	15 Winter	2	+0%					24.810	-1.059	0.000
S1.006	S4	15 Winter	2	+0%	100/15 Summer				24.388	-0.371	0.000
S5.000	S10	30 Winter	2	+0%	100/15 Summer				27.134	-0.191	0.000
S5.001	S11	15 Winter	2	+0%	100/15 Summer				26.713	-0.182	0.000
S6.000	S11	30 Winter	2	+0%	100/15 Summer				27.444	-0.231	0.000
S6.001	S14	15 Winter	2	+0%	100/240 Winter				26.905	-0.446	0.000
S7.000	S17	30 Winter	2	+0%	100/30 Winter				28.103	-0.197	0.000
S6.002	S6	360 Winter	2	+0%	30/120 Summer				26.554	-0.189	0.000
S8.000	S8	30 Winter	2	+0%					27.351	-0.349	0.000
S8.001	S9	15 Winter	2	+0%	100/15 Winter				26.639	-0.298	0.000
S5.002	S7	960 Winter	2	+0%	100/120 Summer				25.930	-0.302	0.000
S5.003	S8	15 Winter	2	+0%					25.778	-0.429	0.000
S5.004	S9	15 Winter	2	+0%					25.790	-1.740	0.000
S5.005	S10	15 Winter	2	+0%					25.769	-0.951	0.000
S5.006	S11	15 Winter	2	+0%	100/15 Summer				24.417	-0.368	0.000
S1.007	S5	15 Winter	2	+0%	100/60 Winter				23.718	-0.720	0.000
S1.008	S6	360 Winter	2	+0%	100/30 Winter				23.634	-0.526	0.000
S1.009	S7	360 Winter	2	+0%	100/1440 Winter				23.352	-0.917	0.000
S1.010	S8	1440 Winter	2	+0%	100/240 Winter				22.998	-0.692	0.000
S1.011	S9	15 Winter	2	+0%					22.344	-0.991	0.000
S9.000	S24	30 Winter	2	+0%					23.550	-1.280	0.000
S10.000	S25	30 Winter	2	+0%					24.820	-1.320	0.000
S9.001	S25	30 Winter	2	+0%					23.264	-0.833	0.000
S1.012	S24	2880 Winter	2	+0%	100/4320 Summer				22.017	-0.795	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.24		19.9	OK	
S2.000	S15	0.31		21.2	OK	
S3.000	S17	0.27		35.6	OK	
S3.001	S4	0.00		42.7	OK	
S2.001	S3	0.00		62.7	OK	
S1.001	S1	0.35		64.3	OK	
S4.000	S3	0.18		14.4	OK	
S1.002	S3	0.47		79.6	OK	
S1.003	S2	0.32		92.1	OK	
S1.004	S3	0.00		117.5	OK	
S1.005	S7	0.17		157.6	OK*	
S1.006	S4	0.31		154.2	OK	
S5.000	S10	0.28		25.3	OK	
S5.001	S11	0.33		33.6	OK	
S6.000	S11	0.31		35.8	OK	
S6.001	S14	0.15		91.4	OK	
S7.000	S17	0.26		27.9	OK	
S6.002	S6	0.01		7.4	OK	
S8.000	S8	0.11		42.2	OK	
S8.001	S9	0.25		71.7	OK	
S5.002	S7	0.08		13.1	OK	
S5.003	S8	0.01		3.7	OK	
S5.004	S9	0.00		47.1	OK	
S5.005	S10	0.02		172.5	OK	
S5.006	S11	0.32		188.3	OK	
S1.007	S5	0.22		348.4	OK	
S1.008	S6	0.09		87.9	OK	
S1.009	S7	0.04		90.5	OK	
S1.010	S8	0.02		27.9	OK	
S1.011	S9	0.01		29.4	OK	
S9.000	S24	0.00		20.8	OK	
S10.000	S25	0.00		18.9	OK	
S9.001	S25	0.02		39.6	OK	
S1.012	S24	0.02		30.4	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.013	S27	2880 Winter	2	+0%	100/2880 Summer				22.017	-0.670	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.013	S27		0.0	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	30 Winter	30	+0%	100/15 Summer				27.184	-0.141	0.000
S2.000	S15	30 Winter	30	+0%	100/15 Summer				27.187	-0.113	0.000
S3.000	S17	30 Winter	30	+0%	100/15 Winter				27.802	-0.163	0.000
S3.001	S4	30 Winter	30	+0%					27.378	-1.572	0.000
S2.001	S3	30 Winter	30	+0%					27.026	-1.634	0.000
S1.001	S1	30 Winter	30	+0%	30/15 Summer				27.017	0.279	0.000
S4.000	S3	30 Winter	30	+0%					27.457	-0.168	0.000
S1.002	S3	30 Winter	30	+0%	100/15 Summer				26.934	-0.002	0.000
S1.003	S2	60 Winter	30	+0%					26.564	-0.219	0.000
S1.004	S3	60 Winter	30	+0%					26.377	-2.103	0.000
S1.005	S7	15 Winter	30	+0%					25.100	-0.769	0.000
S1.006	S4	30 Winter	30	+0%	100/15 Summer				24.550	-0.209	0.000
S5.000	S10	30 Winter	30	+0%	100/15 Summer				27.201	-0.124	0.000
S5.001	S11	15 Winter	30	+0%	100/15 Summer				26.793	-0.102	0.000
S6.000	S11	30 Winter	30	+0%	100/15 Summer				27.534	-0.141	0.000
S6.001	S14	15 Winter	30	+0%	100/240 Winter				26.992	-0.360	0.000
S7.000	S17	30 Winter	30	+0%	100/30 Winter				28.166	-0.134	0.000
S6.002	S6	600 Winter	30	+0%	30/120 Summer				26.957	0.215	0.000
S8.000	S8	30 Winter	30	+0%					27.405	-0.295	0.000
S8.001	S9	15 Winter	30	+0%	100/15 Winter				26.744	-0.193	0.000
S5.002	S7	720 Winter	30	+0%	100/120 Summer				26.144	-0.088	0.000
S5.003	S8	15 Winter	30	+0%					25.911	-0.296	0.000
S5.004	S9	15 Winter	30	+0%					25.922	-1.608	0.000
S5.005	S10	15 Winter	30	+0%					25.888	-0.832	0.000
S5.006	S11	15 Winter	30	+0%	100/15 Summer				24.588	-0.197	0.000
S1.007	S5	180 Winter	30	+0%	100/60 Winter				23.973	-0.465	0.000
S1.008	S6	180 Winter	30	+0%	100/30 Winter				23.963	-0.197	0.000
S1.009	S7	1440 Winter	30	+0%	100/1440 Winter				23.461	-0.808	0.000
S1.010	S8	1440 Winter	30	+0%	100/240 Winter				23.460	-0.230	0.000
S1.011	S9	4320 Winter	30	+0%					22.549	-0.786	0.000
S9.000	S24	30 Winter	30	+0%					23.592	-1.238	0.000
S10.000	S25	30 Winter	30	+0%					24.841	-1.299	0.000
S9.001	S25	30 Winter	30	+0%					23.306	-0.791	0.000
S1.012	S24	4320 Winter	30	+0%	100/4320 Summer				22.548	-0.264	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.55		44.9	OK	
S2.000	S15	0.70		47.9	OK	
S3.000	S17	0.61		80.5	OK	
S3.001	S4	0.00		94.7	OK	
S2.001	S3	0.01		115.2	OK	
S1.001	S1	0.86		156.6	SURCHARGED	
S4.000	S3	0.40		32.7	OK	
S1.002	S3	1.00		167.7	OK	
S1.003	S2	0.72		208.5	OK	
S1.004	S3	0.01		292.0	OK	
S1.005	S7	0.42		381.0	OK*	
S1.006	S4	0.75		372.4	OK	
S5.000	S10	0.64		57.2	OK	
S5.001	S11	0.75		77.7	OK	
S6.000	S11	0.71		81.0	OK	
S6.001	S14	0.33		201.8	OK	
S7.000	S17	0.59		63.2	OK	
S6.002	S6	0.01		7.3	SURCHARGED	
S8.000	S8	0.26		95.6	OK	
S8.001	S9	0.60		174.8	OK	
S5.002	S7	0.09		14.8	OK	
S5.003	S8	0.04		9.3	OK	
S5.004	S9	0.01		137.4	OK	
S5.005	S10	0.05		426.0	OK	
S5.006	S11	0.78		459.1	OK	
S1.007	S5	0.25		403.7	OK	
S1.008	S6	0.19		193.7	OK	
S1.009	S7	0.05		104.9	OK	
S1.010	S8	0.02		29.9	OK	
S1.011	S9	0.01		31.0	OK	
S9.000	S24	0.01		47.0	OK	
S10.000	S25	0.00		42.8	OK	
S9.001	S25	0.04		89.5	OK	
S1.012	S24	0.02		36.1	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.013	S27	4320 Winter	30	+0%	100/2880 Summer				22.547	-0.140	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.013	S27		0.0	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	30 Winter	100	+40%	100/15 Summer				27.645	0.320	0.000
S2.000	S15	30 Winter	100	+40%	100/15 Summer				27.702	0.402	0.000
S3.000	S17	30 Winter	100	+40%	100/15 Winter				28.018	0.053	0.000
S3.001	S4	30 Winter	100	+40%					27.435	-1.515	0.000
S2.001	S3	30 Winter	100	+40%					27.381	-1.279	0.000
S1.001	S1	30 Winter	100	+40%	30/15 Summer				27.380	0.642	0.000
S4.000	S3	30 Winter	100	+40%					27.516	-0.109	0.000
S1.002	S3	30 Winter	100	+40%	100/15 Summer				27.169	0.233	0.000
S1.003	S2	30 Winter	100	+40%					26.783	0.000	0.000
S1.004	S3	15 Winter	100	+40%					26.484	-1.996	0.000
S1.005	S7	15 Winter	100	+40%					25.503	-0.366	0.000
S1.006	S4	30 Winter	100	+40%	100/15 Summer				24.966	0.207	0.000
S5.000	S10	30 Winter	100	+40%	100/15 Summer				27.645	0.320	0.000
S5.001	S11	30 Winter	100	+40%	100/15 Summer				27.070	0.175	0.000
S6.000	S11	30 Winter	100	+40%	100/15 Summer				27.865	0.190	0.000
S6.001	S14	960 Winter	100	+40%	100/240 Winter				27.646	0.294	0.000
S7.000	S17	30 Winter	100	+40%	100/30 Winter				28.377	0.077	0.000
S6.002	S6	960 Winter	100	+40%	30/120 Summer				27.644	0.902	0.000
S8.000	S8	30 Winter	100	+40%					27.466	-0.234	0.000
S8.001	S9	15 Winter	100	+40%	100/15 Winter				26.962	0.025	0.000
S5.002	S7	960 Winter	100	+40%	100/120 Summer				26.641	0.409	0.000
S5.003	S8	15 Winter	100	+40%					26.021	-0.186	0.000
S5.004	S9	15 Winter	100	+40%					26.031	-1.499	0.000
S5.005	S10	15 Winter	100	+40%					25.992	-0.728	0.000
S5.006	S11	15 Winter	100	+40%	100/15 Summer				24.961	0.176	0.000
S1.007	S5	240 Winter	100	+40%	100/60 Winter				24.712	0.274	0.000
S1.008	S6	240 Winter	100	+40%	100/30 Winter				24.701	0.541	0.000
S1.009	S7	2160 Winter	100	+40%	100/1440 Winter				24.338	0.069	0.000
S1.010	S8	2160 Winter	100	+40%	100/240 Winter				24.337	0.647	0.000
S1.011	S9	5760 Winter	100	+40%					22.940	-0.395	0.000
S9.000	S24	30 Winter	100	+40%					23.634	-1.196	0.000
S10.000	S25	30 Winter	100	+40%					24.862	-1.278	0.000
S9.001	S25	30 Winter	100	+40%					23.345	-0.752	0.000
S1.012	S24	5760 Winter	100	+40%	100/4320 Summer				22.938	0.126	0.000

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

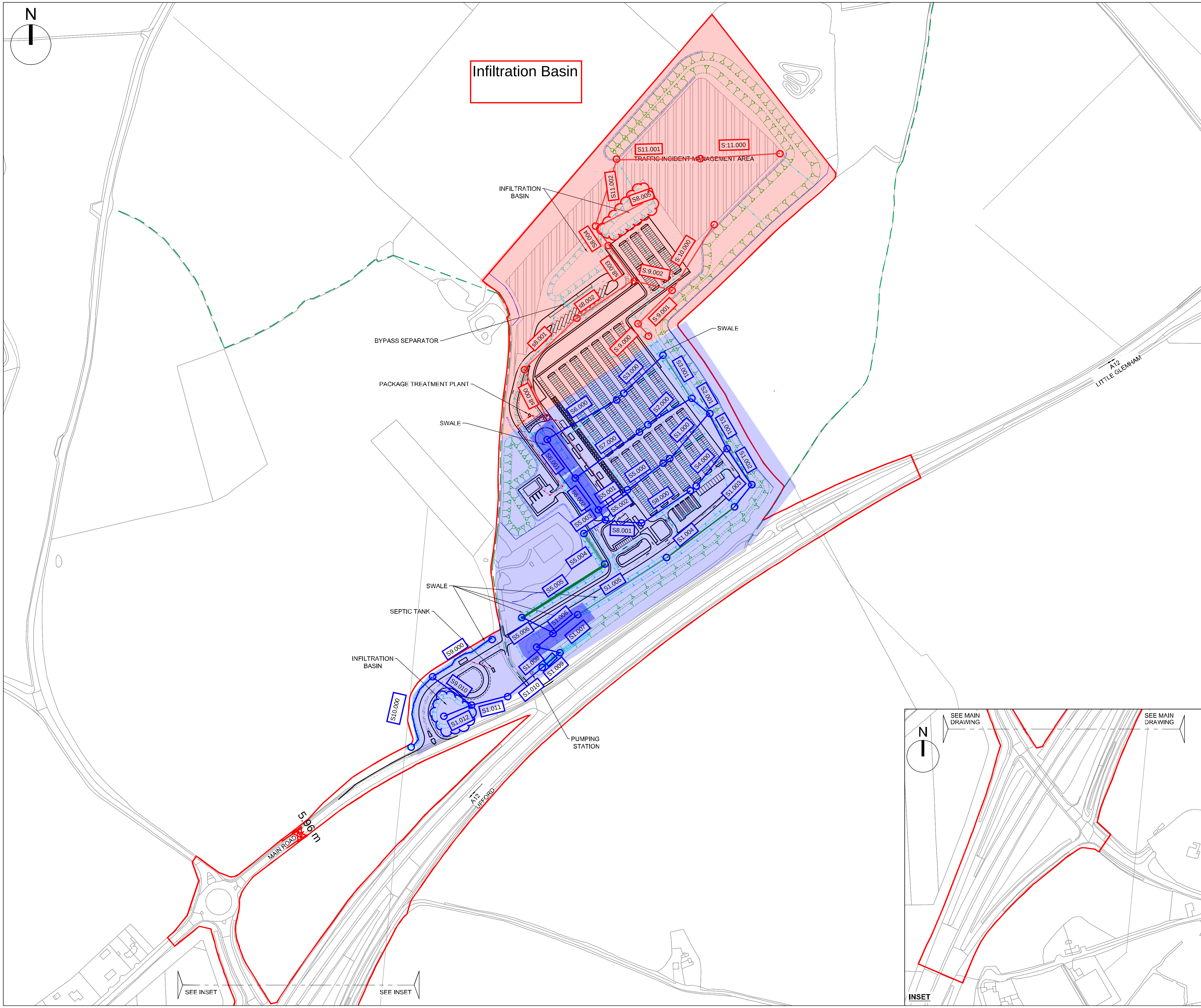
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.96		78.1	SURCHARGED	
S2.000	S15	1.22		83.3	SURCHARGED	
S3.000	S17	1.10		145.5	SURCHARGED	
S3.001	S4	0.01		169.2	OK	
S2.001	S3	0.01		167.3	OK	
S1.001	S1	1.26		231.7	SURCHARGED	
S4.000	S3	0.73		59.1	OK	
S1.002	S3	1.58		265.5	SURCHARGED	
S1.003	S2	1.14		328.1	OK	
S1.004	S3	0.02		564.4	OK	
S1.005	S7	0.81		737.0	OK*	
S1.006	S4	1.33		655.1	SURCHARGED	
S5.000	S10	1.17		104.1	SURCHARGED	
S5.001	S11	1.22		125.5	SURCHARGED	
S6.000	S11	1.27		144.6	SURCHARGED	
S6.001	S14	0.08		46.6	FLOOD RISK	
S7.000	S17	1.05		112.6	SURCHARGED	
S6.002	S6	0.01		7.5	SURCHARGED	
S8.000	S8	0.47		173.8	OK	
S8.001	S9	1.04		301.1	SURCHARGED	
S5.002	S7	0.09		15.0	SURCHARGED	
S5.003	S8	0.06		14.0	OK	
S5.004	S9	0.02		259.6	OK	
S5.005	S10	0.09		786.2	OK	
S5.006	S11	1.22		719.6	SURCHARGED	
S1.007	S5	0.38		610.6	FLOOD RISK	
S1.008	S6	0.20		199.8	SURCHARGED	
S1.009	S7	0.06		128.9	SURCHARGED	
S1.010	S8	0.02		29.9	FLOOD RISK	
S1.011	S9	0.01		32.3	OK	
S9.000	S24	0.01		85.5	OK	
S10.000	S25	0.00		77.8	OK	
S9.001	S25	0.06		162.6	OK	
S1.012	S24	0.02		40.8	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.013	S27	5760 Winter	100	+40%	100/2880 Summer				22.937	0.250	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.013	S27		0.0	SURCHARGED	

APPENDIX C: NORTHERN AND SOUTHERN CATCHMENT PLAN



UK PROTECTIVE MARKING:
Not Protectively Marked

NOTES:
1. Do not scale from this drawing. All dimensions are in metres unless noted otherwise.

KEY

- PIPE
- CRATE BASIN
- BASIN
- INFILTRATION BASIN
- SWALE
- S:9.001 NORTHERN NETWORK
- S3.001 SOUTHERN NETWORK

NOT FOR CONSTRUCTION

NOT FOR APPROVAL

REV.	DATE	PREPARED BY	CHECKED BY	STATUS	REASONS FOR REVISION	APPROVED BY
K	21.02.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
J	31.01.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
I	20.01.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
H	12.11.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
G	06.11.19	NKS	KA	S3	BUFFER ZONE SOUTH OF INFILTRATION TRIMMED	PJ
F	31.10.19	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING TEAM REVIEW	PJ
E	25.09.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
D	02.08.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
C	24.07.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
B	09.07.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
A	01.07.19	NKS	KA	S3	FIRST ISSUE	PJ

NNB GenCo
EDF ENERGY

1st partner: EDF ENERGY
2nd partner: NNB GENCO

CONTRACTOR COMPANY TRADE NAME : ROYAL HASKONINGDHV

CONTRACTOR REF. No. PB7869

CONTRACT NUMBER : SZ0204

CONTRACTOR WBS CODE : N/A

QRA RELATED Yes ☐ No ☒

APPLICABILITY:
1: Document related to Unit 1
2: Document related to Unit 2
9: Document that applies to buildings/systems common to Unit 1 & 2
0: Documents that relate exclusively to buildings or systems that are common to the whole site (e.g. parking, ancillary buildings...)

NUCL/REP/EPR/UKX							
HPC (doc: HK)				SZC (doc: SZ)			
0	1	2	9	0	1	2	9

BUILDING: 000

SYSTEM: 000

SCALE: 1:2000

SIZE: A1

PAGE: 1/1

DESCRIPTION

SIZEWELL C
SOUTHERN PARK AND RIDE SITE
DRAINAGE LAYOUT

DOCUMENT REFERENCE No.

SZC	SZ0204	FP	000	DRW	100053
Project	Contract No. / Orig. Co	Asset / Zone	System / Building	Doc. type	Chrono No.

DOCUMENT SUB -TYPE: N/A

EDF CLASSIFICATION CODE: N/A

SUBCONTRACTOR COMPANY TRADE NAME: N/A

SUBCONTRACTOR DOCUMENT REF. No: N/A

This pattern must be entirely readable

INTELLECTUAL PROPERTY: O-Property of Owner

NNB:

EDF: NNB GenCo © 2018

UK PROTECTIVE MARKING:
Not Protectively Marked

EDF ACCESSIBILITY:
INTERNE ☐ RESTREINT ☐ CONFIDENTIEL ☐

APPENDIX D: NORTHERN CATCHMENT HYDRAULIC CALCULATIONS

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Network North

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Network North

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	1.740	4-8	1.754	8-12	0.481	12-16	0.481	16-20	0.239

Total Area Contributing (ha) = 4.695

Total Pipe Volume (m^3) = 233.983

Network Design Table for Network North

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S8.000	65.683	0.272	241.5	0.382	15.00	0.0	0.600	o	600	Pipe/Conduit	
S8.001	83.632	0.261	320.4	0.453	0.00	0.0	0.600	o	600	Pipe/Conduit	
S8.002	77.351	0.351	220.4	0.418	0.00	0.0	0.600	o	600	Pipe/Conduit	
S9.000	25.003	0.083	301.2	0.033	15.00	0.0	0.600	o	375	Pipe/Conduit	
S9.001	68.374	0.373	183.2	0.322	0.00	0.0	0.600	o	375	Pipe/Conduit	
S10.000	111.255	0.411	270.7	0.668	15.00	0.0	0.600	o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S8.000	50.00	15.70	27.230	0.382	0.0	0.0	0.0	1.56	441.8	51.8
S8.001	50.00	16.73	26.958	0.835	0.0	0.0	0.0	1.35	383.1	113.1
S8.002	50.00	17.52	26.697	1.253	0.0	0.0	0.0	1.64	462.7	169.7
S9.000	50.00	15.40	27.575	0.033	0.0	0.0	0.0	1.04	114.7	4.5
S9.001	50.00	16.25	27.492	0.355	0.0	0.0	0.0	1.34	147.5	48.1
S10.000	50.00	16.37	27.455	0.668	0.0	0.0	0.0	1.36	293.7	90.4

Network Design Table for Network North

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S9.002	55.841	0.623	89.7	0.338	0.00	0.0	0.600	o	525	Pipe/Conduit	
S8.003	42.921	0.086	500.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S8.004	37.349	0.232	160.9	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
S11.000	106.953	0.396	270.1	0.720	15.00	0.0	0.600	o	750	Pipe/Conduit	
S11.001	83.803	0.281	298.2	0.665	0.00	0.0	0.600	o	600	Pipe/Conduit	
S11.002	65.930	0.220	299.7	0.697	0.00	0.0	0.600	o	600	Pipe/Conduit	
S8.005	5.015	0.010	501.5	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S8.006	3.000	0.006	500.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S9.002	50.00	16.76	26.969	1.360	0.0	0.0	0.0	2.37	512.3	184.2
S8.003	50.00	18.13	26.196	2.613	0.0	0.0	0.0	1.17	417.0	353.9
S8.004	50.00	18.43	26.110	2.613	0.0	0.0	0.0	2.06	738.5	353.9
S11.000	50.00	16.05	26.850	0.720	0.0	0.0	0.0	1.70	750.1	97.5
S11.001	50.00	17.04	26.454	1.385	0.0	0.0	0.0	1.40	397.2	187.6
S11.002	50.00	17.83	26.173	2.082	0.0	0.0	0.0	1.40	396.3	281.9
S8.005	50.00	18.49	25.653	4.695	0.0	0.0	0.0	1.39	885.8	635.8
S8.006	50.00	18.53	25.643	4.695	0.0	0.0	0.0	1.39	887.1	635.8

Manhole Schedules for Network North

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)	Backdrop (mm)
S12	28.530	1.300	Open Manhole	1500	S8.000	27.230	600				
S13	28.840	1.882	Open Manhole	1500	S8.001	26.958	600	S8.000	26.958	600	
S14	28.620	1.923	Open Manhole	1500	S8.002	26.697	600	S8.001	26.697	600	
S16	28.950	1.375	Open Manhole	2400	S9.000	27.575	375				
S17	28.920	1.428	Open Manhole	1350	S9.001	27.492	375	S9.000	27.492	375	
S18	28.930	1.475	Open Manhole	1500	S10.000	27.455	525				
S18	28.770	1.801	Open Manhole	1500	S9.002	26.969	525	S9.001	27.119	375	
								S10.000	27.044	525	75
S31	28.810	2.614	Open Manhole	1500	S8.003	26.196	675	S8.002	26.346	600	75
								S9.002	26.346	525	
S32	28.910	2.800	Open Manhole	1500	S8.004	26.110	675	S8.003	26.110	675	
S19	28.180	1.330	Open Manhole	1800	S11.000	26.850	750				
S20	28.180	1.726	Open Manhole	1800	S11.001	26.454	600	S11.000	26.454	750	
S21	28.870	2.697	Open Manhole	1500	S11.002	26.173	600	S11.001	26.173	600	
S22	28.358	2.705	Open Manhole	1800	S8.005	25.653	900	S8.004	25.878	675	
								S11.002	25.953	600	
S23	28.700	3.057	Open Manhole	1800	S8.006	25.643	900	S8.005	25.643	900	
S	28.800	3.163	Open Manhole	0		OUTFALL		S8.006	25.637	900	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S12	628.840	688.752	628.840	688.752	Required	
S13	599.300	747.417	599.300	747.417	Required	
S14	660.875	804.010	660.875	804.010	Required	
S16	734.002	793.114	734.002	793.114	Required	
S17	721.277	814.636	721.277	814.636	Required	
S18	843.928	943.506	843.928	943.506	Required	
S18	776.403	855.085	776.403	855.085	Required	
S31	720.595	853.171	720.595	853.171	Required	
S32	691.261	884.505	691.261	884.505	Required	
S19	893.648	992.437	893.648	992.437	Required	

Manhole Schedules for Network North

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S20	786.703	991.119	786.703	991.119	Required	
S21	703.296	982.983	703.296	982.983	Required	
S22	709.114	917.310	709.114	917.310	Required	
S23	714.103	917.815	714.103	917.815	Required	
S	716.611	919.462			No Entry	

PIPELINE SCHEDULES for Network North

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)
S8.000	o	600	S12	28.530	27.230	0.700	Open Manhole	1500
S8.001	o	600	S13	28.840	26.958	1.282	Open Manhole	1500
S8.002	o	600	S14	28.620	26.697	1.323	Open Manhole	1500
S9.000	o	375	S16	28.950	27.575	1.000	Open Manhole	2400
S9.001	o	375	S17	28.920	27.492	1.053	Open Manhole	1350
S10.000	o	525	S18	28.930	27.455	0.950	Open Manhole	1500
S9.002	o	525	S18	28.770	26.969	1.276	Open Manhole	1500
S8.003	o	675	S31	28.810	26.196	1.939	Open Manhole	1500
S8.004	o	675	S32	28.910	26.110	2.125	Open Manhole	1500
S11.000	o	750	S19	28.180	26.850	0.580	Open Manhole	1800
S11.001	o	600	S20	28.180	26.454	1.126	Open Manhole	1800
S11.002	o	600	S21	28.870	26.173	2.097	Open Manhole	1500
S8.005	o	900	S22	28.358	25.653	1.805	Open Manhole	1800
S8.006	o	900	S23	28.700	25.643	2.157	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)
S8.000	65.683	241.5	S13	28.840	26.958	1.282	Open Manhole	1500
S8.001	83.632	320.4	S14	28.620	26.697	1.323	Open Manhole	1500
S8.002	77.351	220.4	S31	28.810	26.346	1.864	Open Manhole	1500
S9.000	25.003	301.2	S17	28.920	27.492	1.053	Open Manhole	1350
S9.001	68.374	183.2	S18	28.770	27.119	1.276	Open Manhole	1500
S10.000	111.255	270.7	S18	28.770	27.044	1.201	Open Manhole	1500
S9.002	55.841	89.7	S31	28.810	26.346	1.939	Open Manhole	1500
S8.003	42.921	500.0	S32	28.910	26.110	2.125	Open Manhole	1500
S8.004	37.349	160.9	S22	28.358	25.878	1.805	Open Manhole	1800
S11.000	106.953	270.1	S20	28.180	26.454	0.976	Open Manhole	1800
S11.001	83.803	298.2	S21	28.870	26.173	2.097	Open Manhole	1500
S11.002	65.930	299.7	S22	28.358	25.953	1.805	Open Manhole	1800
S8.005	5.015	501.5	S23	28.700	25.643	2.157	Open Manhole	1800
S8.006	3.000	500.0	S	28.800	25.637	2.263	Open Manhole	0

Area Summary for Network North

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
8.000	User	-	100	0.382	0.382	0.382
8.001	User	-	100	0.453	0.453	0.453
8.002	User	-	100	0.418	0.418	0.418
9.000	User	-	100	0.033	0.033	0.033
9.001	User	-	100	0.322	0.322	0.322
10.000	User	-	50	1.335	0.668	0.668
9.002	User	-	100	0.338	0.338	0.338
8.003	-	-	100	0.000	0.000	0.000
8.004	-	-	100	0.000	0.000	0.000
11.000	-	-	100	0.720	0.720	0.720
11.001	User	-	50	1.330	0.665	0.665
11.002	User	-	40	1.742	0.697	0.697
8.005	-	-	100	0.000	0.000	0.000
8.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				7.073	4.695	4.695

Network Classifications for Network North

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S8.000	S12	600	0.700	1.282	Unclassified	1500	0	0.700	Unclassified
S8.001	S13	600	1.282	1.323	Unclassified	1500	0	1.282	Unclassified
S8.002	S14	600	1.323	1.864	Unclassified	1500	0	1.323	Unclassified
S9.000	S16	375	1.000	1.053	Unclassified	2400	0	1.000	Unclassified
S9.001	S17	375	1.053	1.276	Unclassified	1350	0	1.053	Unclassified
S10.000	S18	525	0.950	1.201	Unclassified	1500	0	0.950	Unclassified
S9.002	S18	525	1.276	1.939	Unclassified	1500	0	1.276	Unclassified
S8.003	S31	675	1.939	2.125	Unclassified	1500	0	1.939	Unclassified
S8.004	S32	675	1.805	2.125	Unclassified	1500	0	2.125	Unclassified
S11.000	S19	750	0.580	0.976	Unclassified	1800	0	0.580	Unclassified
S11.001	S20	600	1.126	2.097	Unclassified	1800	0	1.126	Unclassified
S11.002	S21	600	1.805	2.097	Unclassified	1500	0	2.097	Unclassified
S8.005	S22	900	1.805	2.157	Unclassified	1800	0	1.805	Unclassified
S8.006	S23	900	2.157	2.263	Unclassified	1800	0	2.157	Unclassified

Free Flowing Outfall Details for Network North

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S8.006	S	28.800	25.637	0.000	0	0

Simulation Criteria for Network North

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

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

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location GB 640286 267538 TM 40286 67538		Cv (Winter)	0.840
Data Type	Point	Storm Duration (mins)	30

Online Controls for Network North

Weir Manhole: S23, DS/PN: S8.006, Volume (m³): 9.8

Discharge Coef 0.544 Width (m) 1.800 Invert Level (m) 28.700

Storage Structures for Network North

Infiltration Basin Manhole: S23, DS/PN: S8.006

Invert Level (m) 25.643 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.18600 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.18600

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3349.9	3.000	5220.0

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	30 Winter	2	+0%	100/15 Summer				27.341	-0.489	0.000	0.08
S8.001	S13	15 Winter	2	+0%	100/15 Summer				27.154	-0.404	0.000	0.22
S8.002	S14	15 Winter	2	+0%	100/15 Summer				26.920	-0.377	0.000	0.29
S9.000	S16	15 Winter	2	+0%	100/15 Summer				27.642	-0.308	0.000	0.03
S9.001	S17	15 Winter	2	+0%	100/15 Summer				27.635	-0.232	0.000	0.31
S10.000	S18	30 Winter	2	+0%	100/15 Summer				27.611	-0.369	0.000	0.19
S9.002	S18	15 Winter	2	+0%	100/15 Summer				27.155	-0.339	0.000	0.27
S8.003	S31	15 Winter	2	+0%	30/15 Summer				26.613	-0.258	0.000	0.69
S8.004	S32	15 Winter	2	+0%	100/15 Summer				26.406	-0.379	0.000	0.40
S11.000	S19	30 Winter	2	+0%	100/15 Summer				26.996	-0.604	0.000	0.08
S11.001	S20	15 Winter	2	+0%	100/15 Summer				26.699	-0.355	0.000	0.34
S11.002	S21	15 Winter	2	+0%	30/15 Winter				26.493	-0.280	0.000	0.55
S8.005	S22	15 Winter	2	+0%	30/15 Summer				26.289	-0.264	0.000	0.84
S8.006	S23	240 Winter	2	+0%	100/480 Winter				25.821	-0.722	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		30.9	OK	
S8.001	S13		78.4	OK	
S8.002	S14		123.8	OK	
S9.000	S16		3.0	OK	
S9.001	S17		43.1	OK	
S10.000	S18		53.4	OK	
S9.002	S18		124.5	OK	
S8.003	S31		242.9	OK	
S8.004	S32		241.2	OK	
S11.000	S19		58.0	OK	
S11.001	S20		124.6	OK	
S11.002	S21		195.9	OK	
S8.005	S22		429.7	OK	
S8.006	S23		0.0	OK	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 0.750
Site Location	GB 640286 267538 TM 40286 67538		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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	30 Winter	30	+0%	100/15 Summer				27.399	-0.431	0.000	0.18
S8.001	S13	15 Winter	30	+0%	100/15 Summer				27.293	-0.265	0.000	0.55
S8.002	S14	15 Winter	30	+0%	100/15 Summer				27.141	-0.156	0.000	0.67
S9.000	S16	15 Winter	30	+0%	100/15 Summer				27.767	-0.183	0.000	0.08
S9.001	S17	15 Winter	30	+0%	100/15 Summer				27.764	-0.103	0.000	0.83
S10.000	S18	30 Winter	30	+0%	100/15 Summer				27.698	-0.282	0.000	0.44
S9.002	S18	15 Winter	30	+0%	100/15 Summer				27.283	-0.211	0.000	0.66
S8.003	S31	15 Winter	30	+0%	30/15 Summer				26.988	0.117	0.000	1.59
S8.004	S32	15 Winter	30	+0%	100/15 Summer				26.759	-0.026	0.000	0.91
S11.000	S19	30 Winter	30	+0%	100/15 Summer				27.086	-0.514	0.000	0.19
S11.001	S20	15 Winter	30	+0%	100/15 Summer				26.940	-0.114	0.000	0.69
S11.002	S21	15 Winter	30	+0%	30/15 Winter				26.816	0.043	0.000	1.06
S8.005	S22	15 Winter	30	+0%	30/15 Summer				26.565	0.012	0.000	1.83
S8.006	S23	360 Winter	30	+0%	100/480 Winter				26.058	-0.485	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		69.9	OK	
S8.001	S13		194.6	OK	
S8.002	S14		283.9	OK	
S9.000	S16		8.2	OK	
S9.001	S17		114.9	OK	
S10.000	S18		121.1	OK	
S9.002	S18		303.5	OK	
S8.003	S31		558.0	SURCHARGED	
S8.004	S32		553.0	OK	
S11.000	S19		132.0	OK	
S11.001	S20		250.7	OK	
S11.002	S21		377.7	SURCHARGED	
S8.005	S22		931.9	SURCHARGED	
S8.006	S23		0.0	OK	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	15 Winter	100	+40%	100/15 Summer				28.164	0.334	0.000	0.35
S8.001	S13	15 Winter	100	+40%	100/15 Summer				28.138	0.580	0.000	0.74
S8.002	S14	15 Winter	100	+40%	100/15 Summer				28.006	0.709	0.000	1.03
S9.000	S16	15 Winter	100	+40%	100/15 Summer				28.404	0.454	0.000	0.23
S9.001	S17	15 Winter	100	+40%	100/15 Summer				28.407	0.540	0.000	1.32
S10.000	S18	30 Winter	100	+40%	100/15 Summer				28.341	0.361	0.000	0.83
S9.002	S18	15 Winter	100	+40%	100/15 Summer				28.148	0.654	0.000	0.83
S8.003	S31	15 Winter	100	+40%	30/15 Summer				27.679	0.808	0.000	2.23
S8.004	S32	15 Winter	100	+40%	100/15 Summer				27.271	0.486	0.000	1.27
S11.000	S19	30 Winter	100	+40%	100/15 Summer				28.062	0.462	0.000	0.38
S11.001	S20	30 Winter	100	+40%	100/15 Summer				28.015	0.961	0.000	1.18
S11.002	S21	30 Winter	100	+40%	30/15 Winter				27.630	0.857	0.000	1.80
S8.005	S22	15 Winter	100	+40%	30/15 Summer				26.888	0.335	0.000	2.76
S8.006	S23	600 Winter	100	+40%	100/480 Winter				26.575	0.032	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		140.3	SURCHARGED	
S8.001	S13		259.1	SURCHARGED	
S8.002	S14		435.5	SURCHARGED	
S9.000	S16		22.9	SURCHARGED	
S9.001	S17		183.8	SURCHARGED	
S10.000	S18		230.1	SURCHARGED	
S9.002	S18		383.8	SURCHARGED	
S8.003	S31		783.8	SURCHARGED	
S8.004	S32		775.3	SURCHARGED	
S11.000	S19		261.2	FLOOD RISK	
S11.001	S20		430.7	FLOOD RISK	
S11.002	S21		642.6	SURCHARGED	
S8.005	S22		1406.1	SURCHARGED	
S8.006	S23		0.0	SURCHARGED	

APPENDIX E: SOUTHERN CATCHMENT HYDRAULIC CALCULATIONS

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Network South

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Network South

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	1.160	4-8	1.722	8-12	2.335	12-16	1.815	16-20	0.920	20-24	0.744	24-28	0.414	28-32	0.172

Total Area Contributing (ha) = 9.281

Total Pipe Volume (m^3) = 5873.770

Network Design Table for Network South

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	64.797	0.386	167.9	0.246	15.00	0.0	0.600		o	300	Pipe/Conduit	
S2.000	65.687	0.274	239.7	0.263	15.00	0.0	0.600		o	300	Pipe/Conduit	
S3.000	66.073	0.330	200.2	0.441	15.00	0.0	0.600		o	375	Pipe/Conduit	
S3.001	44.777	0.384	116.6	0.104	0.00	0.0	0.045	3 \=/		1500	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	15.89	27.025	0.246	0.0	0.0	0.0	1.21	85.6	33.3
S2.000	50.00	16.08	27.000	0.263	0.0	0.0	0.0	1.01	71.5	35.6
S3.000	50.00	15.86	27.590	0.441	0.0	0.0	0.0	1.28	141.0	59.7
S3.001	50.00	17.36	27.260	0.545	0.0	0.0	0.0	0.50	146.0	73.8

Network Design Table for Network South

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.001	33.181	0.138	240.4	0.000	0.00	0.0		0.045	3 \=/	1500	1:3 Swale	
S1.001	45.813	0.153	299.4	0.152	0.00	0.0		0.045	o	750	Pipe/Conduit	
S4.000	57.183	0.340	168.2	0.178	15.00	0.0	0.600		o	300	Pipe/Conduit	
S1.002	45.813	0.153	299.4	0.198	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.003	26.883	0.074	361.8	0.318	0.00	0.0	0.600		o	600	Pipe/Conduit	
S1.004	102.802	0.390	263.9	0.573	0.00	0.0		0.045	3 \=/	1500	1:3 Swale	
S1.005	104.957	0.210	499.8	0.606	0.00	0.0		0.045	o	1500	Pipe/Conduit	
S1.006	44.603	0.308	145.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S5.000	60.711	0.430	141.2	0.313	15.00	0.0	0.600		o	300	Pipe/Conduit	
S5.001	38.530	0.385	100.0	0.103	0.00	0.0	0.600		o	300	Pipe/Conduit	
S6.000	90.297	0.324	279.0	0.441	15.00	0.0	0.600		o	375	Pipe/Conduit	
S6.001	60.861	0.609	99.9	0.513	0.00	0.0	0.600		o	600	Pipe/Conduit	
S7.000	88.800	0.888	100.0	0.344	15.00	0.0	0.600		o	300	Pipe/Conduit	
S6.002	43.575	0.436	99.9	0.223	0.00	0.0	0.600		o	600	Pipe/Conduit	
S8.000	76.277	1.140	66.9	0.521	15.00	0.0	0.600		o	450	Pipe/Conduit	
S8.001	44.044	0.440	100.1	0.292	0.00	0.0	0.600		o	450	Pipe/Conduit	
S5.002	12.369	0.025	494.8	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S5.003	30.392	0.062	490.2	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S5.004	42.116	0.084	501.4	0.456	0.00	0.0		0.045	4 \=/	600	1:4 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.001	50.00	18.95	26.726	0.808	0.0	0.0	0.0	0.35	101.7«	109.4
S1.001	50.00	20.76	25.988	1.206	0.0	0.0	0.0	0.42	185.9	163.2
S4.000	50.00	15.79	27.325	0.178	0.0	0.0	0.0	1.21	85.5	24.1
S1.002	50.00	21.42	26.486	1.581	0.0	0.0	0.0	1.17	186.0«	214.1
S1.003	50.00	21.77	26.183	1.899	0.0	0.0	0.0	1.27	360.3	257.2
S1.004	50.00	26.93	26.109	2.472	0.0	0.0	0.0	0.33	97.0«	334.7
S1.005	50.00	30.00	24.369	3.078	0.0	0.0	0.0	0.52	913.4	416.8
S1.006	50.00	30.00	24.159	3.078	0.0	0.0	0.0	2.02	571.2	416.8
S5.000	50.00	15.77	27.025	0.313	0.0	0.0	0.0	1.32	93.4	42.4
S5.001	50.00	16.17	26.595	0.416	0.0	0.0	0.0	1.57	111.1	56.3
S6.000	50.00	16.39	27.300	0.441	0.0	0.0	0.0	1.08	119.3	59.8
S6.001	50.00	16.81	26.751	0.955	0.0	0.0	0.0	2.44	688.8	129.3
S7.000	50.00	15.94	28.000	0.344	0.0	0.0	0.0	1.57	111.1	46.6
S6.002	50.00	17.11	26.142	1.521	0.0	0.0	0.0	2.44	688.8	206.0
S8.000	50.00	15.51	27.250	0.521	0.0	0.0	0.0	2.49	395.8	70.6
S8.001	50.00	15.87	26.487	0.813	0.0	0.0	0.0	2.03	323.2	110.2
S5.002	50.00	17.30	25.632	2.751	0.0	0.0	0.0	1.09	307.6«	372.5
S5.003	50.00	17.76	25.607	2.751	0.0	0.0	0.0	1.09	309.1«	372.5
S5.004	50.00	21.09	25.545	3.207	0.0	0.0	0.0	0.21	38.0«	434.3

. | Souther Park and Ride
. | Attenuation Model
. | Network South

Date 07/02/2022 | Designed by Dan James
File SPR DRawnet OP8 1.MDX | Checked by Derek Lord
XP Solutions | Network 2019.1

Network Design Table for Network South

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S5.005	109.837	1.373	80.0	1.106	0.00	0.0		0.045	3 \=/	600	1:3 Swale	
S5.006	42.249	0.422	100.1	0.174	0.00	0.0	0.600		o	600	Pipe/Conduit	
S1.007	22.494	0.278	80.9	0.199	0.00	0.0	0.600		o	1050	Pipe/Conduit	
S1.008	18.911	0.057	331.8	0.104	0.00	0.0	0.600		o	1050	Pipe/Conduit	
S1.009	11.370	0.574	19.8	0.206	0.00	0.0	0.600		o	1050	Pipe/Conduit	
S1.010	61.289	0.255	240.3	0.158	0.00	0.0	0.600		o	1050	Pipe/Conduit	
S1.011	33.560	0.673	49.9	0.226	0.00	0.0	0.600		o	1050	Pipe/Conduit	
S9.000	83.677	0.209	400.4	0.256	15.00	0.0		0.045	3 \=/	1500	1:3 Swale	
S10.000	50.967	1.593	32.0	0.233	15.00	0.0		0.045	3 \=/	1500	1:3 Swale	
S9.001	53.969	1.250	43.2	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
S1.012	37.603	0.125	300.8	0.333	0.00	0.0	0.600		o	1200	Pipe/Conduit	
S1.013	8.803	0.425	20.7	0.000	0.00	0.0	0.600		o	1200	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S5.005	50.00	24.47	25.558	4.313	0.0	0.0	0.0	0.54	85.3«	584.1
S5.006	50.00	24.76	24.185	4.487	0.0	0.0	0.0	2.43	688.2	607.6
S1.007	50.00	30.00	23.388	7.764	0.0	0.0	0.0	3.83	3318.9	1051.4
S1.008	50.00	30.00	23.110	7.868	0.0	0.0	0.0	1.89	1633.4	1065.5
S1.009	50.00	30.00	23.219	8.074	0.0	0.0	0.0	7.76	6720.9	1093.4
S1.010	50.00	30.00	22.640	8.232	0.0	0.0	0.0	2.22	1921.0	1114.8
S1.011	50.00	30.00	22.285	8.459	0.0	0.0	0.0	4.89	4230.8	1145.4
S9.000	50.00	20.18	23.480	0.256	0.0	0.0	0.0	0.27	78.8	34.7
S10.000	50.00	15.89	24.790	0.233	0.0	0.0	0.0	0.95	278.7	31.6
S9.001	50.00	20.37	23.197	0.489	0.0	0.0	0.0	4.78	3038.2	66.2
S1.012	50.00	30.00	21.612	9.281	0.0	0.0	0.0	2.15	2433.6	1256.8
S1.013	50.00	30.00	21.487	9.281	0.0	0.0	0.0	8.24	9315.9	1256.8

Manhole Schedules for Network South

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)
S1	28.450	1.425	Open Manhole	1200	S1.000	27.025	300				
S15	28.370	1.370	Open Manhole	1200	S2.000	27.000	300				
S17	28.890	1.300	Open Manhole	1350	S3.000	27.590	375				
S4	28.950	1.690	Open Manhole	10000	S3.001	27.260	1500	S3.000	27.260	375	
S3	28.660	1.934	Open Manhole	10000	S2.001	26.726	1500	S2.000	26.726	300	
								S3.001	26.876	1500	150
S1	28.580	2.592	Open Manhole	10000	S1.001	25.988	750	S1.000	26.639	300	201
								S2.001	26.588	1500	
S3	28.750	1.425	Open Manhole	1200	S4.000	27.325	300				
S3	28.440	2.605	Open Manhole	1800	S1.002	26.486	450	S1.001	25.835	750	
								S4.000	26.985	300	349
S2	28.440	2.257	Open Manhole	1500	S1.003	26.183	600	S1.002	26.333	450	
S3	28.480	2.371	Open Manhole	10000	S1.004	26.109	1500	S1.003	26.109	600	
S7	26.000	1.631	Junction		S1.005	24.369	1500	S1.004	25.719	1500	
S4	26.000	1.841	Open Manhole	2400	S1.006	24.159	600	S1.005	24.159	1500	
S10	28.450	1.425	Open Manhole	1200	S5.000	27.025	300				
S11	28.020	1.425	Open Manhole	1200	S5.001	26.595	300	S5.000	26.595	300	
S11	28.530	1.230	Open Manhole	1350	S6.000	27.300	375				
S14	27.940	1.189	Open Manhole	1500	S6.001	26.751	600	S6.000	26.976	375	
S17	29.300	1.300	Open Manhole	1200	S7.000	28.000	300				
S6	28.190	2.048	Open Manhole	1500	S6.002	26.142	600	S6.001	26.142	600	
								S7.000	27.112	300	670
S8	28.750	1.500	Open Manhole	1350	S8.000	27.250	450				
S9	27.610	1.500	Open Manhole	1350	S8.001	26.487	450	S8.000	26.110	450	
S7	27.276	1.644	Open Manhole	1500	S5.002	25.632	600	S5.001	26.210	300	278
								S6.002	25.706	600	74
								S8.001	26.047	450	265
S8	27.550	1.943	Open Manhole	1500	S5.003	25.607	600	S5.002	25.607	600	
S9	27.530	1.985	Open Manhole	1500	S5.004	25.545	600	S5.003	25.545	600	
S10	26.720	1.259	Junction		S5.005	25.558	600	S5.004	25.461	600	
S11	25.520	1.335	Open Manhole	1500	S5.006	24.185	600	S5.005	24.185	600	
S5	24.752	1.364	Open Manhole	2400	S1.007	23.388	1050	S1.006	23.851	600	13
								S5.006	23.763	600	
S6	25.270	2.160	Open Manhole	2400	S1.008	23.110	1050	S1.007	23.110	1050	
S7	24.650	1.597	Open Manhole	1950	S1.009	23.219	1050	S1.008	23.053	1050	
S8	24.600	1.960	Open Manhole	1950	S1.010	22.640	1050	S1.009	22.645	1050	5
S9	24.410	2.125	Open Manhole	1950	S1.011	22.285	1050	S1.010	22.385	1050	100
S24	24.830	1.350	Junction		S9.000	23.480	1500				
S25	26.140	1.350	Junction		S10.000	24.790	1500				
S25	24.250	1.053	Open Manhole	1500	S9.001	23.197	900	S9.000	23.271	1500	
								S10.000	23.197	1500	
S24	23.500	1.888	Open Manhole	2100	S1.012	21.612	1200	S1.011	21.612	1050	
								S9.001	21.947	900	35
S27	23.330	1.843	Open Manhole	2100	S1.013	21.487	1200	S1.012	21.487	1200	
S	22.500	1.438	Open Manhole	0		OUTFALL		S1.013	21.062	1200	

Manhole Schedules for Network South

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	766.688	646.471	766.688	646.471	Required	
S15	733.145	680.684	733.145	680.684	Required	
S17	706.309	717.886	706.309	717.886	Required	
S4	759.876	756.568	759.876	756.568	Required	
S3	785.749	720.023	785.749	720.023	Required	
S1	808.558	695.924	808.558	695.924	Required	
S3	792.261	616.505	792.261	616.505	Required	
S3	832.667	656.967	832.667	656.967	Required	
S2	856.777	618.011	856.777	618.011	Required	
S3	837.553	599.219	837.553	599.219	Required	
S7	758.350	533.681			No Entry	
S4	669.902	477.176	669.902	477.176	Required	
S10	765.558	648.208	765.558	648.208	Required	
S11	716.535	612.395	716.535	612.395	Required	
S11	703.066	714.468	703.066	714.468	Required	
S14	622.595	673.505	622.595	673.505	Required	
S17	732.154	679.979	732.154	679.979	Required	
S6	661.261	626.505	661.261	626.505	Required	
S8	791.458	615.308	791.458	615.308	Required	
S9	726.595	575.172	726.595	575.172	Required	

Manhole Schedules for Network South

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S7	685.142	590.056	685.142	590.056	Required	
S8	691.595	579.505	691.595	579.505	Required	
S9	665.639	563.695	665.639	563.695	Required	
S10	688.262	528.172			No Entry	
S11	596.261	468.172	596.261	468.172	Required	
S5	634.453	450.106	634.453	450.106	Required	
S6	616.141	437.043	616.141	437.043	Required	
S7	628.511	422.738	628.511	422.738	Required	
S8	620.381	414.789	620.381	414.789	Required	
S9	569.361	380.828	569.361	380.828	Required	
S24	564.595	446.172			No Entry	
S25	475.389	353.495			No Entry	
S25	494.262	400.839	494.262	400.839	Required	
S24	537.915	369.104	537.915	369.104	Required	
S27	503.262	354.505	503.262	354.505	Required	
S	495.230	350.902			No Entry	

PIPELINE SCHEDULES for Network South

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)
S1.000	o	300	S1	28.450	27.025	1.125	Open Manhole	1200
S2.000	o	300	S15	28.370	27.000	1.070	Open Manhole	1200
S3.000	o	375	S17	28.890	27.590	0.925	Open Manhole	1350
S3.001	3 \=/	1500	S4	28.950	27.260	1.540	Open Manhole	10000
S2.001	3 \=/	1500	S3	28.660	26.726	1.784	Open Manhole	10000
S1.001	o	750	S1	28.580	25.988	1.842	Open Manhole	10000
S4.000	o	300	S3	28.750	27.325	1.125	Open Manhole	1200
S1.002	o	450	S3	28.440	26.486	1.504	Open Manhole	1800
S1.003	o	600	S2	28.440	26.183	1.657	Open Manhole	1500
S1.004	3 \=/	1500	S3	28.480	26.109	2.221	Open Manhole	10000
S1.005	o	1500	S7	26.000	24.369	0.131	Junction	
S1.006	o	600	S4	26.000	24.159	1.241	Open Manhole	2400
S5.000	o	300	S10	28.450	27.025	1.125	Open Manhole	1200
S5.001	o	300	S11	28.020	26.595	1.125	Open Manhole	1200
S6.000	o	375	S11	28.530	27.300	0.855	Open Manhole	1350
S6.001	o	600	S14	27.940	26.751	0.589	Open Manhole	1500
S7.000	o	300	S17	29.300	28.000	1.000	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)
S1.000	64.797	167.9	S1	28.580	26.639	1.641	Open Manhole	10000
S2.000	65.687	239.7	S3	28.660	26.726	1.634	Open Manhole	10000
S3.000	66.073	200.2	S4	28.950	27.260	1.315	Open Manhole	10000
S3.001	44.777	116.6	S3	28.660	26.876	1.634	Open Manhole	10000
S2.001	33.181	240.4	S1	28.580	26.588	1.842	Open Manhole	10000
S1.001	45.813	299.4	S3	28.440	25.835	1.855	Open Manhole	1800
S4.000	57.183	168.2	S3	28.440	26.985	1.155	Open Manhole	1800
S1.002	45.813	299.4	S2	28.440	26.333	1.657	Open Manhole	1500
S1.003	26.883	361.8	S3	28.480	26.109	1.771	Open Manhole	10000
S1.004	102.802	263.9	S7	26.000	25.719	0.131	Junction	
S1.005	104.957	499.8	S4	26.000	24.159	0.341	Open Manhole	2400
S1.006	44.603	145.0	S5	24.752	23.851	0.301	Open Manhole	2400
S5.000	60.711	141.2	S11	28.020	26.595	1.125	Open Manhole	1200
S5.001	38.530	100.0	S7	27.276	26.210	0.766	Open Manhole	1500
S6.000	90.297	279.0	S14	27.940	26.976	0.589	Open Manhole	1500
S6.001	60.861	99.9	S6	28.190	26.142	1.448	Open Manhole	1500
S7.000	88.800	100.0	S6	28.190	27.112	0.778	Open Manhole	1500

PIPELINE SCHEDULES for Network South

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)
S6.002	o	600	S6	28.190	26.142	1.448	Open Manhole	1500
S8.000	o	450	S8	28.750	27.250	1.050	Open Manhole	1350
S8.001	o	450	S9	27.610	26.487	0.673	Open Manhole	1350
S5.002	o	600	S7	27.276	25.632	1.044	Open Manhole	1500
S5.003	o	600	S8	27.550	25.607	1.343	Open Manhole	1500
S5.004	4 \=/	600	S9	27.530	25.545	1.835	Open Manhole	1500
S5.005	3 \=/	600	S10	26.720	25.558	1.012	Junction	
S5.006	o	600	S11	25.520	24.185	0.735	Open Manhole	1500
S1.007	o	1050	S5	24.752	23.388	0.314	Open Manhole	2400
S1.008	o	1050	S6	25.270	23.110	1.110	Open Manhole	2400
S1.009	o	1050	S7	24.650	23.219	0.381	Open Manhole	1950
S1.010	o	1050	S8	24.600	22.640	0.910	Open Manhole	1950
S1.011	o	1050	S9	24.410	22.285	1.075	Open Manhole	1950
S9.000	3 \=/	1500	S24	24.830	23.480	1.200	Junction	
S10.000	3 \=/	1500	S25	26.140	24.790	1.200	Junction	
S9.001	o	900	S25	24.250	23.197	0.153	Open Manhole	1500
S1.012	o	1200	S24	23.500	21.612	0.688	Open Manhole	2100
S1.013	o	1200	S27	23.330	21.487	0.643	Open Manhole	2100

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)
S6.002	43.575	99.9	S7	27.276	25.706	0.970	Open Manhole	1500
S8.000	76.277	66.9	S9	27.610	26.110	1.050	Open Manhole	1350
S8.001	44.044	100.1	S7	27.276	26.047	0.779	Open Manhole	1500
S5.002	12.369	494.8	S8	27.550	25.607	1.343	Open Manhole	1500
S5.003	30.392	490.2	S9	27.530	25.545	1.385	Open Manhole	1500
S5.004	42.116	501.4	S10	26.720	25.461	1.109	Junction	
S5.005	109.837	80.0	S11	25.520	24.185	1.185	Open Manhole	1500
S5.006	42.249	100.1	S5	24.752	23.763	0.389	Open Manhole	2400
S1.007	22.494	80.9	S6	25.270	23.110	1.110	Open Manhole	2400
S1.008	18.911	331.8	S7	24.650	23.053	0.547	Open Manhole	1950
S1.009	11.370	19.8	S8	24.600	22.645	0.905	Open Manhole	1950
S1.010	61.289	240.3	S9	24.410	22.385	0.975	Open Manhole	1950
S1.011	33.560	49.9	S24	23.500	21.612	0.838	Open Manhole	2100
S9.000	83.677	400.4	S25	24.250	23.271	0.829	Open Manhole	1500
S10.000	50.967	32.0	S25	24.250	23.197	0.903	Open Manhole	1500
S9.001	53.969	43.2	S24	23.500	21.947	0.653	Open Manhole	2100
S1.012	37.603	300.8	S27	23.330	21.487	0.643	Open Manhole	2100
S1.013	8.803	20.7	S	22.500	21.062	0.238	Open Manhole	0

Area Summary for Network South

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.246	0.246	0.246
2.000	User	-	100	0.263	0.263	0.263
3.000	User	-	100	0.441	0.441	0.441
3.001	User	-	50	0.209	0.104	0.104
2.001	-	-	100	0.000	0.000	0.000
1.001	User	-	100	0.152	0.152	0.152
4.000	User	-	100	0.178	0.178	0.178
1.002	User	-	100	0.198	0.198	0.198
1.003	User	-	100	0.175	0.175	0.175
	User	-	100	0.142	0.142	0.318
1.004	User	-	100	0.573	0.573	0.573
1.005	User	-	100	0.606	0.606	0.606
1.006	-	-	100	0.000	0.000	0.000
5.000	User	-	100	0.313	0.313	0.313
5.001	User	-	100	0.103	0.103	0.103
6.000	User	-	100	0.441	0.441	0.441
6.001	User	-	75	0.684	0.513	0.513
7.000	User	-	100	0.344	0.344	0.344
6.002	User	-	100	0.223	0.223	0.223
8.000	User	-	100	0.282	0.282	0.282
	User	-	100	0.239	0.239	0.521
8.001	User	-	100	0.292	0.292	0.292
5.002	-	-	100	0.000	0.000	0.000
5.003	-	-	100	0.000	0.000	0.000
5.004	User	-	100	0.456	0.456	0.456
5.005	User	-	100	0.813	0.813	0.813
	User	-	100	0.294	0.294	1.106
5.006	User	-	100	0.174	0.174	0.174
1.007	User	-	100	0.199	0.199	0.199
1.008	User	-	100	0.104	0.104	0.104
1.009	User	-	100	0.206	0.206	0.206
1.010	User	-	100	0.158	0.158	0.158
1.011	User	-	100	0.226	0.226	0.226
9.000	User	-	100	0.256	0.256	0.256
10.000	User	-	100	0.233	0.233	0.233
9.001	-	-	100	0.000	0.000	0.000
1.012	User	-	100	0.333	0.333	0.333
1.013	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				9.556	9.281	9.281

Network Classifications for Network South

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S1.000	S1	300	1.125	1.641	Unclassified	1200	0	1.125	Unclassified
S2.000	S15	300	1.070	1.634	Unclassified	1200	0	1.070	Unclassified
S3.000	S17	375	0.925	1.315	Unclassified	1350	0	0.925	Unclassified
S3.001	S4	1500	1.540	1.634	Unclassified	10000	0	1.540	Unclassified
S2.001	S3	1500	1.784	1.842	Unclassified	10000	0	1.784	Unclassified
S1.001	S1	750	1.842	1.855	Unclassified	10000	0	1.842	Unclassified
S4.000	S3	300	1.125	1.155	Unclassified	1200	0	1.125	Unclassified
S1.002	S3	450	1.504	1.657	Unclassified	1800	0	1.504	Unclassified
S1.003	S2	600	1.657	1.771	Unclassified	1500	0	1.657	Unclassified
S1.004	S3	1500	0.131	2.221	Unclassified	10000	0	2.221	Unclassified
S1.005	S7	1500	0.131	0.341	Unclassified				Junction
S1.006	S4	600	0.301	1.241	Unclassified	2400	0	1.241	Unclassified
S5.000	S10	300	1.125	1.125	Unclassified	1200	0	1.125	Unclassified
S5.001	S11	300	0.766	1.125	Unclassified	1200	0	1.125	Unclassified
S6.000	S11	375	0.589	0.855	Unclassified	1350	0	0.855	Unclassified
S6.001	S14	600	0.589	1.448	Unclassified	1500	0	0.589	Unclassified
S7.000	S17	300	0.778	1.000	Unclassified	1200	0	1.000	Unclassified
S6.002	S6	600	0.970	1.448	Unclassified	1500	0	1.448	Unclassified
S8.000	S8	450	1.050	1.050	Unclassified	1350	0	1.050	Unclassified
S8.001	S9	450	0.673	0.779	Unclassified	1350	0	0.673	Unclassified
S5.002	S7	600	1.044	1.343	Unclassified	1500	0	1.044	Unclassified
S5.003	S8	600	1.343	1.385	Unclassified	1500	0	1.343	Unclassified
S5.004	S9	600	1.109	1.835	Unclassified	1500	0	1.835	Unclassified
S5.005	S10	600	1.012	1.185	Unclassified				Junction
S5.006	S11	600	0.389	0.735	Unclassified	1500	0	0.735	Unclassified
S1.007	S5	1050	0.314	1.110	Unclassified	2400	0	0.314	Unclassified
S1.008	S6	1050	0.547	1.110	Unclassified	2400	0	1.110	Unclassified
S1.009	S7	1050	0.381	0.905	Unclassified	1950	0	0.381	Unclassified
S1.010	S8	1050	0.910	0.975	Unclassified	1950	0	0.910	Unclassified
S1.011	S9	1050	0.838	1.075	Unclassified	1950	0	1.075	Unclassified
S9.000	S24	1500	0.829	1.200	Unclassified				Junction
S10.000	S25	1500	0.903	1.200	Unclassified				Junction
S9.001	S25	900	0.153	0.653	Unclassified	1500	0	0.153	Unclassified
S1.012	S24	1200	0.643	0.688	Unclassified	2100	0	0.688	Unclassified
S1.013	S27	1200	0.238	0.643	Unclassified	2100	0	0.643	Unclassified

Free Flowing Outfall Details for Network South

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.013	S	22.500	21.062	0.000	0	0

Simulation Criteria for Network South

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Return Period (years) 100

Synthetic Rainfall Details

FEH Rainfall Version	2013	Winter Storms	Yes
Site Location	GB 640286 267538 TM 40286 67538	Cv (Summer)	0.750
Data Type	Point	Cv (Winter)	0.840
Summer Storms	Yes	Storm Duration (mins)	30

Online Controls for Network South

Hydro-Brake® Optimum Manhole: S6, DS/PN: S6.002, Volume (m³): 26.6

Unit Reference	MD-SHE-0128-7500-1000-7500
Design Head (m)	1.000
Design Flow (l/s)	7.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	128
Invert Level (m)	26.142
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	7.5	Kick-Flo®	0.656	6.2
Flush-Flo™	0.297	7.5	Mean Flow over Head Range	-	6.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.6	0.800	6.8	2.000	10.4	4.000	14.4	7.000	18.9
0.200	7.3	1.000	7.5	2.200	10.9	4.500	15.3	7.500	19.5
0.300	7.5	1.200	8.2	2.400	11.3	5.000	16.1	8.000	20.1
0.400	7.4	1.400	8.8	2.600	11.8	5.500	16.8	8.500	20.7
0.500	7.2	1.600	9.4	3.000	12.6	6.000	17.5	9.000	21.3
0.600	6.7	1.800	9.9	3.500	13.5	6.500	18.2	9.500	21.9

Hydro-Brake® Optimum Manhole: S7, DS/PN: S5.002, Volume (m³): 24.2

Unit Reference	MD-SHE-0163-1500-1800-1500
Design Head (m)	1.800
Design Flow (l/s)	15.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	163
Invert Level (m)	25.632
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	15.0	Kick-Flo®	1.111	11.9
Flush-Flo™	0.523	15.0	Mean Flow over Head Range	-	13.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.8	0.800	14.5	2.000	15.8	4.000	21.9	7.000	28.7
0.200	12.9	1.000	13.3	2.200	16.5	4.500	23.2	7.500	29.7
0.300	14.2	1.200	12.4	2.400	17.2	5.000	24.4	8.000	30.6
0.400	14.8	1.400	13.3	2.600	17.9	5.500	25.6	8.500	31.5
0.500	15.0	1.600	14.2	3.000	19.1	6.000	26.7	9.000	32.4
0.600	15.0	1.800	15.0	3.500	20.6	6.500	27.7	9.500	33.3

Hydro-Brake® Optimum Manhole: S6, DS/PN: S1.008, Volume (m³): 27.2

Unit Reference	MD-SHE-0517-2000-1800-2000
Design Head (m)	1.800
Design Flow (l/s)	200.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	517
Invert Level (m)	23.110
Minimum Outlet Pipe Diameter (mm)	Site Specific Design (Contact Hydro International)
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	200.0	Kick-Flo®	1.398	176.8
Flush-Flo™	0.788	200.0	Mean Flow over Head Range	-	161.7

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)	Depth (m)	Flow (l/s)
0.100	12.8	0.800	200.0	2.000	210.6	4.000	295.6	7.000	389.2
0.200	47.4	1.000	197.4	2.200	220.6	4.500	313.2	7.500	402.6
0.300	96.6	1.200	190.6	2.400	230.2	5.000	329.8	8.000	415.6
0.400	151.4	1.400	177.2	2.600	239.4	5.500	345.7	8.500	428.2
0.500	192.0	1.600	188.8	3.000	256.7	6.000	360.8	9.000	440.4
0.600	196.9	1.800	200.0	3.500	276.9	6.500	375.2	9.500	452.3

Hydro-Brake® Optimum Manhole: S8, DS/PN: S1.010, Volume (m³): 14.0

Unit Reference	MD-SHE-0217-3000-2400-3000
Design Head (m)	2.400
Design Flow (l/s)	30.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	217
Invert Level (m)	22.640
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.400	30.0	Kick-Flo®	1.468	23.7
Flush-Flo™	0.690	30.0	Mean Flow over Head Range	-	26.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.3	0.800	29.9	2.000	27.5	4.000	38.3	7.000	50.2
0.200	21.2	1.000	29.2	2.200	28.7	4.500	40.6	7.500	51.9
0.300	26.7	1.200	27.9	2.400	30.0	5.000	42.7	8.000	53.6
0.400	28.5	1.400	25.2	2.600	31.1	5.500	44.7	8.500	55.2
0.500	29.4	1.600	24.7	3.000	33.4	6.000	46.6	9.000	56.7
0.600	29.9	1.800	26.1	3.500	35.9	6.500	48.4	9.500	58.2

Weir Manhole: S27, DS/PN: S1.013, Volume (m³): 46.5

Discharge Coef 0.544 Width (m) 1.500 Invert Level (m) 23.030

Storage Structures for Network South

Tank or Pond Manhole: S6, DS/PN: S6.002

Invert Level (m) 26.142

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	509.0	1.600	1389.0

Tank or Pond Manhole: S7, DS/PN: S5.002

Invert Level (m) 25.632

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	870.0	1.500	1700.0

Tank or Pond Manhole: S6, DS/PN: S1.008

Invert Level (m) 23.110

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1073.0	1.550	1643.0

Cellular Storage Manhole: S8, DS/PN: S1.010

Invert Level (m) 22.640 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	2640.0	0.0	1.700	2640.0	0.0	1.701	0.0	0.0

Infiltration Basin Manhole: S27, DS/PN: S1.013

Invert Level (m) 21.487 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.10584 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.10584

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1908.7	1.500	3193.5

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	30 Winter	2	+0%	100/15 Summer				27.125	-0.200	0.000
S2.000	S15	30 Winter	2	+0%	100/15 Summer				27.115	-0.185	0.000
S3.000	S17	30 Winter	2	+0%	100/15 Winter				27.722	-0.243	0.000
S3.001	S4	30 Winter	2	+0%					27.334	-1.616	0.000
S2.001	S3	30 Winter	2	+0%					26.840	-1.820	0.000
S1.001	S1	120 Summer	2	+0%	30/15 Summer				26.738	0.000	0.000
S4.000	S3	30 Winter	2	+0%					27.410	-0.215	0.000
S1.002	S3	120 Summer	2	+0%	100/15 Summer				26.707	-0.229	0.000
S1.003	S2	120 Summer	2	+0%					26.419	-0.364	0.000
S1.004	S3	120 Summer	2	+0%					26.277	-2.203	0.000
S1.005	S7	15 Winter	2	+0%					24.810	-1.059	0.000
S1.006	S4	15 Winter	2	+0%	100/15 Summer				24.388	-0.371	0.000
S5.000	S10	30 Winter	2	+0%	100/15 Summer				27.134	-0.191	0.000
S5.001	S11	15 Winter	2	+0%	100/15 Summer				26.713	-0.182	0.000
S6.000	S11	30 Winter	2	+0%	100/15 Summer				27.444	-0.231	0.000
S6.001	S14	15 Winter	2	+0%	100/240 Winter				26.905	-0.446	0.000
S7.000	S17	30 Winter	2	+0%	100/30 Winter				28.103	-0.197	0.000
S6.002	S6	360 Winter	2	+0%	30/120 Summer				26.554	-0.189	0.000
S8.000	S8	30 Winter	2	+0%					27.351	-0.349	0.000
S8.001	S9	15 Winter	2	+0%	100/15 Winter				26.639	-0.298	0.000
S5.002	S7	960 Winter	2	+0%	100/120 Summer				25.930	-0.302	0.000
S5.003	S8	15 Winter	2	+0%					25.778	-0.429	0.000
S5.004	S9	15 Winter	2	+0%					25.790	-1.740	0.000
S5.005	S10	15 Winter	2	+0%					25.769	-0.951	0.000
S5.006	S11	15 Winter	2	+0%	100/15 Summer				24.417	-0.368	0.000
S1.007	S5	15 Winter	2	+0%	100/60 Winter				23.718	-0.720	0.000
S1.008	S6	360 Winter	2	+0%	100/30 Winter				23.634	-0.526	0.000
S1.009	S7	360 Winter	2	+0%	100/1440 Winter				23.352	-0.917	0.000
S1.010	S8	1440 Winter	2	+0%	100/240 Winter				22.998	-0.692	0.000
S1.011	S9	15 Winter	2	+0%					22.344	-0.991	0.000
S9.000	S24	30 Winter	2	+0%					23.550	-1.280	0.000
S10.000	S25	30 Winter	2	+0%					24.820	-1.320	0.000
S9.001	S25	30 Winter	2	+0%					23.264	-0.833	0.000
S1.012	S24	2880 Winter	2	+0%	100/4320 Summer				22.017	-0.795	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.24		19.9	OK	
S2.000	S15	0.31		21.2	OK	
S3.000	S17	0.27		35.6	OK	
S3.001	S4	0.00		42.7	OK	
S2.001	S3	0.00		62.7	OK	
S1.001	S1	0.35		64.3	OK	
S4.000	S3	0.18		14.4	OK	
S1.002	S3	0.47		79.6	OK	
S1.003	S2	0.32		92.1	OK	
S1.004	S3	0.00		117.5	OK	
S1.005	S7	0.17		157.6	OK*	
S1.006	S4	0.31		154.2	OK	
S5.000	S10	0.28		25.3	OK	
S5.001	S11	0.33		33.6	OK	
S6.000	S11	0.31		35.8	OK	
S6.001	S14	0.15		91.4	OK	
S7.000	S17	0.26		27.9	OK	
S6.002	S6	0.01		7.4	OK	
S8.000	S8	0.11		42.2	OK	
S8.001	S9	0.25		71.7	OK	
S5.002	S7	0.08		13.1	OK	
S5.003	S8	0.01		3.7	OK	
S5.004	S9	0.00		47.1	OK	
S5.005	S10	0.02		172.5	OK	
S5.006	S11	0.32		188.3	OK	
S1.007	S5	0.22		348.4	OK	
S1.008	S6	0.09		87.9	OK	
S1.009	S7	0.04		90.5	OK	
S1.010	S8	0.02		27.9	OK	
S1.011	S9	0.01		29.4	OK	
S9.000	S24	0.00		20.8	OK	
S10.000	S25	0.00		18.9	OK	
S9.001	S25	0.02		39.6	OK	
S1.012	S24	0.02		30.4	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.013	S27	2880 Winter	2	+0%	100/2880 Summer				22.017	-0.670	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.013	S27		0.0	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	30 Winter	30	+0%	100/15 Summer				27.184	-0.141	0.000
S2.000	S15	30 Winter	30	+0%	100/15 Summer				27.187	-0.113	0.000
S3.000	S17	30 Winter	30	+0%	100/15 Winter				27.802	-0.163	0.000
S3.001	S4	30 Winter	30	+0%					27.378	-1.572	0.000
S2.001	S3	30 Winter	30	+0%					27.026	-1.634	0.000
S1.001	S1	30 Winter	30	+0%	30/15 Summer				27.017	0.279	0.000
S4.000	S3	30 Winter	30	+0%					27.457	-0.168	0.000
S1.002	S3	30 Winter	30	+0%	100/15 Summer				26.934	-0.002	0.000
S1.003	S2	60 Winter	30	+0%					26.564	-0.219	0.000
S1.004	S3	60 Winter	30	+0%					26.377	-2.103	0.000
S1.005	S7	15 Winter	30	+0%					25.100	-0.769	0.000
S1.006	S4	30 Winter	30	+0%	100/15 Summer				24.550	-0.209	0.000
S5.000	S10	30 Winter	30	+0%	100/15 Summer				27.201	-0.124	0.000
S5.001	S11	15 Winter	30	+0%	100/15 Summer				26.793	-0.102	0.000
S6.000	S11	30 Winter	30	+0%	100/15 Summer				27.534	-0.141	0.000
S6.001	S14	15 Winter	30	+0%	100/240 Winter				26.992	-0.360	0.000
S7.000	S17	30 Winter	30	+0%	100/30 Winter				28.166	-0.134	0.000
S6.002	S6	600 Winter	30	+0%	30/120 Summer				26.957	0.215	0.000
S8.000	S8	30 Winter	30	+0%					27.405	-0.295	0.000
S8.001	S9	15 Winter	30	+0%	100/15 Winter				26.744	-0.193	0.000
S5.002	S7	720 Winter	30	+0%	100/120 Summer				26.144	-0.088	0.000
S5.003	S8	15 Winter	30	+0%					25.911	-0.296	0.000
S5.004	S9	15 Winter	30	+0%					25.922	-1.608	0.000
S5.005	S10	15 Winter	30	+0%					25.888	-0.832	0.000
S5.006	S11	15 Winter	30	+0%	100/15 Summer				24.588	-0.197	0.000
S1.007	S5	180 Winter	30	+0%	100/60 Winter				23.973	-0.465	0.000
S1.008	S6	180 Winter	30	+0%	100/30 Winter				23.963	-0.197	0.000
S1.009	S7	1440 Winter	30	+0%	100/1440 Winter				23.461	-0.808	0.000
S1.010	S8	1440 Winter	30	+0%	100/240 Winter				23.460	-0.230	0.000
S1.011	S9	4320 Winter	30	+0%					22.549	-0.786	0.000
S9.000	S24	30 Winter	30	+0%					23.592	-1.238	0.000
S10.000	S25	30 Winter	30	+0%					24.841	-1.299	0.000
S9.001	S25	30 Winter	30	+0%					23.306	-0.791	0.000
S1.012	S24	4320 Winter	30	+0%	100/4320 Summer				22.548	-0.264	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.55		44.9	OK	
S2.000	S15	0.70		47.9	OK	
S3.000	S17	0.61		80.5	OK	
S3.001	S4	0.00		94.7	OK	
S2.001	S3	0.01		115.2	OK	
S1.001	S1	0.86		156.6	SURCHARGED	
S4.000	S3	0.40		32.7	OK	
S1.002	S3	1.00		167.7	OK	
S1.003	S2	0.72		208.5	OK	
S1.004	S3	0.01		292.0	OK	
S1.005	S7	0.42		381.0	OK*	
S1.006	S4	0.75		372.4	OK	
S5.000	S10	0.64		57.2	OK	
S5.001	S11	0.75		77.7	OK	
S6.000	S11	0.71		81.0	OK	
S6.001	S14	0.33		201.8	OK	
S7.000	S17	0.59		63.2	OK	
S6.002	S6	0.01		7.3	SURCHARGED	
S8.000	S8	0.26		95.6	OK	
S8.001	S9	0.60		174.8	OK	
S5.002	S7	0.09		14.8	OK	
S5.003	S8	0.04		9.3	OK	
S5.004	S9	0.01		137.4	OK	
S5.005	S10	0.05		426.0	OK	
S5.006	S11	0.78		459.1	OK	
S1.007	S5	0.25		403.7	OK	
S1.008	S6	0.19		193.7	OK	
S1.009	S7	0.05		104.9	OK	
S1.010	S8	0.02		29.9	OK	
S1.011	S9	0.01		31.0	OK	
S9.000	S24	0.01		47.0	OK	
S10.000	S25	0.00		42.8	OK	
S9.001	S25	0.04		89.5	OK	
S1.012	S24	0.02		36.1	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.013	S27	4320 Winter	30	+0%	100/2880 Summer				22.547	-0.140	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.013	S27		0.0	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 5 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	30 Winter	100	+40%	100/15 Summer				27.645	0.320	0.000
S2.000	S15	30 Winter	100	+40%	100/15 Summer				27.702	0.402	0.000
S3.000	S17	30 Winter	100	+40%	100/15 Winter				28.018	0.053	0.000
S3.001	S4	30 Winter	100	+40%					27.435	-1.515	0.000
S2.001	S3	30 Winter	100	+40%					27.381	-1.279	0.000
S1.001	S1	30 Winter	100	+40%	30/15 Summer				27.380	0.642	0.000
S4.000	S3	30 Winter	100	+40%					27.516	-0.109	0.000
S1.002	S3	30 Winter	100	+40%	100/15 Summer				27.169	0.233	0.000
S1.003	S2	30 Winter	100	+40%					26.783	0.000	0.000
S1.004	S3	15 Winter	100	+40%					26.484	-1.996	0.000
S1.005	S7	15 Winter	100	+40%					25.503	-0.366	0.000
S1.006	S4	30 Winter	100	+40%	100/15 Summer				24.966	0.207	0.000
S5.000	S10	30 Winter	100	+40%	100/15 Summer				27.645	0.320	0.000
S5.001	S11	30 Winter	100	+40%	100/15 Summer				27.070	0.175	0.000
S6.000	S11	30 Winter	100	+40%	100/15 Summer				27.865	0.190	0.000
S6.001	S14	960 Winter	100	+40%	100/240 Winter				27.646	0.294	0.000
S7.000	S17	30 Winter	100	+40%	100/30 Winter				28.377	0.077	0.000
S6.002	S6	960 Winter	100	+40%	30/120 Summer				27.644	0.902	0.000
S8.000	S8	30 Winter	100	+40%					27.466	-0.234	0.000
S8.001	S9	15 Winter	100	+40%	100/15 Winter				26.962	0.025	0.000
S5.002	S7	960 Winter	100	+40%	100/120 Summer				26.641	0.409	0.000
S5.003	S8	15 Winter	100	+40%					26.021	-0.186	0.000
S5.004	S9	15 Winter	100	+40%					26.031	-1.499	0.000
S5.005	S10	15 Winter	100	+40%					25.992	-0.728	0.000
S5.006	S11	15 Winter	100	+40%	100/15 Summer				24.961	0.176	0.000
S1.007	S5	240 Winter	100	+40%	100/60 Winter				24.712	0.274	0.000
S1.008	S6	240 Winter	100	+40%	100/30 Winter				24.701	0.541	0.000
S1.009	S7	2160 Winter	100	+40%	100/1440 Winter				24.338	0.069	0.000
S1.010	S8	2160 Winter	100	+40%	100/240 Winter				24.337	0.647	0.000
S1.011	S9	5760 Winter	100	+40%					22.940	-0.395	0.000
S9.000	S24	30 Winter	100	+40%					23.634	-1.196	0.000
S10.000	S25	30 Winter	100	+40%					24.862	-1.278	0.000
S9.001	S25	30 Winter	100	+40%					23.345	-0.752	0.000
S1.012	S24	5760 Winter	100	+40%	100/4320 Summer				22.938	0.126	0.000

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

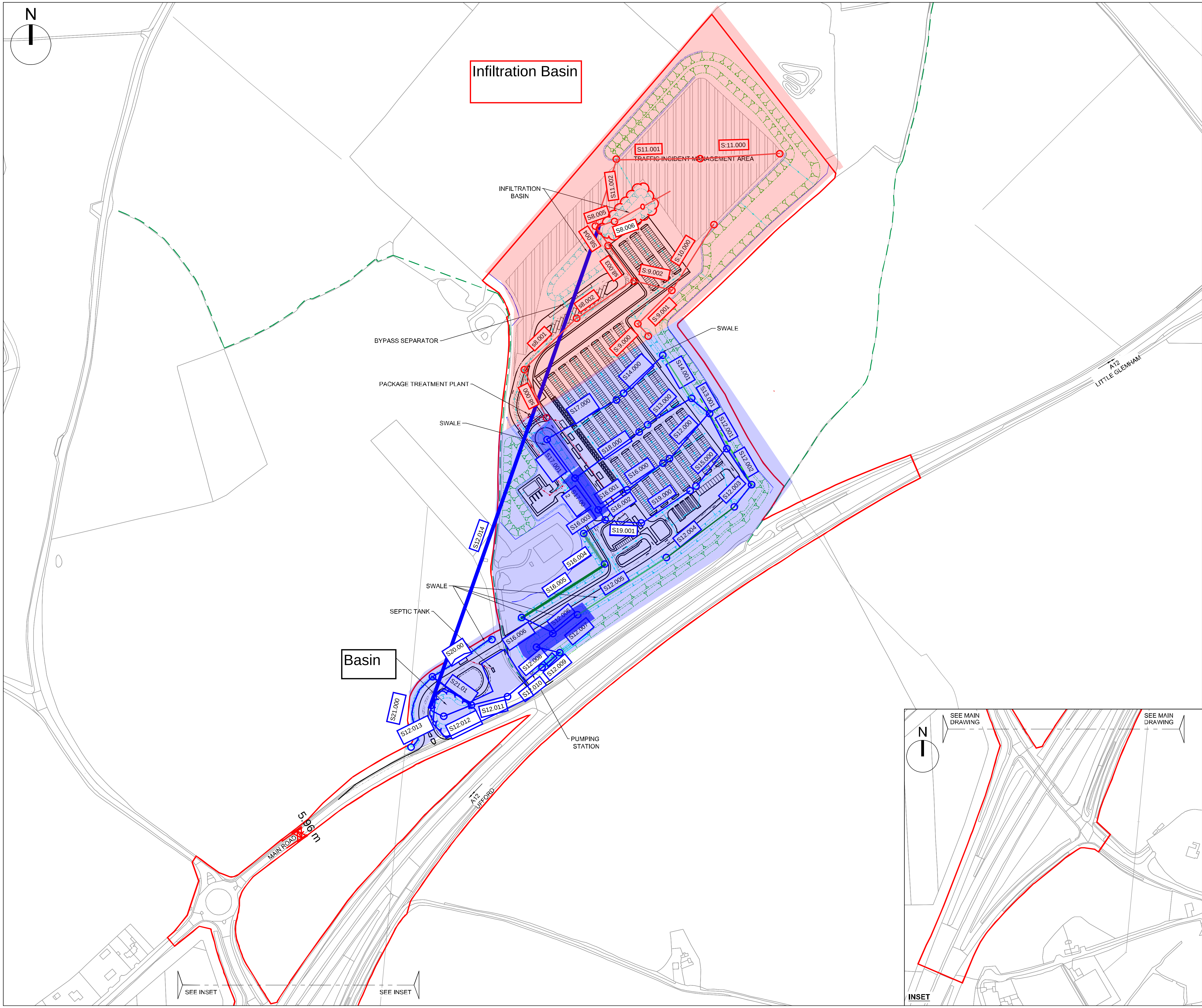
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.96		78.1	SURCHARGED	
S2.000	S15	1.22		83.3	SURCHARGED	
S3.000	S17	1.10		145.5	SURCHARGED	
S3.001	S4	0.01		169.2	OK	
S2.001	S3	0.01		167.3	OK	
S1.001	S1	1.26		231.7	SURCHARGED	
S4.000	S3	0.73		59.1	OK	
S1.002	S3	1.58		265.5	SURCHARGED	
S1.003	S2	1.14		328.1	OK	
S1.004	S3	0.02		564.4	OK	
S1.005	S7	0.81		737.0	OK*	
S1.006	S4	1.33		655.1	SURCHARGED	
S5.000	S10	1.17		104.1	SURCHARGED	
S5.001	S11	1.22		125.5	SURCHARGED	
S6.000	S11	1.27		144.6	SURCHARGED	
S6.001	S14	0.08		46.6	FLOOD RISK	
S7.000	S17	1.05		112.6	SURCHARGED	
S6.002	S6	0.01		7.5	SURCHARGED	
S8.000	S8	0.47		173.8	OK	
S8.001	S9	1.04		301.1	SURCHARGED	
S5.002	S7	0.09		15.0	SURCHARGED	
S5.003	S8	0.06		14.0	OK	
S5.004	S9	0.02		259.6	OK	
S5.005	S10	0.09		786.2	OK	
S5.006	S11	1.22		719.6	SURCHARGED	
S1.007	S5	0.38		610.6	FLOOD RISK	
S1.008	S6	0.20		199.8	SURCHARGED	
S1.009	S7	0.06		128.9	SURCHARGED	
S1.010	S8	0.02		29.9	FLOOD RISK	
S1.011	S9	0.01		32.3	OK	
S9.000	S24	0.01		85.5	OK	
S10.000	S25	0.00		77.8	OK	
S9.001	S25	0.06		162.6	OK	
S1.012	S24	0.02		40.8	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.013	S27	5760 Winter	100	+40%	100/2880 Summer				22.937	0.250	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.013	S27		0.0	SURCHARGED	

APPENDIX F: COMBINED NORTHERN AND SOUTHERN CATCHMENT HYDRAULIC CALCULATIONS



UK PROTECTIVE MARKING:
Not Protectively Marked

NOTES:
1. Do not scale from this drawing. All dimensions are in metres unless noted otherwise.

KEY

- PIPE
- CRATE BASIN
- BASIN
- INFILTRATION BASIN 8.006
- SWALE
- S:9.001 NORTHERN NETWORK
- S3.001 SOUTHERN NETWORK

NOT FOR CONSTRUCTION

NOT FOR APPROVAL

REV.	DATE	PREPARED BY	CHECKED BY	STATUS	REASONS FOR REVISION	APPROVED BY
K	21.02.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
J	31.01.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
I	20.01.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
H	12.11.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
G	06.11.19	NKS	KA	S3	BUFFER ZONE SOUTH OF INFILTRATION TRIMMED	PJ
F	31.10.19	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING TEAM REVIEW	PJ
E	25.09.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
D	02.08.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
C	24.07.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
B	09.07.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
A	01.07.19	NKS	KA	S3	FIRST ISSUE	PJ

NNB GenCo
EDF ENERGY

1st partner	2nd partner
EDF ENERGY	NNB GENCO

CONTRACTOR COMPANY TRADE NAME : ROYAL HASKONINGDHV

CONTRACTOR REF. No. PB7869

CONTRACT NUMBER : SZ0204

CONTRACTOR WBS CODE : N/A — QRA RELATED Yes ☐ No ☒

APPLICABILITY:
1: Document related to Unit 1
2: Document related to Unit 2
9: Document that applies to buildings/systems common to Unit 1 & 2
0: Documents that relate exclusively to buildings or systems that are common to the whole site (e.g. parking, ancillary buildings...)

NUCL/REP/EPR/UKX							
HPC (doc: HK)				SZC (doc: SZ)			
0	1	2	9	0	1	2	9

BUILDING
000

SYSTEM
000

SCALE
1:2000

SIZE A1

PAGE
1/1

DESCRIPTION
SIZEWELL C
SOUTHERN PARK AND RIDE SITE
DRAINAGE LAYOUT

DOCUMENT REFERENCE No.

Project	Contract No. / Orig. Co	Asset / Zone	System / Building	Doc. type	Chrono No.
SZC	SZ0204	FP	000	DRW	100053

DOCUMENT SUB -TYPE
N/A

EDF CLASSIFICATION CODE
N/A

SUBCONTRACTOR COMPANY TRADE NAME
N/A

SUBCONTRACTOR DOCUMENT REF. No
N/A

This pattern must be entirely readable
For A0 and A1 : ABERPFTHLIJOOCGQUVWMNSZXKY
zsaeocmuvnwxirlkhbdpqgyjlt 71423855690
0 1 2 3 4 5 6 7 8 9 10

INTELLECTUAL PROPERTY:
O-Property of Owner

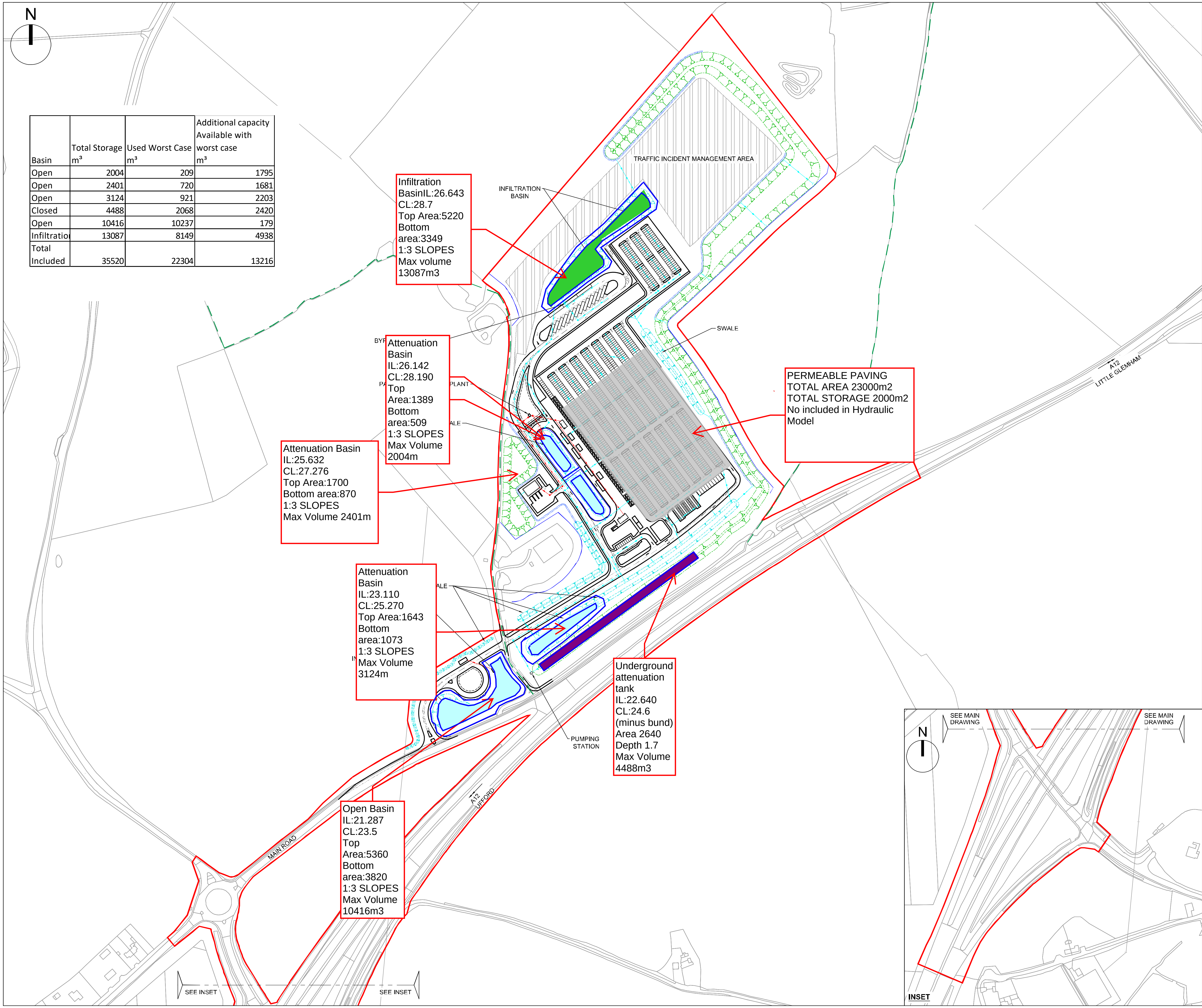
NNB:

EDF:
NNB GenCo © 2018

UK PROTECTIVE MARKING:
Not Protectively Marked

EDF ACCESSIBILITY:
INTERNE ☐ RESTREINT ☐ CONFIDENTIEL ☐

Basin	Total Storage m³	Used Worst Case m³	Additional capacity Available with worst case m³
Open	2004	209	1795
Open	2401	720	1681
Open	3124	921	2203
Closed	4488	2068	2420
Open	10416	10237	179
Infiltratio	13087	8149	4938
Total Included	35520	22304	13216



UK PROTECTIVE MARKING:
Not Protectively Marked

NOTES:
1. Do not scale from this drawing. All dimensions are in metres unless noted otherwise.

KEY

- TOP OF BASIN
- ATTENUATION BASIN
- INFILTRATION BASIN
- CRATE STORAGE
- PERMEABLE PAVING

NOT FOR CONSTRUCTION

NOT FOR APPROVAL

REV.	DATE	PREPARED BY	CHECKED BY	STATUS	REASONS FOR REVISION	APPROVED BY
K	21.02.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
J	31.01.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
I	20.01.20	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING HSF REVIEW	PJ
H	12.11.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
G	06.11.19	NKS	KA	S3	BUFFER ZONE SOUTH OF INFILTRATION TRIMMED	PJ
F	31.10.19	NKS	KA	S3	MINOR AMENDMENTS FOLLOWING TEAM REVIEW	PJ
E	25.09.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
D	02.08.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
C	24.07.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
B	09.07.19	NKS	KA	S3	MINOR AMENDMENTS	PJ
A	01.07.19	NKS	KA	S3	FIRST ISSUE	PJ

NNB GenCo
EDF ENERGY

1st partner: EDF ENERGY
2nd partner: NNB GENCO

CONTRACTOR COMPANY TRADE NAME : ROYAL HASKONINGDHV

CONTRACTOR REF. No. PB7869

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QRA RELATED Yes ☐ No ☒

APPLICABILITY:
1: Document related to Unit 1
2: Document related to Unit 2
9: Document that applies to buildings/systems common to Unit 1 & 2
0: Documents that relate exclusively to buildings or systems that are common to the whole site (e.g. parking, ancillary buildings...)

NUCL/REP/EPR/UKX							
HPC (doc: HK)				SZC (doc: SZ)			
0	1	2	9	0	1	2	9

BUILDING 000

SYSTEM 000

SCALE 1:2000

SIZE A1

PAGE 1/1

DESCRIPTION

SIZEWELL C
SOUTHERN PARK AND RIDE SITE
DRAINAGE LAYOUT

DOCUMENT REFERENCE No.

Project	Contract No. / Orig. Co	Asset / Zone	System / Building	Doc. type	Chrono No.
SZC	SZ0204	FP	000	DRW	100053

DOCUMENT SUB -TYPE
N/A

EDF CLASSIFICATION CODE
N/A

SUBCONTRACTOR COMPANY TRADE NAME
N/A

SUBCONTRACTOR DOCUMENT REF. No
N/A

This pattern must be entirely readable
For A0 and A1 : ABERPFTHLIJOOCGQUVWMNSZXKY
zsaeocmuvnwxirfkhbdpqgyjlt 71423855690
0 1 2 3 4 5 6 7 8 9 10

INTELLECTUAL PROPERTY:
O-Property of Owner

NNB:

EDF:
NNB GenCo © 2018

UK PROTECTIVE MARKING:
Not Protectively Marked

EDF ACCESSIBILITY:
INTERNE ☐ RESTREINT ☐ CONFIDENTIEL ☐

Time Area Diagram for Network North

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	1.760	8-12	0.873	16-20	3.340	24-28	0.817	32-36	0.211
4-8	1.741	12-16	3.553	20-24	1.135	28-32	0.547		

Total Area Contributing (ha) = 13.976

Total Pipe Volume (m^3) = 7254.317

Existing Network Details for Network North

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S8.000	65.683	0.272	241.5	0.382	15.00	0.0	0.600		o	600	Pipe/Conduit
S8.001	83.632	0.261	320.4	0.453	0.00	0.0	0.600		o	600	Pipe/Conduit
S8.002	77.351	0.351	220.4	0.418	0.00	0.0	0.600		o	600	Pipe/Conduit
S9.000	25.003	0.083	301.2	0.033	15.00	0.0	0.600		o	300	Pipe/Conduit
S9.001	68.374	0.373	183.3	0.322	0.00	0.0	0.600		o	450	Pipe/Conduit
S10.000	111.255	0.411	270.7	0.668	15.00	0.0	0.600		o	600	Pipe/Conduit
S9.002	55.841	0.623	89.6	0.338	0.00	0.0	0.600		o	600	Pipe/Conduit
S8.003	42.921	0.086	500.0	0.000	0.00	0.0	0.600		o	675	Pipe/Conduit
S8.004	37.349	0.232	160.9	0.000	0.00	0.0	0.600		o	675	Pipe/Conduit
S11.000	106.953	0.396	270.1	0.720	15.00	0.0	0.600		o	750	Pipe/Conduit
S11.001	83.803	0.281	298.2	0.665	0.00	0.0	0.600		o	600	Pipe/Conduit
S11.002	65.930	0.220	299.7	0.697	0.00	0.0	0.600		o	600	Pipe/Conduit
S12.000	64.797	0.386	167.9	0.246	15.00	0.0	0.600		o	300	Pipe/Conduit
S13.000	65.687	0.274	239.7	0.263	15.00	0.0	0.600		o	300	Pipe/Conduit
S14.000	66.073	0.330	200.2	0.441	15.00	0.0	0.600		o	375	Pipe/Conduit
S14.001	44.777	0.384	116.6	0.104	0.00	0.0	0.045	3 \=/		1500	1:3 Swale
S13.001	33.181	0.138	240.4	0.000	0.00	0.0	0.045	3 \=/		1500	1:3 Swale
S12.001	45.813	0.153	299.4	0.152	0.00	0.0	0.045		o	750	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S8.000	27.230	0.382	0.0	1.56	441.8
S8.001	26.958	0.835	0.0	1.35	383.1
S8.002	26.697	1.253	0.0	1.64	462.7
S9.000	27.575	0.033	0.0	0.90	63.7
S9.001	27.492	0.355	0.0	1.50	238.3
S10.000	27.455	0.668	0.0	1.48	417.1
S9.002	26.969	1.360	0.0	2.57	727.5
S8.003	26.196	2.613	0.0	1.17	417.0
S8.004	26.110	2.613	0.0	2.06	738.5
S11.000	26.850	0.720	0.0	1.70	750.1
S11.001	26.454	1.385	0.0	1.40	397.2
S11.002	26.173	2.082	0.0	1.40	396.3
S12.000	27.025	0.246	0.0	1.21	85.6
S13.000	27.000	0.263	0.0	1.01	71.5
S14.000	27.590	0.441	0.0	1.28	141.0
S14.001	27.260	0.545	0.0	1.93	21472.2
S13.001	26.726	0.808	0.0	1.46	20620.2
S12.001	25.988	1.206	0.0	0.42	185.9

Existing Network Details for Network North

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S15.000	57.183	0.340	168.2	0.178	15.00	0.0	0.600		o	375	Pipe/Conduit
S12.002	45.813	0.153	299.4	0.198	0.00	0.0	0.600		o	525	Pipe/Conduit
S12.003	26.883	0.074	361.8	0.318	0.00	0.0	0.600		o	600	Pipe/Conduit
S12.004	102.802	0.390	263.9	0.573	0.00	0.0		0.045	3 \=/	1500	1:3 Swale
S12.005	104.957	0.210	499.8	0.606	0.00	0.0		0.045	o	1500	Pipe/Conduit
S12.006	44.603	0.308	144.8	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit
S16.000	60.711	0.430	141.2	0.313	15.00	0.0	0.600		o	375	Pipe/Conduit
S16.001	38.530	0.385	100.0	0.103	0.00	0.0	0.600		o	300	Pipe/Conduit
S17.000	90.297	0.324	279.0	0.441	15.00	0.0	0.600		o	375	Pipe/Conduit
S17.001	60.861	0.609	99.9	0.513	0.00	0.0	0.600		o	600	Pipe/Conduit
S18.000	88.800	0.888	100.0	0.344	15.00	0.0	0.600		o	300	Pipe/Conduit
S17.002	43.575	0.436	99.9	0.223	0.00	0.0	0.600		o	600	Pipe/Conduit
S19.000	76.277	1.140	66.9	0.521	15.00	0.0	0.600		o	450	Pipe/Conduit
S19.001	44.044	0.440	100.1	0.292	0.00	0.0	0.600		o	450	Pipe/Conduit
S16.002	12.369	0.025	494.7	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit
S16.003	30.392	0.062	490.2	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit
S16.004	42.116	0.084	501.4	0.456	0.00	0.0		0.045	4 \=/	600	1:4 Swale
S16.005	109.837	1.373	80.0	1.106	0.00	0.0		0.045	3 \=/	600	1:3 Swale
S16.006	42.249	0.422	100.1	0.174	0.00	0.0	0.600		o	600	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S15.000	27.325	0.178	0.0	1.39	154.0
S12.002	26.486	1.581	0.0	1.29	279.1
S12.003	26.183	1.899	0.0	1.27	360.3
S12.004	26.109	2.472	0.0	1.58	32208.3
S12.005	24.369	3.078	0.0	0.52	913.4
S12.006	24.159	3.078	0.0	2.32	1026.5
S16.000	27.025	0.313	0.0	1.52	168.2
S16.001	26.595	0.416	0.0	1.57	111.1
S17.000	27.300	0.441	0.0	1.08	119.3
S17.001	26.751	0.955	0.0	2.44	688.8
S18.000	28.000	0.344	0.0	1.57	111.1
S17.002	26.142	1.521	0.0	2.44	688.8
S19.000	27.250	0.521	0.0	2.49	395.8
S19.001	26.487	0.813	0.0	2.03	323.2
S16.002	25.632	2.751	0.0	1.09	307.6
S16.003	25.607	2.751	0.0	1.09	309.1
S16.004	25.545	3.207	0.0	0.99	16812.6
S16.005	25.558	4.313	0.0	1.76	8366.5
S16.006	24.185	4.487	0.0	2.43	688.2

Existing Network Details for Network North

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S12.007	22.494	0.278	80.9	0.199	0.00	0.0	0.600		o	1200	Pipe/Conduit
S12.008	18.911	0.057	331.8	0.104	0.00	0.0	0.600		o	1200	Pipe/Conduit
S12.009	11.370	0.574	19.8	0.206	0.00	0.0	0.600		o	1200	Pipe/Conduit
S12.010	61.289	0.255	240.3	0.158	0.00	0.0	0.600		o	1200	Pipe/Conduit
S12.011	33.560	0.673	49.9	0.226	0.00	0.0	0.600		o	1200	Pipe/Conduit
S20.000	83.677	0.209	400.4	0.256	15.00	0.0	0.045	3 \=/		1500	1:3 Swale
S21.000	50.967	1.593	32.0	0.233	15.00	0.0	0.045	3 \=/		1500	1:3 Swale
S20.001	53.969	1.250	43.2	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit
S12.012	37.603	0.325	115.7	0.333	0.00	0.0	0.600		o	1200	Pipe/Conduit
S12.013	8.803	0.010	880.3	0.000	0.00	0.0	0.600		o	1500	Pipe/Conduit
S12.014	605.446	-4.376	-138.4	0.000	0.00	0.0	0.600		o	1500	Pipe/Conduit
S8.005	5.015	0.010	501.5	0.000	0.00	0.0	0.600		o	1200	Pipe/Conduit
S8.006	3.000	0.006	500.0	0.000	0.00	0.0	0.600		o	1200	Pipe/Conduit
S8.007	2.000	0.037	54.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S12.007	23.388	7.764	0.0	4.16	4706.0
S12.008	23.110	7.868	0.0	2.05	2316.7
S12.009	23.219	8.074	0.0	8.42	9526.5
S12.010	22.640	8.232	0.0	2.41	2724.4
S12.011	22.285	8.459	0.0	5.30	5998.7
S20.000	23.480	0.256	0.0	0.91	6847.0
S21.000	24.790	0.233	0.0	3.23	24219.0
S20.001	23.197	0.489	0.0	4.78	3038.2
S12.012	21.612	9.281	0.0	3.48	3933.1
S12.013	21.287	9.281	0.0	1.44	2540.2
S12.014	21.277	9.281	0.0	0.00	0.0
S8.005	25.653	13.976	0.0	1.66	1881.6
S8.006	25.643	13.976	0.0	1.67	1884.5
S8.007	25.637	13.976	0.0	2.14	151.5

Manhole Schedules for Network North

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)
S12	28.530	1.300	Open Manhole	1500	S8.000	27.230	600				
S13	28.840	1.882	Open Manhole	1500	S8.001	26.958	600	S8.000	26.958	600	
S14	28.620	1.923	Open Manhole	1500	S8.002	26.697	600	S8.001	26.697	600	
S16	28.950	1.375	Open Manhole	2400	S9.000	27.575	300				
S17	28.920	1.428	Open Manhole	1350	S9.001	27.492	450	S9.000	27.492	300	
S18	28.930	1.475	Open Manhole	1500	S10.000	27.455	600				
S18	28.770	1.801	Open Manhole	1500	S9.002	26.969	600	S9.001	27.119	450	
								S10.000	27.044	600	75
S31	28.810	2.614	Open Manhole	1500	S8.003	26.196	675	S8.002	26.346	600	75
								S9.002	26.346	600	75
S32	28.910	2.800	Open Manhole	1500	S8.004	26.110	675	S8.003	26.110	675	
S19	28.180	1.330	Open Manhole	1800	S11.000	26.850	750				
S20	28.180	1.726	Open Manhole	1800	S11.001	26.454	600	S11.000	26.454	750	
S21	28.870	2.697	Open Manhole	1500	S11.002	26.173	600	S11.001	26.173	600	
S1	28.450	1.425	Open Manhole	1500	S12.000	27.025	300				
S15	28.370	1.370	Open Manhole	1200	S13.000	27.000	300				
S17	28.890	1.300	Open Manhole	1350	S14.000	27.590	375				
S4	28.950	1.690	Open Manhole	10000	S14.001	27.260	1500	S14.000	27.260	375	
S3	28.660	1.934	Open Manhole	10000	S13.001	26.726	1500	S13.000	26.726	300	
								S14.001	26.876	1500	150
S1	28.580	2.592	Open Manhole	10000	S12.001	25.988	750	S12.000	26.639	300	201
								S13.001	26.588	1500	
S3	28.750	1.425	Open Manhole	1200	S15.000	27.325	375				
S3	28.440	2.605	Open Manhole	1800	S12.002	26.486	525	S12.001	25.835	750	
								S15.000	26.985	375	349
S2	28.440	2.257	Open Manhole	1500	S12.003	26.183	600	S12.002	26.333	525	75
S3	28.480	2.371	Open Manhole	10000	S12.004	26.109	1500	S12.003	26.109	600	
S7	26.000	1.631	Open Manhole	10000	S12.005	24.369	1500	S12.004	25.719	1500	
S4	26.000	1.841	Open Manhole	2400	S12.006	24.159	750	S12.005	24.159	1500	
S10	28.450	1.425	Open Manhole	1200	S16.000	27.025	375				
S11	28.020	1.425	Open Manhole	1200	S16.001	26.595	300	S16.000	26.595	375	
S11	28.530	1.230	Open Manhole	1350	S17.000	27.300	375				
S14	27.940	1.189	Open Manhole	1500	S17.001	26.751	600	S17.000	26.976	375	
S17	29.300	1.300	Open Manhole	1200	S18.000	28.000	300				
S6	28.190	2.048	Open Manhole	1500	S17.002	26.142	600	S17.001	26.142	600	
								S18.000	27.112	300	670
S8	28.750	1.500	Open Manhole	1350	S19.000	27.250	450				
S9	27.610	1.500	Open Manhole	1350	S19.001	26.487	450	S19.000	26.110	450	
S7	27.276	1.644	Open Manhole	1500	S16.002	25.632	600	S16.001	26.210	300	278
								S17.002	25.706	600	74
								S19.001	26.047	450	265
S8	27.550	1.943	Open Manhole	1500	S16.003	25.607	600	S16.002	25.607	600	
S9	27.530	1.985	Open Manhole	1500	S16.004	25.545	600	S16.003	25.545	600	
S10	26.720	1.259	Junction		S16.005	25.558	600	S16.004	25.461	600	
S11	25.520	1.335	Open Manhole	1500	S16.006	24.185	600	S16.005	24.185	600	
S5	24.752	1.364	Open Manhole	2400	S12.007	23.388	1200	S12.006	23.851	750	13
								S16.006	23.763	600	

Manhole Schedules for Network North

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)	Backdrop (mm)
S6	25.270	2.160	Open Manhole	2400	S12.008	23.110	1200	S12.007	23.110	1200	
S7	24.650	1.597	Open Manhole	1950	S12.009	23.219	1200	S12.008	23.053	1200	
S8	24.600	1.960	Open Manhole	1950	S12.010	22.640	1200	S12.009	22.645	1200	5
S9	24.410	2.125	Open Manhole	1950	S12.011	22.285	1200	S12.010	22.385	1200	100
S24	24.830	1.350	Junction		S20.000	23.480	1500				
S25	26.140	1.350	Junction		S21.000	24.790	1500				
S25	24.250	1.053	Open Manhole	1200	S20.001	23.197	900	S20.000	23.271	1500	
								S21.000	23.197	1500	
S24	23.500	1.888	Open Manhole	2400	S12.012	21.612	1200	S12.011	21.612	1200	
								S20.001	21.947	900	35
S27	23.500	2.213	Open Manhole	3000	S12.013	21.287	1500	S12.012	21.287	1200	
S48	26.500	5.223	Open Manhole	3000	S12.014	21.277	1500	S12.013	21.277	1500	
S22	28.358	2.705	Open Manhole	4000	S8.005	25.653	1200	S8.004	25.878	675	
								S11.002	25.953	600	
								S12.014	25.653	1500	
S23	28.700	3.057	Open Manhole	4000	S8.006	25.643	1200	S8.005	25.643	1200	
S51	29.000	3.363	Open Manhole	1500	S8.007	25.637	300	S8.006	25.637	1200	
S	28.800	3.200	Open Manhole	0		OUTFALL		S8.007	25.600	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S12	628.840	688.752	628.840	688.752	Required	
S13	599.300	747.417	599.300	747.417	Required	
S14	660.875	804.010	660.875	804.010	Required	
S16	734.002	793.114	734.002	793.114	Required	
S17	721.277	814.636	721.277	814.636	Required	
S18	843.928	943.506	843.928	943.506	Required	
S18	776.403	855.085	776.403	855.085	Required	
S31	720.595	853.171	720.595	853.171	Required	
S32	691.261	884.505	691.261	884.505	Required	
S19	893.648	992.437	893.648	992.437	Required	

Manhole Schedules for Network North

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S20	786.703	991.119	786.703	991.119	Required	
S21	703.296	982.983	703.296	982.983	Required	
S1	766.688	646.471	766.688	646.471	Required	
S15	733.145	680.684	733.145	680.684	Required	
S17	706.309	717.886	706.309	717.886	Required	
S4	759.876	756.568	759.876	756.568	Required	
S3	785.749	720.023	785.749	720.023	Required	
S1	808.558	695.924	808.558	695.924	Required	
S3	792.261	616.505	792.261	616.505	Required	
S3	832.667	656.967	832.667	656.967	Required	
S2	856.777	618.011	856.777	618.011	Required	
S3	837.553	599.219	837.553	599.219	Required	
S7	758.350	533.681	758.350	533.681	Required	
S4	669.902	477.176	669.902	477.176	Required	
S10	765.558	648.208	765.558	648.208	Required	
S11	716.535	612.395	716.535	612.395	Required	
S11	703.066	714.468	703.066	714.468	Required	
S14	622.595	673.505	622.595	673.505	Required	
S17	732.154	679.979	732.154	679.979	Required	

Manhole Schedules for Network North

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S6	661.261	626.505	661.261	626.505	Required	
S8	791.458	615.308	791.458	615.308	Required	
S9	726.595	575.172	726.595	575.172	Required	
S7	685.142	590.056	685.142	590.056	Required	
S8	691.595	579.505	691.595	579.505	Required	
S9	665.639	563.695	665.639	563.695	Required	
S10	688.262	528.172			No Entry	
S11	596.261	468.172	596.261	468.172	Required	
S5	634.453	450.106	634.453	450.106	Required	
S6	616.141	437.043	616.141	437.043	Required	
S7	628.511	422.738	628.511	422.738	Required	
S8	620.381	414.789	620.381	414.789	Required	
S9	569.361	380.828	569.361	380.828	Required	
S24	564.595	446.172			No Entry	
S25	475.389	353.495			No Entry	
S25	494.262	400.839	494.262	400.839	Required	
S24	537.915	369.104	537.915	369.104	Required	
S27	503.262	354.505	503.262	354.505	Required	
S48	495.230	350.902	495.230	350.902	Required	

Manhole Schedules for Network North

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S22	709.114	917.310	709.114	917.310	Required	
S23	714.103	917.815	714.103	917.815	Required	
S51	716.611	919.462	716.611	919.462	Required	
S	718.611	919.462			No Entry	

PIPELINE SCHEDULES for Network North

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)
S8.000	o	600	S12	28.530	27.230	0.700	Open Manhole	1500
S8.001	o	600	S13	28.840	26.958	1.282	Open Manhole	1500
S8.002	o	600	S14	28.620	26.697	1.323	Open Manhole	1500
S9.000	o	300	S16	28.950	27.575	1.075	Open Manhole	2400
S9.001	o	450	S17	28.920	27.492	0.978	Open Manhole	1350
S10.000	o	600	S18	28.930	27.455	0.875	Open Manhole	1500
S9.002	o	600	S18	28.770	26.969	1.201	Open Manhole	1500
S8.003	o	675	S31	28.810	26.196	1.939	Open Manhole	1500
S8.004	o	675	S32	28.910	26.110	2.125	Open Manhole	1500
S11.000	o	750	S19	28.180	26.850	0.580	Open Manhole	1800
S11.001	o	600	S20	28.180	26.454	1.126	Open Manhole	1800
S11.002	o	600	S21	28.870	26.173	2.097	Open Manhole	1500
S12.000	o	300	S1	28.450	27.025	1.125	Open Manhole	1500
S13.000	o	300	S15	28.370	27.000	1.070	Open Manhole	1200
S14.000	o	375	S17	28.890	27.590	0.925	Open Manhole	1350
S14.001	3 \=/	1500	S4	28.950	27.260	1.540	Open Manhole	10000
S13.001	3 \=/	1500	S3	28.660	26.726	1.784	Open Manhole	10000

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)
S8.000	65.683	241.5	S13	28.840	26.958	1.282	Open Manhole	1500
S8.001	83.632	320.4	S14	28.620	26.697	1.323	Open Manhole	1500
S8.002	77.351	220.4	S31	28.810	26.346	1.864	Open Manhole	1500
S9.000	25.003	301.2	S17	28.920	27.492	1.128	Open Manhole	1350
S9.001	68.374	183.3	S18	28.770	27.119	1.201	Open Manhole	1500
S10.000	111.255	270.7	S18	28.770	27.044	1.126	Open Manhole	1500
S9.002	55.841	89.6	S31	28.810	26.346	1.864	Open Manhole	1500
S8.003	42.921	500.0	S32	28.910	26.110	2.125	Open Manhole	1500
S8.004	37.349	160.9	S22	28.358	25.878	1.805	Open Manhole	4000
S11.000	106.953	270.1	S20	28.180	26.454	0.976	Open Manhole	1800
S11.001	83.803	298.2	S21	28.870	26.173	2.097	Open Manhole	1500
S11.002	65.930	299.7	S22	28.358	25.953	1.805	Open Manhole	4000
S12.000	64.797	167.9	S1	28.580	26.639	1.641	Open Manhole	10000
S13.000	65.687	239.7	S3	28.660	26.726	1.634	Open Manhole	10000
S14.000	66.073	200.2	S4	28.950	27.260	1.315	Open Manhole	10000
S14.001	44.777	116.6	S3	28.660	26.876	1.634	Open Manhole	10000
S13.001	33.181	240.4	S1	28.580	26.588	1.842	Open Manhole	10000

PIPELINE SCHEDULES for Network North

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)
S12.001	o	750	S1	28.580	25.988	1.842	Open Manhole	10000
S15.000	o	375	S3	28.750	27.325	1.050	Open Manhole	1200
S12.002	o	525	S3	28.440	26.486	1.429	Open Manhole	1800
S12.003	o	600	S2	28.440	26.183	1.657	Open Manhole	1500
S12.004	3 \=/	1500	S3	28.480	26.109	2.221	Open Manhole	10000
S12.005	o	1500	S7	26.000	24.369	0.131	Open Manhole	10000
S12.006	o	750	S4	26.000	24.159	1.091	Open Manhole	2400
S16.000	o	375	S10	28.450	27.025	1.050	Open Manhole	1200
S16.001	o	300	S11	28.020	26.595	1.125	Open Manhole	1200
S17.000	o	375	S11	28.530	27.300	0.855	Open Manhole	1350
S17.001	o	600	S14	27.940	26.751	0.589	Open Manhole	1500
S18.000	o	300	S17	29.300	28.000	1.000	Open Manhole	1200
S17.002	o	600	S6	28.190	26.142	1.448	Open Manhole	1500
S19.000	o	450	S8	28.750	27.250	1.050	Open Manhole	1350
S19.001	o	450	S9	27.610	26.487	0.673	Open Manhole	1350
S16.002	o	600	S7	27.276	25.632	1.044	Open Manhole	1500
S16.003	o	600	S8	27.550	25.607	1.343	Open Manhole	1500
S16.004	4 \=/	600	S9	27.530	25.545	1.835	Open Manhole	1500
S16.005	3 \=/	600	S10	26.720	25.558	1.012	Junction	

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)
S12.001	45.813	299.4	S3	28.440	25.835	1.855	Open Manhole	1800
S15.000	57.183	168.2	S3	28.440	26.985	1.080	Open Manhole	1800
S12.002	45.813	299.4	S2	28.440	26.333	1.582	Open Manhole	1500
S12.003	26.883	361.8	S3	28.480	26.109	1.771	Open Manhole	10000
S12.004	102.802	263.9	S7	26.000	25.719	0.131	Open Manhole	10000
S12.005	104.957	499.8	S4	26.000	24.159	0.341	Open Manhole	2400
S12.006	44.603	144.8	S5	24.752	23.851	0.151	Open Manhole	2400
S16.000	60.711	141.2	S11	28.020	26.595	1.050	Open Manhole	1200
S16.001	38.530	100.0	S7	27.276	26.210	0.766	Open Manhole	1500
S17.000	90.297	279.0	S14	27.940	26.976	0.589	Open Manhole	1500
S17.001	60.861	99.9	S6	28.190	26.142	1.448	Open Manhole	1500
S18.000	88.800	100.0	S6	28.190	27.112	0.778	Open Manhole	1500
S17.002	43.575	99.9	S7	27.276	25.706	0.970	Open Manhole	1500
S19.000	76.277	66.9	S9	27.610	26.110	1.050	Open Manhole	1350
S19.001	44.044	100.1	S7	27.276	26.047	0.779	Open Manhole	1500
S16.002	12.369	494.7	S8	27.550	25.607	1.343	Open Manhole	1500
S16.003	30.392	490.2	S9	27.530	25.545	1.385	Open Manhole	1500
S16.004	42.116	501.4	S10	26.720	25.461	1.109	Junction	
S16.005	109.837	80.0	S11	25.520	24.185	1.185	Open Manhole	1500

PIPELINE SCHEDULES for Network North

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)
S16.006	o	600	S11	25.520	24.185	0.735	Open Manhole	1500
S12.007	o	1200	S5	24.752	23.388	0.164	Open Manhole	2400
S12.008	o	1200	S6	25.270	23.110	0.960	Open Manhole	2400
S12.009	o	1200	S7	24.650	23.219	0.231	Open Manhole	1950
S12.010	o	1200	S8	24.600	22.640	0.760	Open Manhole	1950
S12.011	o	1200	S9	24.410	22.285	0.925	Open Manhole	1950
S20.000	3 \=/	1500	S24	24.830	23.480	1.200	Junction	
S21.000	3 \=/	1500	S25	26.140	24.790	1.200	Junction	
S20.001	o	900	S25	24.250	23.197	0.153	Open Manhole	1200
S12.012	o	1200	S24	23.500	21.612	0.688	Open Manhole	2400
S12.013	o	1500	S27	23.500	21.287	0.713	Open Manhole	3000
S12.014	o	1500	S48	26.500	21.277	3.723	Open Manhole	3000
S8.005	o	1200	S22	28.358	25.653	1.505	Open Manhole	4000
S8.006	o	1200	S23	28.700	25.643	1.857	Open Manhole	4000
S8.007	o	300	S51	29.000	25.637	3.063	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S16.006	42.249	100.1	S5	24.752	23.763	0.389	Open Manhole	2400
S12.007	22.494	80.9	S6	25.270	23.110	0.960	Open Manhole	2400
S12.008	18.911	331.8	S7	24.650	23.053	0.397	Open Manhole	1950
S12.009	11.370	19.8	S8	24.600	22.645	0.755	Open Manhole	1950
S12.010	61.289	240.3	S9	24.410	22.385	0.825	Open Manhole	1950
S12.011	33.560	49.9	S24	23.500	21.612	0.688	Open Manhole	2400
S20.000	83.677	400.4	S25	24.250	23.271	0.829	Open Manhole	1200
S21.000	50.967	32.0	S25	24.250	23.197	0.903	Open Manhole	1200
S20.001	53.969	43.2	S24	23.500	21.947	0.653	Open Manhole	2400
S12.012	37.603	115.7	S27	23.500	21.287	1.013	Open Manhole	3000
S12.013	8.803	880.3	S48	26.500	21.277	3.723	Open Manhole	3000
S12.014	605.446	-138.4	S22	28.358	25.653	1.205	Open Manhole	4000
S8.005	5.015	501.5	S23	28.700	25.643	1.857	Open Manhole	4000
S8.006	3.000	500.0	S51	29.000	25.637	2.163	Open Manhole	1500
S8.007	2.000	54.1	S	28.800	25.600	2.900	Open Manhole	0

Area Summary for Network North

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
8.000	User	-	100	0.382	0.382	0.382
8.001	User	-	100	0.453	0.453	0.453
8.002	User	-	100	0.418	0.418	0.418
9.000	User	-	100	0.033	0.033	0.033
9.001	User	-	100	0.322	0.322	0.322
10.000	User	-	50	1.335	0.668	0.668
9.002	User	-	100	0.338	0.338	0.338
8.003	-	-	100	0.000	0.000	0.000
8.004	-	-	100	0.000	0.000	0.000
11.000	-	-	100	0.720	0.720	0.720
11.001	User	-	50	1.330	0.665	0.665
11.002	User	-	40	1.742	0.697	0.697
12.000	User	-	100	0.246	0.246	0.246
13.000	User	-	100	0.263	0.263	0.263
14.000	User	-	100	0.441	0.441	0.441
14.001	User	-	50	0.209	0.104	0.104
13.001	-	-	100	0.000	0.000	0.000
12.001	User	-	100	0.152	0.152	0.152
15.000	User	-	100	0.178	0.178	0.178
12.002	User	-	100	0.198	0.198	0.198
12.003	User	-	100	0.175	0.175	0.175
	User	-	100	0.142	0.142	0.318
12.004	User	-	100	0.573	0.573	0.573
12.005	User	-	100	0.606	0.606	0.606
12.006	-	-	100	0.000	0.000	0.000
16.000	User	-	100	0.313	0.313	0.313
16.001	User	-	100	0.103	0.103	0.103
17.000	User	-	100	0.441	0.441	0.441
17.001	User	-	75	0.684	0.513	0.513
18.000	User	-	100	0.344	0.344	0.344
17.002	User	-	100	0.223	0.223	0.223
19.000	User	-	100	0.282	0.282	0.282
	User	-	100	0.239	0.239	0.521
19.001	User	-	100	0.292	0.292	0.292
16.002	-	-	100	0.000	0.000	0.000
16.003	-	-	100	0.000	0.000	0.000
16.004	User	-	100	0.456	0.456	0.456
16.005	User	-	100	0.813	0.813	0.813
	User	-	100	0.294	0.294	1.106
16.006	User	-	100	0.174	0.174	0.174
12.007	User	-	100	0.199	0.199	0.199
12.008	User	-	100	0.104	0.104	0.104
12.009	User	-	100	0.206	0.206	0.206
12.010	User	-	100	0.158	0.158	0.158
12.011	User	-	100	0.226	0.226	0.226
20.000	User	-	100	0.256	0.256	0.256
21.000	User	-	100	0.233	0.233	0.233
20.001	-	-	100	0.000	0.000	0.000
12.012	User	-	100	0.333	0.333	0.333
12.013	-	-	100	0.000	0.000	0.000
12.014	-	-	100	0.000	0.000	0.000
8.005	-	-	100	0.000	0.000	0.000
8.006	-	-	100	0.000	0.000	0.000
8.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				16.630	13.976	13.976

Network Classifications for Network North

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S8.000	S12	600	0.700	1.282	Unclassified	1500	0	0.700	Unclassified
S8.001	S13	600	1.282	1.323	Unclassified	1500	0	1.282	Unclassified
S8.002	S14	600	1.323	1.864	Unclassified	1500	0	1.323	Unclassified
S9.000	S16	300	1.075	1.128	Unclassified	2400	0	1.075	Unclassified
S9.001	S17	450	0.978	1.201	Unclassified	1350	0	0.978	Unclassified
S10.000	S18	600	0.875	1.126	Unclassified	1500	0	0.875	Unclassified
S9.002	S18	600	1.201	1.864	Unclassified	1500	0	1.201	Unclassified
S8.003	S31	675	1.939	2.125	Unclassified	1500	0	1.939	Unclassified
S8.004	S32	675	1.805	2.125	Unclassified	1500	0	2.125	Unclassified
S11.000	S19	750	0.580	0.976	Unclassified	1800	0	0.580	Unclassified
S11.001	S20	600	1.126	2.097	Unclassified	1800	0	1.126	Unclassified
S11.002	S21	600	1.805	2.097	Unclassified	1500	0	2.097	Unclassified
S12.000	S1	300	1.125	1.641	Unclassified	1500	0	1.125	Unclassified
S13.000	S15	300	1.070	1.634	Unclassified	1200	0	1.070	Unclassified
S14.000	S17	375	0.925	1.315	Unclassified	1350	0	0.925	Unclassified
S14.001	S4	1500	1.540	1.634	Unclassified	10000	0	1.540	Unclassified
S13.001	S3	1500	1.784	1.842	Unclassified	10000	0	1.784	Unclassified
S12.001	S1	750	1.842	1.855	Unclassified	10000	0	1.842	Unclassified
S15.000	S3	375	1.050	1.080	Unclassified	1200	0	1.050	Unclassified
S12.002	S3	525	1.429	1.582	Unclassified	1800	0	1.429	Unclassified
S12.003	S2	600	1.657	1.771	Unclassified	1500	0	1.657	Unclassified
S12.004	S3	1500	0.131	2.221	Unclassified	10000	0	2.221	Unclassified
S12.005	S7	1500	0.131	0.341	Unclassified	10000	0	0.131	Unclassified
S12.006	S4	750	0.151	1.091	Unclassified	2400	0	1.091	Unclassified
S16.000	S10	375	1.050	1.050	Unclassified	1200	0	1.050	Unclassified
S16.001	S11	300	0.766	1.125	Unclassified	1200	0	1.125	Unclassified
S17.000	S11	375	0.589	0.855	Unclassified	1350	0	0.855	Unclassified
S17.001	S14	600	0.589	1.448	Unclassified	1500	0	0.589	Unclassified
S18.000	S17	300	0.778	1.000	Unclassified	1200	0	1.000	Unclassified
S17.002	S6	600	0.970	1.448	Unclassified	1500	0	1.448	Unclassified
S19.000	S8	450	1.050	1.050	Unclassified	1350	0	1.050	Unclassified
S19.001	S9	450	0.673	0.779	Unclassified	1350	0	0.673	Unclassified
S16.002	S7	600	1.044	1.343	Unclassified	1500	0	1.044	Unclassified
S16.003	S8	600	1.343	1.385	Unclassified	1500	0	1.343	Unclassified
S16.004	S9	600	1.109	1.835	Unclassified	1500	0	1.835	Unclassified
S16.005	S10	600	1.012	1.185	Unclassified				Junction
S16.006	S11	600	0.389	0.735	Unclassified	1500	0	0.735	Unclassified
S12.007	S5	1200	0.164	0.960	Unclassified	2400	0	0.164	Unclassified
S12.008	S6	1200	0.397	0.960	Unclassified	2400	0	0.960	Unclassified
S12.009	S7	1200	0.231	0.755	Unclassified	1950	0	0.231	Unclassified
S12.010	S8	1200	0.760	0.825	Unclassified	1950	0	0.760	Unclassified
S12.011	S9	1200	0.688	0.925	Unclassified	1950	0	0.925	Unclassified
S20.000	S24	1500	0.829	1.200	Unclassified				Junction
S21.000	S25	1500	0.903	1.200	Unclassified				Junction
S20.001	S25	900	0.153	0.653	Unclassified	1200	0	0.153	Unclassified
S12.012	S24	1200	0.688	1.013	Unclassified	2400	0	0.688	Unclassified
S12.013	S27	1500	0.713	3.723	Unclassified	3000	0	0.713	Unclassified
S12.014	S48	1500	1.205	3.723	Unclassified	3000	0	3.723	Unclassified
S8.005	S22	1200	1.505	1.857	Unclassified	4000	0	1.505	Unclassified
S8.006	S23	1200	1.857	2.163	Unclassified	4000	0	1.857	Unclassified
S8.007	S51	300	2.900	3.063	Unclassified	1500	0	3.063	Unclassified

Free Flowing Outfall Details for Network North

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S8.007	S	28.800	25.600	0.000	0	0

Simulation Criteria for Network North

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

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 2	Number of Storage Structures 6	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	Cv (Winter)	0.840
Data Type	Point	Storm Duration (mins)	30

Online Controls for Network North

Pump Manhole: S48, DS/PN: S12.014, Volume (m³): 47.2

Invert Level (m) 21.277

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.000	90.0000	2.000	90.0000	3.000	0.0000	4.000	0.0000	6.000	0.0000

Pump Manhole: S23, DS/PN: S8.006, Volume (m³): 39.6

Invert Level (m) 25.643

Storage Structures for Network North

Tank or Pond Manhole: S6, DS/PN: S17.002

Invert Level (m) 26.142

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	509.0	1.600	1389.0

Tank or Pond Manhole: S7, DS/PN: S16.002

Invert Level (m) 25.632

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	870.0	1.500	1700.0

Tank or Pond Manhole: S6, DS/PN: S12.008

Invert Level (m) 23.110

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1073.0	1.550	1643.0

Cellular Storage Manhole: S8, DS/PN: S12.010

Invert Level (m) 22.640 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	2640.0	0.0	1.700	2640.0	0.0	1.701	0.0	0.0

Tank or Pond Manhole: S27, DS/PN: S12.013

Invert Level (m) 21.287

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3820.0	2.200	5620.0

Infiltration Basin Manhole: S23, DS/PN: S8.006

Invert Level (m) 25.643 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.18600 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.18600

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3349.0	3.000	5220.0

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

Simulation Criteria

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

Number of Input Hydrographs 0 | Number of Offline Controls 0 | Number of Time/Area Diagrams 0
Number of Online Controls 2 | Number of Storage Structures 6 | Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH | Data Type Point
FEH Rainfall Version 2013 | Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 | 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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years): 2, 30, 100
Climate Change (%): 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	30 Winter	2	+0%	100/15 Summer				27.341	-0.489	0.000	0.08
S8.001	S13	15 Winter	2	+0%	100/15 Summer				27.154	-0.404	0.000	0.22
S8.002	S14	15 Winter	2	+0%	100/15 Summer				26.920	-0.377	0.000	0.29
S9.000	S16	15 Winter	2	+0%	100/30 Winter				27.637	-0.238	0.000	0.05
S9.001	S17	15 Winter	2	+0%					27.627	-0.315	0.000	0.19
S10.000	S18	30 Winter	2	+0%					27.603	-0.452	0.000	0.14
S9.002	S18	15 Winter	2	+0%	100/15 Summer				27.149	-0.420	0.000	0.19
S8.003	S31	15 Winter	2	+0%	30/15 Summer				26.614	-0.257	0.000	0.69
S8.004	S32	15 Winter	2	+0%	100/15 Summer				26.406	-0.379	0.000	0.40
S11.000	S19	30 Winter	2	+0%	100/15 Summer				26.996	-0.604	0.000	0.08
S11.001	S20	15 Winter	2	+0%	100/15 Summer				26.699	-0.355	0.000	0.34
S11.002	S21	15 Winter	2	+0%	30/15 Winter				26.493	-0.280	0.000	0.55
S12.000	S1	30 Winter	2	+0%	100/15 Winter				27.125	-0.200	0.000	0.24
S13.000	S15	30 Winter	2	+0%	100/15 Summer				27.115	-0.185	0.000	0.31
S14.000	S17	30 Winter	2	+0%	100/15 Winter				27.722	-0.243	0.000	0.27
S14.001	S4	30 Winter	2	+0%					27.334	-1.616	0.000	0.00
S13.001	S3	30 Winter	2	+0%					26.840	-1.820	0.000	0.00
S12.001	S1	120 Summer	2	+0%	30/15 Summer				26.726	-0.012	0.000	0.36
S15.000	S3	30 Winter	2	+0%					27.404	-0.296	0.000	0.10
S12.002	S3	120 Summer	2	+0%	100/30 Summer				26.695	-0.316	0.000	0.33
S12.003	S2	120 Summer	2	+0%	100/30 Summer				26.421	-0.362	0.000	0.33
S12.004	S3	120 Summer	2	+0%					26.279	-2.201	0.000	0.00
S12.005	S7	15 Winter	2	+0%					24.773	-1.096	0.000	0.15
S12.006	S4	120 Winter	2	+0%					24.363	-0.546	0.000	0.17
S16.000	S10	30 Winter	2	+0%					27.125	-0.275	0.000	0.16
S16.001	S11	15 Winter	2	+0%	100/15 Summer				26.714	-0.181	0.000	0.33
S17.000	S11	30 Winter	2	+0%	100/15 Summer				27.444	-0.231	0.000	0.31
S17.001	S14	15 Winter	2	+0%					26.905	-0.446	0.000	0.15
S18.000	S17	30 Winter	2	+0%	100/30 Winter				28.103	-0.197	0.000	0.26
S17.002	S6	30 Winter	2	+0%					26.281	-0.461	0.000	0.12
S19.000	S8	30 Winter	2	+0%					27.351	-0.349	0.000	0.11
S19.001	S9	15 Winter	2	+0%	100/15 Winter				26.639	-0.298	0.000	0.25
S16.002	S7	180 Winter	2	+0%	100/30 Summer				25.894	-0.338	0.000	0.40
S16.003	S8	180 Winter	2	+0%	100/30 Winter				25.838	-0.369	0.000	0.25
S16.004	S9	15 Winter	2	+0%					25.789	-1.741	0.000	0.00

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

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		30.9	OK	
S8.001	S13		78.4	OK	
S8.002	S14		123.8	OK	
S9.000	S16		2.9	OK	
S9.001	S17		43.0	OK	
S10.000	S18		53.6	OK	
S9.002	S18		125.7	OK	
S8.003	S31		243.6	OK	
S8.004	S32		242.8	OK	
S11.000	S19		58.0	OK	
S11.001	S20		124.6	OK	
S11.002	S21		195.9	OK	
S12.000	S1		19.9	OK	
S13.000	S15		21.2	OK	
S14.000	S17		35.6	OK	
S14.001	S4		42.7	OK	
S13.001	S3		62.7	OK	
S12.001	S1		65.0	OK	
S15.000	S3		14.4	OK	
S12.002	S3		80.8	OK	
S12.003	S2		94.1	OK	
S12.004	S3		120.2	OK	
S12.005	S7		136.6	OK	
S12.006	S4		140.8	OK	
S16.000	S10		25.3	OK	
S16.001	S11		33.8	OK	
S17.000	S11		35.8	OK	
S17.001	S14		91.4	OK	
S18.000	S17		27.9	OK	
S17.002	S6		72.9	OK	
S19.000	S8		42.2	OK	
S19.001	S9		71.7	OK	
S16.002	S7		63.5	OK	
S16.003	S8		63.6	OK	
S16.004	S9		47.2	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S16.005	S10	15 Winter	2	+0%					25.769	-0.951	0.000
S16.006	S11	15 Winter	2	+0%	100/15 Summer				24.417	-0.368	0.000
S12.007	S5	15 Winter	2	+0%					23.692	-0.896	0.000
S12.008	S6	180 Winter	2	+0%					23.459	-0.851	0.000
S12.009	S7	180 Winter	2	+0%					23.421	-0.998	0.000
S12.010	S8	360 Winter	2	+0%					22.842	-0.998	0.000
S12.011	S9	360 Winter	2	+0%					22.442	-1.043	0.000
S20.000	S24	30 Winter	2	+0%					23.550	-1.280	0.000
S21.000	S25	30 Winter	2	+0%					24.820	-1.320	0.000
S20.001	S25	30 Winter	2	+0%					23.264	-0.833	0.000
S12.012	S24	360 Winter	2	+0%					21.808	-1.004	0.000
S12.013	S27	960 Winter	2	+0%					21.647	-1.140	0.000
S12.014	S48	1440 Winter	2	+0%					21.655	-1.122	0.000
S8.005	S22	15 Winter	2	+0%	100/360 Winter				26.214	-0.639	0.000
S8.006	S23	600 Winter	2	+0%	100/360 Winter				25.846	-0.997	0.000
S8.007	S51	240 Winter	2	+0%					25.637	-0.300	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.005	S10	0.02		172.0	OK	
S16.006	S11	0.32		188.1	OK	
S12.007	S5	0.14		305.9	OK	
S12.008	S6	0.15		199.5	OK	
S12.009	S7	0.07		203.4	OK	
S12.010	S8	0.07		135.3	OK	
S12.011	S9	0.04		137.2	OK	
S20.000	S24	0.00		20.8	OK	
S21.000	S25	0.00		18.9	OK	
S20.001	S25	0.02		39.6	OK	
S12.012	S24	0.06		145.5	OK	
S12.013	S27	0.03		33.2	OK	
S12.014	S48	0.01		32.6	OK	
S8.005	S22	0.44		413.4	OK	
S8.006	S23	0.00		0.0	OK	
S8.007	S51	0.00		0.0	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 0.750
Site Location	GB 640286 267538 TM 40286 67538		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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	30 Winter	30	+0%	100/15 Summer				27.399	-0.431	0.000	0.18
S8.001	S13	15 Winter	30	+0%	100/15 Summer				27.293	-0.265	0.000	0.55
S8.002	S14	15 Winter	30	+0%	100/15 Summer				27.141	-0.156	0.000	0.67
S9.000	S16	15 Winter	30	+0%	100/30 Winter				27.736	-0.139	0.000	0.13
S9.001	S17	15 Winter	30	+0%					27.731	-0.211	0.000	0.52
S10.000	S18	30 Winter	30	+0%					27.685	-0.370	0.000	0.31
S9.002	S18	15 Winter	30	+0%	100/15 Summer				27.266	-0.303	0.000	0.48
S8.003	S31	15 Winter	30	+0%	30/15 Summer				26.983	0.112	0.000	1.61
S8.004	S32	15 Winter	30	+0%	100/15 Summer				26.713	-0.072	0.000	0.88
S11.000	S19	15 Winter	30	+0%	100/15 Summer				27.080	-0.520	0.000	0.18
S11.001	S20	15 Winter	30	+0%	100/15 Summer				26.924	-0.130	0.000	0.68
S11.002	S21	15 Winter	30	+0%	30/15 Winter				26.796	0.023	0.000	1.09
S12.000	S1	30 Winter	30	+0%	100/15 Winter				27.184	-0.141	0.000	0.55
S13.000	S15	30 Winter	30	+0%	100/15 Summer				27.187	-0.113	0.000	0.70
S14.000	S17	30 Winter	30	+0%	100/15 Winter				27.802	-0.163	0.000	0.61
S14.001	S4	30 Winter	30	+0%					27.378	-1.572	0.000	0.00
S13.001	S3	30 Winter	30	+0%					26.980	-1.680	0.000	0.01
S12.001	S1	30 Winter	30	+0%	30/15 Summer				26.960	0.222	0.000	0.89
S15.000	S3	30 Winter	30	+0%					27.446	-0.254	0.000	0.23
S12.002	S3	30 Winter	30	+0%	100/30 Summer				26.841	-0.170	0.000	0.79
S12.003	S2	60 Winter	30	+0%	100/30 Summer				26.581	-0.202	0.000	0.77
S12.004	S3	30 Winter	30	+0%					26.381	-2.099	0.000	0.01
S12.005	S7	15 Winter	30	+0%					25.065	-0.804	0.000	0.39
S12.006	S4	30 Winter	30	+0%					24.504	-0.405	0.000	0.44
S16.000	S10	30 Winter	30	+0%					27.181	-0.219	0.000	0.36
S16.001	S11	15 Winter	30	+0%	100/15 Summer				26.795	-0.100	0.000	0.76
S17.000	S11	30 Winter	30	+0%	100/15 Summer				27.534	-0.141	0.000	0.71
S17.001	S14	15 Winter	30	+0%					26.992	-0.360	0.000	0.33
S18.000	S17	30 Winter	30	+0%	100/30 Winter				28.166	-0.134	0.000	0.59
S17.002	S6	30 Winter	30	+0%					26.381	-0.362	0.000	0.33
S19.000	S8	30 Winter	30	+0%					27.405	-0.295	0.000	0.26
S19.001	S9	15 Winter	30	+0%	100/15 Winter				26.744	-0.193	0.000	0.60
S16.002	S7	120 Winter	30	+0%	100/30 Summer				26.083	-0.149	0.000	0.92
S16.003	S8	120 Winter	30	+0%	100/30 Winter				25.955	-0.252	0.000	0.58
S16.004	S9	15 Winter	30	+0%					25.916	-1.614	0.000	0.01

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

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		69.9	OK	
S8.001	S13		194.6	OK	
S8.002	S14		283.6	OK	
S9.000	S16		7.5	OK	
S9.001	S17		115.9	OK	
S10.000	S18		121.4	OK	
S9.002	S18		311.2	OK	
S8.003	S31		566.3	SURCHARGED	
S8.004	S32		538.0	OK	
S11.000	S19		127.2	OK	
S11.001	S20		249.5	OK	
S11.002	S21		387.7	SURCHARGED	
S12.000	S1		44.9	OK	
S13.000	S15		47.9	OK	
S14.000	S17		80.5	OK	
S14.001	S4		94.7	OK	
S13.001	S3		123.4	OK	
S12.001	S1		163.0	SURCHARGED	
S15.000	S3		32.7	OK	
S12.002	S3		195.7	OK	
S12.003	S2		221.0	OK	
S12.004	S3		301.1	OK	
S12.005	S7		352.7	OK	
S12.006	S4		370.9	OK	
S16.000	S10		57.3	OK	
S16.001	S11		78.4	OK	
S17.000	S11		81.0	OK	
S17.001	S14		201.8	OK	
S18.000	S17		63.2	OK	
S17.002	S6		198.0	OK	
S19.000	S8		95.6	OK	
S19.001	S9		174.8	OK	
S16.002	S7		147.5	OK	
S16.003	S8		147.6	OK	
S16.004	S9		129.7	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S16.005	S10	15 Winter	30	+0%					25.885	-0.835	0.000
S16.006	S11	15 Winter	30	+0%	100/15 Summer				24.584	-0.201	0.000
S12.007	S5	15 Winter	30	+0%					23.878	-0.710	0.000
S12.008	S6	120 Winter	30	+0%					23.619	-0.691	0.000
S12.009	S7	120 Winter	30	+0%					23.552	-0.867	0.000
S12.010	S8	180 Winter	30	+0%					22.980	-0.860	0.000
S12.011	S9	180 Winter	30	+0%					22.550	-0.935	0.000
S20.000	S24	30 Winter	30	+0%					23.592	-1.238	0.000
S21.000	S25	30 Winter	30	+0%					24.841	-1.299	0.000
S20.001	S25	30 Winter	30	+0%					23.306	-0.791	0.000
S12.012	S24	720 Winter	30	+0%					22.004	-0.808	0.000
S12.013	S27	720 Winter	30	+0%					22.001	-0.786	0.000
S12.014	S48	1440 Winter	30	+0%					22.049	-0.728	0.000
S8.005	S22	15 Winter	30	+0%	100/360 Winter				26.558	-0.295	0.000
S8.006	S23	1440 Winter	30	+0%	100/360 Winter				26.454	-0.389	0.000
S8.007	S51	240 Winter	30	+0%					25.637	-0.300	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.005	S10	0.05		419.8	OK	
S16.006	S11	0.77		452.5	OK	
S12.007	S5	0.35		736.7	OK	
S12.008	S6	0.38		513.2	OK	
S12.009	S7	0.17		522.9	OK	
S12.010	S8	0.18		361.4	OK	
S12.011	S9	0.11		365.5	OK	
S20.000	S24	0.01		47.0	OK	
S21.000	S25	0.00		42.8	OK	
S20.001	S25	0.04		89.5	OK	
S12.012	S24	0.11		258.3	OK	
S12.013	S27	0.06		71.1	OK	
S12.014	S48	0.03		63.6	OK	
S8.005	S22	0.92		858.3	OK	
S8.006	S23	0.00		0.0	OK	
S8.007	S51	0.00		0.0	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S8.000	S12	15 Winter	100	+40%	100/15 Summer				28.083	0.253	0.000
S8.001	S13	15 Winter	100	+40%	100/15 Summer				28.056	0.498	0.000
S8.002	S14	15 Winter	100	+40%	100/15 Summer				27.913	0.616	0.000
S9.000	S16	30 Winter	100	+40%	100/30 Winter				27.876	0.001	0.000
S9.001	S17	30 Winter	100	+40%					27.866	-0.076	0.000
S10.000	S18	30 Winter	100	+40%					27.934	-0.121	0.000
S9.002	S18	30 Winter	100	+40%	100/15 Summer				27.805	0.236	0.000
S8.003	S31	2880 Winter	100	+40%	30/15 Summer				27.699	0.828	0.000
S8.004	S32	2880 Winter	100	+40%	100/15 Summer				27.700	0.914	0.000
S11.000	S19	30 Winter	100	+40%	100/15 Summer				28.020	0.420	0.000
S11.001	S20	30 Winter	100	+40%	100/15 Summer				27.974	0.920	0.000
S11.002	S21	2880 Winter	100	+40%	30/15 Winter				27.700	0.927	0.000
S12.000	S1	30 Winter	100	+40%	100/15 Winter				27.595	0.270	0.000
S13.000	S15	30 Winter	100	+40%	100/15 Summer				27.657	0.357	0.000
S14.000	S17	30 Winter	100	+40%	100/15 Winter				28.018	0.053	0.000
S14.001	S4	30 Winter	100	+40%					27.424	-1.526	0.000
S13.001	S3	30 Winter	100	+40%					27.315	-1.345	0.000
S12.001	S1	30 Winter	100	+40%	30/15 Summer				27.313	0.575	0.000
S15.000	S3	30 Winter	100	+40%					27.492	-0.208	0.000
S12.002	S3	30 Winter	100	+40%	100/30 Summer				27.050	0.039	0.000
S12.003	S2	30 Winter	100	+40%	100/30 Summer				26.816	0.033	0.000
S12.004	S3	30 Winter	100	+40%					26.495	-1.985	0.000
S12.005	S7	30 Winter	100	+40%					25.467	-0.402	0.000
S12.006	S4	30 Winter	100	+40%					24.693	-0.216	0.000
S16.000	S10	30 Winter	100	+40%					27.290	-0.110	0.000
S16.001	S11	30 Winter	100	+40%	100/15 Summer				27.106	0.211	0.000
S17.000	S11	30 Winter	100	+40%	100/15 Summer				27.865	0.190	0.000
S17.001	S14	15 Winter	100	+40%					27.084	-0.267	0.000
S18.000	S17	30 Winter	100	+40%	100/30 Winter				28.377	0.077	0.000
S17.002	S6	30 Winter	100	+40%					26.495	-0.247	0.000
S19.000	S8	30 Winter	100	+40%					27.466	-0.234	0.000
S19.001	S9	15 Winter	100	+40%	100/15 Winter				26.962	0.025	0.000
S16.002	S7	60 Winter	100	+40%	100/30 Summer				26.317	0.085	0.000
S16.003	S8	120 Winter	100	+40%	100/30 Winter				26.233	0.026	0.000
S16.004	S9	15 Winter	100	+40%					26.022	-1.508	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12	0.34		135.5	SURCHARGED	
S8.001	S13	0.76		269.5	SURCHARGED	
S8.002	S14	1.05		446.1	SURCHARGED	
S9.000	S16	0.26		14.7	SURCHARGED	
S9.001	S17	0.74		164.6	OK	
S10.000	S18	0.57		223.9	OK	
S9.002	S18	0.65		416.6	SURCHARGED	
S8.003	S31	0.15		52.3	SURCHARGED	
S8.004	S32	0.08		51.7	SURCHARGED	
S11.000	S19	0.37		257.2	FLOOD RISK	
S11.001	S20	1.17		428.1	FLOOD RISK	
S11.002	S21	0.12		41.3	SURCHARGED	
S12.000	S1	0.96		78.1	SURCHARGED	
S13.000	S15	1.23		83.6	SURCHARGED	
S14.000	S17	1.10		145.5	SURCHARGED	
S14.001	S4	0.01		169.2	OK	
S13.001	S3	0.01		186.7	OK	
S12.001	S1	1.35		246.5	SURCHARGED	
S15.000	S3	0.41		59.4	OK	
S12.002	S3	1.19		294.0	SURCHARGED	
S12.003	S2	1.27		364.5	SURCHARGED	
S12.004	S3	0.02		599.6	OK	
S12.005	S7	0.82		740.9	OK	
S12.006	S4	0.85		725.6	OK	
S16.000	S10	0.67		105.2	OK	
S16.001	S11	1.26		129.5	SURCHARGED	
S17.000	S11	1.27		144.6	SURCHARGED	
S17.001	S14	0.58		359.2	OK	
S18.000	S17	1.05		112.6	SURCHARGED	
S17.002	S6	0.65		384.9	OK	
S19.000	S8	0.47		173.8	OK	
S19.001	S9	1.04		301.1	SURCHARGED	
S16.002	S7	2.16		347.1	SURCHARGED	
S16.003	S8	1.37		347.0	SURCHARGED	
S16.004	S9	0.02		241.3	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S16.005	S10	15 Winter	100	+40%					25.986	-0.734	0.000
S16.006	S11	15 Winter	100	+40%	100/15 Summer				24.945	0.160	0.000
S12.007	S5	30 Winter	100	+40%					24.093	-0.495	0.000
S12.008	S6	60 Winter	100	+40%					23.865	-0.445	0.000
S12.009	S7	120 Winter	100	+40%					23.689	-0.730	0.000
S12.010	S8	120 Winter	100	+40%					23.171	-0.669	0.000
S12.011	S9	960 Winter	100	+40%					22.815	-0.670	0.000
S20.000	S24	30 Winter	100	+40%					23.634	-1.196	0.000
S21.000	S25	30 Winter	100	+40%					24.862	-1.278	0.000
S20.001	S25	30 Winter	100	+40%					23.345	-0.752	0.000
S12.012	S24	960 Winter	100	+40%					22.811	-0.001	0.000
S12.013	S27	960 Winter	100	+40%					22.772	-0.015	0.000
S12.014	S48	960 Winter	100	+40%					22.772	-0.005	0.000
S8.005	S22	2880 Winter	100	+40%	100/360 Winter				27.700	0.847	0.000
S8.006	S23	2880 Winter	100	+40%	100/360 Winter				27.699	0.856	0.000
S8.007	S51	240 Winter	100	+40%					25.637	-0.300	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.005	S10	0.09		767.1	OK	
S16.006	S11	1.20		709.5	SURCHARGED	
S12.007	S5	0.65		1367.6	OK	
S12.008	S6	0.72		975.8	OK	
S12.009	S7	0.33		987.6	OK	
S12.010	S8	0.41		825.1	OK	
S12.011	S9	0.12		400.8	OK	
S20.000	S24	0.01		85.5	OK	
S21.000	S25	0.00		77.8	OK	
S20.001	S25	0.06		162.6	OK	
S12.012	S24	0.19		435.7	OK	
S12.013	S27	0.09		108.2	OK	
S12.014	S48	0.04		90.0	OK	
S8.005	S22	0.18		164.2	SURCHARGED	
S8.006	S23	0.00		0.0	SURCHARGED	
S8.007	S51	0.00		0.0	OK	

Time Area Diagram for Network North

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	1.760	8-12	0.873	16-20	3.340	24-28	0.817	32-36	0.211
4-8	1.741	12-16	3.553	20-24	1.135	28-32	0.547		

Total Area Contributing (ha) = 13.976

Total Pipe Volume (m^3) = 7254.317

Existing Network Details for Network North

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S8.000	65.683	0.272	241.5	0.382	15.00	0.0	0.600		o	600	Pipe/Conduit
S8.001	83.632	0.261	320.4	0.453	0.00	0.0	0.600		o	600	Pipe/Conduit
S8.002	77.351	0.351	220.4	0.418	0.00	0.0	0.600		o	600	Pipe/Conduit
S9.000	25.003	0.083	301.2	0.033	15.00	0.0	0.600		o	300	Pipe/Conduit
S9.001	68.374	0.373	183.3	0.322	0.00	0.0	0.600		o	450	Pipe/Conduit
S10.000	111.255	0.411	270.7	0.668	15.00	0.0	0.600		o	600	Pipe/Conduit
S9.002	55.841	0.623	89.6	0.338	0.00	0.0	0.600		o	600	Pipe/Conduit
S8.003	42.921	0.086	500.0	0.000	0.00	0.0	0.600		o	675	Pipe/Conduit
S8.004	37.349	0.232	160.9	0.000	0.00	0.0	0.600		o	675	Pipe/Conduit
S11.000	106.953	0.396	270.1	0.720	15.00	0.0	0.600		o	750	Pipe/Conduit
S11.001	83.803	0.281	298.2	0.665	0.00	0.0	0.600		o	600	Pipe/Conduit
S11.002	65.930	0.220	299.7	0.697	0.00	0.0	0.600		o	600	Pipe/Conduit
S12.000	64.797	0.386	167.9	0.246	15.00	0.0	0.600		o	300	Pipe/Conduit
S13.000	65.687	0.274	239.7	0.263	15.00	0.0	0.600		o	300	Pipe/Conduit
S14.000	66.073	0.330	200.2	0.441	15.00	0.0	0.600		o	375	Pipe/Conduit
S14.001	44.777	0.384	116.6	0.104	0.00	0.0	0.045	3 \=/	1500		1:3 Swale
S13.001	33.181	0.138	240.4	0.000	0.00	0.0	0.045	3 \=/	1500		1:3 Swale
S12.001	45.813	0.153	299.4	0.152	0.00	0.0	0.045		o	750	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S8.000	27.230	0.382	0.0	1.56	441.8
S8.001	26.958	0.835	0.0	1.35	383.1
S8.002	26.697	1.253	0.0	1.64	462.7
S9.000	27.575	0.033	0.0	0.90	63.7
S9.001	27.492	0.355	0.0	1.50	238.3
S10.000	27.455	0.668	0.0	1.48	417.1
S9.002	26.969	1.360	0.0	2.57	727.5
S8.003	26.196	2.613	0.0	1.17	417.0
S8.004	26.110	2.613	0.0	2.06	738.5
S11.000	26.850	0.720	0.0	1.70	750.1
S11.001	26.454	1.385	0.0	1.40	397.2
S11.002	26.173	2.082	0.0	1.40	396.3
S12.000	27.025	0.246	0.0	1.21	85.6
S13.000	27.000	0.263	0.0	1.01	71.5
S14.000	27.590	0.441	0.0	1.28	141.0
S14.001	27.260	0.545	0.0	1.93	21472.2
S13.001	26.726	0.808	0.0	1.46	20620.2
S12.001	25.988	1.206	0.0	0.42	185.9

Existing Network Details for Network North

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S15.000	57.183	0.340	168.2	0.178	15.00	0.0	0.600		o	375	Pipe/Conduit
S12.002	45.813	0.153	299.4	0.198	0.00	0.0	0.600		o	525	Pipe/Conduit
S12.003	26.883	0.074	361.8	0.318	0.00	0.0	0.600		o	600	Pipe/Conduit
S12.004	102.802	0.390	263.9	0.573	0.00	0.0		0.045	3 \=/	1500	1:3 Swale
S12.005	104.957	0.210	499.8	0.606	0.00	0.0		0.045	o	1500	Pipe/Conduit
S12.006	44.603	0.308	144.8	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit
S16.000	60.711	0.430	141.2	0.313	15.00	0.0	0.600		o	375	Pipe/Conduit
S16.001	38.530	0.385	100.0	0.103	0.00	0.0	0.600		o	300	Pipe/Conduit
S17.000	90.297	0.324	279.0	0.441	15.00	0.0	0.600		o	375	Pipe/Conduit
S17.001	60.861	0.609	99.9	0.513	0.00	0.0	0.600		o	600	Pipe/Conduit
S18.000	88.800	0.888	100.0	0.344	15.00	0.0	0.600		o	300	Pipe/Conduit
S17.002	43.575	0.436	99.9	0.223	0.00	0.0	0.600		o	600	Pipe/Conduit
S19.000	76.277	1.140	66.9	0.521	15.00	0.0	0.600		o	450	Pipe/Conduit
S19.001	44.044	0.440	100.1	0.292	0.00	0.0	0.600		o	450	Pipe/Conduit
S16.002	12.369	0.025	494.7	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit
S16.003	30.392	0.062	490.2	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit
S16.004	42.116	0.084	501.4	0.456	0.00	0.0		0.045	4 \=/	600	1:4 Swale
S16.005	109.837	1.373	80.0	1.106	0.00	0.0		0.045	3 \=/	600	1:3 Swale
S16.006	42.249	0.422	100.1	0.174	0.00	0.0	0.600		o	600	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S15.000	27.325	0.178	0.0	1.39	154.0
S12.002	26.486	1.581	0.0	1.29	279.1
S12.003	26.183	1.899	0.0	1.27	360.3
S12.004	26.109	2.472	0.0	1.58	32208.3
S12.005	24.369	3.078	0.0	0.52	913.4
S12.006	24.159	3.078	0.0	2.32	1026.5
S16.000	27.025	0.313	0.0	1.52	168.2
S16.001	26.595	0.416	0.0	1.57	111.1
S17.000	27.300	0.441	0.0	1.08	119.3
S17.001	26.751	0.955	0.0	2.44	688.8
S18.000	28.000	0.344	0.0	1.57	111.1
S17.002	26.142	1.521	0.0	2.44	688.8
S19.000	27.250	0.521	0.0	2.49	395.8
S19.001	26.487	0.813	0.0	2.03	323.2
S16.002	25.632	2.751	0.0	1.09	307.6
S16.003	25.607	2.751	0.0	1.09	309.1
S16.004	25.545	3.207	0.0	0.99	16812.6
S16.005	25.558	4.313	0.0	1.76	8366.5
S16.006	24.185	4.487	0.0	2.43	688.2

Existing Network Details for Network North

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S12.007	22.494	0.278	80.9	0.199	0.00	0.0	0.600		o	1200	Pipe/Conduit
S12.008	18.911	0.057	331.8	0.104	0.00	0.0	0.600		o	1200	Pipe/Conduit
S12.009	11.370	0.574	19.8	0.206	0.00	0.0	0.600		o	1200	Pipe/Conduit
S12.010	61.289	0.255	240.3	0.158	0.00	0.0	0.600		o	1200	Pipe/Conduit
S12.011	33.560	0.673	49.9	0.226	0.00	0.0	0.600		o	1200	Pipe/Conduit
S20.000	83.677	0.209	400.4	0.256	15.00	0.0		0.045	3 \=/	1500	1:3 Swale
S21.000	50.967	1.593	32.0	0.233	15.00	0.0		0.045	3 \=/	1500	1:3 Swale
S20.001	53.969	1.250	43.2	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit
S12.012	37.603	0.325	115.7	0.333	0.00	0.0	0.600		o	1200	Pipe/Conduit
S12.013	8.803	0.010	880.3	0.000	0.00	0.0	0.600		o	1500	Pipe/Conduit
S12.014	605.446	-4.376	-138.4	0.000	0.00	0.0	0.600		o	1500	Pipe/Conduit
S8.005	5.015	0.010	501.5	0.000	0.00	0.0	0.600		o	1200	Pipe/Conduit
S8.006	3.000	0.006	500.0	0.000	0.00	0.0	0.600		o	1200	Pipe/Conduit
S8.007	2.000	0.037	54.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S12.007	23.388	7.764	0.0	4.16	4706.0
S12.008	23.110	7.868	0.0	2.05	2316.7
S12.009	23.219	8.074	0.0	8.42	9526.5
S12.010	22.640	8.232	0.0	2.41	2724.4
S12.011	22.285	8.459	0.0	5.30	5998.7
S20.000	23.480	0.256	0.0	0.91	6847.0
S21.000	24.790	0.233	0.0	3.23	24219.0
S20.001	23.197	0.489	0.0	4.78	3038.2
S12.012	21.612	9.281	0.0	3.48	3933.1
S12.013	21.287	9.281	0.0	1.44	2540.2
S12.014	21.277	9.281	0.0	0.00	0.0
S8.005	25.653	13.976	0.0	1.66	1881.6
S8.006	25.643	13.976	0.0	1.67	1884.5
S8.007	25.637	13.976	0.0	2.14	151.5

Manhole Schedules for Network North

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)
S12	28.530	1.300	Open Manhole	1500	S8.000	27.230	600				
S13	28.840	1.882	Open Manhole	1500	S8.001	26.958	600	S8.000	26.958	600	
S14	28.620	1.923	Open Manhole	1500	S8.002	26.697	600	S8.001	26.697	600	
S16	28.950	1.375	Open Manhole	2400	S9.000	27.575	300				
S17	28.920	1.428	Open Manhole	1350	S9.001	27.492	450	S9.000	27.492	300	
S18	28.930	1.475	Open Manhole	1500	S10.000	27.455	600				
S18	28.770	1.801	Open Manhole	1500	S9.002	26.969	600	S9.001	27.119	450	
								S10.000	27.044	600	75
S31	28.810	2.614	Open Manhole	1500	S8.003	26.196	675	S8.002	26.346	600	75
								S9.002	26.346	600	75
S32	28.910	2.800	Open Manhole	1500	S8.004	26.110	675	S8.003	26.110	675	
S19	28.180	1.330	Open Manhole	1800	S11.000	26.850	750				
S20	28.180	1.726	Open Manhole	1800	S11.001	26.454	600	S11.000	26.454	750	
S21	28.870	2.697	Open Manhole	1500	S11.002	26.173	600	S11.001	26.173	600	
S1	28.450	1.425	Open Manhole	1500	S12.000	27.025	300				
S15	28.370	1.370	Open Manhole	1200	S13.000	27.000	300				
S17	28.890	1.300	Open Manhole	1350	S14.000	27.590	375				
S4	28.950	1.690	Open Manhole	10000	S14.001	27.260	1500	S14.000	27.260	375	
S3	28.660	1.934	Open Manhole	10000	S13.001	26.726	1500	S13.000	26.726	300	
								S14.001	26.876	1500	150
S1	28.580	2.592	Open Manhole	10000	S12.001	25.988	750	S12.000	26.639	300	201
								S13.001	26.588	1500	
S3	28.750	1.425	Open Manhole	1200	S15.000	27.325	375				
S3	28.440	2.605	Open Manhole	1800	S12.002	26.486	525	S12.001	25.835	750	
								S15.000	26.985	375	349
S2	28.440	2.257	Open Manhole	1500	S12.003	26.183	600	S12.002	26.333	525	75
S3	28.480	2.371	Open Manhole	10000	S12.004	26.109	1500	S12.003	26.109	600	
S7	26.000	1.631	Open Manhole	10000	S12.005	24.369	1500	S12.004	25.719	1500	
S4	26.000	1.841	Open Manhole	2400	S12.006	24.159	750	S12.005	24.159	1500	
S10	28.450	1.425	Open Manhole	1200	S16.000	27.025	375				
S11	28.020	1.425	Open Manhole	1200	S16.001	26.595	300	S16.000	26.595	375	
S11	28.530	1.230	Open Manhole	1350	S17.000	27.300	375				
S14	27.940	1.189	Open Manhole	1500	S17.001	26.751	600	S17.000	26.976	375	
S17	29.300	1.300	Open Manhole	1200	S18.000	28.000	300				
S6	28.190	2.048	Open Manhole	1500	S17.002	26.142	600	S17.001	26.142	600	
								S18.000	27.112	300	670
S8	28.750	1.500	Open Manhole	1350	S19.000	27.250	450				
S9	27.610	1.500	Open Manhole	1350	S19.001	26.487	450	S19.000	26.110	450	
S7	27.276	1.644	Open Manhole	1500	S16.002	25.632	600	S16.001	26.210	300	278
								S17.002	25.706	600	74
								S19.001	26.047	450	265
S8	27.550	1.943	Open Manhole	1500	S16.003	25.607	600	S16.002	25.607	600	
S9	27.530	1.985	Open Manhole	1500	S16.004	25.545	600	S16.003	25.545	600	
S10	26.720	1.259	Junction		S16.005	25.558	600	S16.004	25.461	600	
S11	25.520	1.335	Open Manhole	1500	S16.006	24.185	600	S16.005	24.185	600	
S5	24.752	1.364	Open Manhole	2400	S12.007	23.388	1200	S12.006	23.851	750	13
								S16.006	23.763	600	

Manhole Schedules for Network North

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)	Backdrop (mm)
S6	25.270	2.160	Open Manhole	2400	S12.008	23.110	1200	S12.007	23.110	1200	
S7	24.650	1.597	Open Manhole	1950	S12.009	23.219	1200	S12.008	23.053	1200	
S8	24.600	1.960	Open Manhole	1950	S12.010	22.640	1200	S12.009	22.645	1200	5
S9	24.410	2.125	Open Manhole	1950	S12.011	22.285	1200	S12.010	22.385	1200	100
S24	24.830	1.350	Junction		S20.000	23.480	1500				
S25	26.140	1.350	Junction		S21.000	24.790	1500				
S25	24.250	1.053	Open Manhole	1200	S20.001	23.197	900	S20.000	23.271	1500	
								S21.000	23.197	1500	
S24	23.500	1.888	Open Manhole	2400	S12.012	21.612	1200	S12.011	21.612	1200	
								S20.001	21.947	900	35
S27	23.500	2.213	Open Manhole	3000	S12.013	21.287	1500	S12.012	21.287	1200	
S48	26.500	5.223	Open Manhole	3000	S12.014	21.277	1500	S12.013	21.277	1500	
S22	28.358	2.705	Open Manhole	4000	S8.005	25.653	1200	S8.004	25.878	675	
								S11.002	25.953	600	
								S12.014	25.653	1500	
S23	28.700	3.057	Open Manhole	4000	S8.006	25.643	1200	S8.005	25.643	1200	
S51	29.000	3.363	Open Manhole	1500	S8.007	25.637	300	S8.006	25.637	1200	
S	28.800	3.200	Open Manhole	0		OUTFALL		S8.007	25.600	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S12	628.840	688.752	628.840	688.752	Required	
S13	599.300	747.417	599.300	747.417	Required	
S14	660.875	804.010	660.875	804.010	Required	
S16	734.002	793.114	734.002	793.114	Required	
S17	721.277	814.636	721.277	814.636	Required	
S18	843.928	943.506	843.928	943.506	Required	
S18	776.403	855.085	776.403	855.085	Required	
S31	720.595	853.171	720.595	853.171	Required	
S32	691.261	884.505	691.261	884.505	Required	
S19	893.648	992.437	893.648	992.437	Required	

Manhole Schedules for Network North

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S20	786.703	991.119	786.703	991.119	Required	
S21	703.296	982.983	703.296	982.983	Required	
S1	766.688	646.471	766.688	646.471	Required	
S15	733.145	680.684	733.145	680.684	Required	
S17	706.309	717.886	706.309	717.886	Required	
S4	759.876	756.568	759.876	756.568	Required	
S3	785.749	720.023	785.749	720.023	Required	
S1	808.558	695.924	808.558	695.924	Required	
S3	792.261	616.505	792.261	616.505	Required	
S3	832.667	656.967	832.667	656.967	Required	
S2	856.777	618.011	856.777	618.011	Required	
S3	837.553	599.219	837.553	599.219	Required	
S7	758.350	533.681	758.350	533.681	Required	
S4	669.902	477.176	669.902	477.176	Required	
S10	765.558	648.208	765.558	648.208	Required	
S11	716.535	612.395	716.535	612.395	Required	
S11	703.066	714.468	703.066	714.468	Required	
S14	622.595	673.505	622.595	673.505	Required	
S17	732.154	679.979	732.154	679.979	Required	

Manhole Schedules for Network North

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S6	661.261	626.505	661.261	626.505	Required	
S8	791.458	615.308	791.458	615.308	Required	
S9	726.595	575.172	726.595	575.172	Required	
S7	685.142	590.056	685.142	590.056	Required	
S8	691.595	579.505	691.595	579.505	Required	
S9	665.639	563.695	665.639	563.695	Required	
S10	688.262	528.172			No Entry	
S11	596.261	468.172	596.261	468.172	Required	
S5	634.453	450.106	634.453	450.106	Required	
S6	616.141	437.043	616.141	437.043	Required	
S7	628.511	422.738	628.511	422.738	Required	
S8	620.381	414.789	620.381	414.789	Required	
S9	569.361	380.828	569.361	380.828	Required	
S24	564.595	446.172			No Entry	
S25	475.389	353.495			No Entry	
S25	494.262	400.839	494.262	400.839	Required	
S24	537.915	369.104	537.915	369.104	Required	
S27	503.262	354.505	503.262	354.505	Required	
S48	495.230	350.902	495.230	350.902	Required	

Manhole Schedules for Network North

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S22	709.114	917.310	709.114	917.310	Required	
S23	714.103	917.815	714.103	917.815	Required	
S51	716.611	919.462	716.611	919.462	Required	
S	718.611	919.462			No Entry	

PIPELINE SCHEDULES for Network North

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)
S8.000	o	600	S12	28.530	27.230	0.700	Open Manhole	1500
S8.001	o	600	S13	28.840	26.958	1.282	Open Manhole	1500
S8.002	o	600	S14	28.620	26.697	1.323	Open Manhole	1500
S9.000	o	300	S16	28.950	27.575	1.075	Open Manhole	2400
S9.001	o	450	S17	28.920	27.492	0.978	Open Manhole	1350
S10.000	o	600	S18	28.930	27.455	0.875	Open Manhole	1500
S9.002	o	600	S18	28.770	26.969	1.201	Open Manhole	1500
S8.003	o	675	S31	28.810	26.196	1.939	Open Manhole	1500
S8.004	o	675	S32	28.910	26.110	2.125	Open Manhole	1500
S11.000	o	750	S19	28.180	26.850	0.580	Open Manhole	1800
S11.001	o	600	S20	28.180	26.454	1.126	Open Manhole	1800
S11.002	o	600	S21	28.870	26.173	2.097	Open Manhole	1500
S12.000	o	300	S1	28.450	27.025	1.125	Open Manhole	1500
S13.000	o	300	S15	28.370	27.000	1.070	Open Manhole	1200
S14.000	o	375	S17	28.890	27.590	0.925	Open Manhole	1350
S14.001	3 \=/	1500	S4	28.950	27.260	1.540	Open Manhole	10000
S13.001	3 \=/	1500	S3	28.660	26.726	1.784	Open Manhole	10000

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)
S8.000	65.683	241.5	S13	28.840	26.958	1.282	Open Manhole	1500
S8.001	83.632	320.4	S14	28.620	26.697	1.323	Open Manhole	1500
S8.002	77.351	220.4	S31	28.810	26.346	1.864	Open Manhole	1500
S9.000	25.003	301.2	S17	28.920	27.492	1.128	Open Manhole	1350
S9.001	68.374	183.3	S18	28.770	27.119	1.201	Open Manhole	1500
S10.000	111.255	270.7	S18	28.770	27.044	1.126	Open Manhole	1500
S9.002	55.841	89.6	S31	28.810	26.346	1.864	Open Manhole	1500
S8.003	42.921	500.0	S32	28.910	26.110	2.125	Open Manhole	1500
S8.004	37.349	160.9	S22	28.358	25.878	1.805	Open Manhole	4000
S11.000	106.953	270.1	S20	28.180	26.454	0.976	Open Manhole	1800
S11.001	83.803	298.2	S21	28.870	26.173	2.097	Open Manhole	1500
S11.002	65.930	299.7	S22	28.358	25.953	1.805	Open Manhole	4000
S12.000	64.797	167.9	S1	28.580	26.639	1.641	Open Manhole	10000
S13.000	65.687	239.7	S3	28.660	26.726	1.634	Open Manhole	10000
S14.000	66.073	200.2	S4	28.950	27.260	1.315	Open Manhole	10000
S14.001	44.777	116.6	S3	28.660	26.876	1.634	Open Manhole	10000
S13.001	33.181	240.4	S1	28.580	26.588	1.842	Open Manhole	10000

PIPELINE SCHEDULES for Network North

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)
S12.001	o	750	S1	28.580	25.988	1.842	Open Manhole	10000
S15.000	o	375	S3	28.750	27.325	1.050	Open Manhole	1200
S12.002	o	525	S3	28.440	26.486	1.429	Open Manhole	1800
S12.003	o	600	S2	28.440	26.183	1.657	Open Manhole	1500
S12.004	3 \=/	1500	S3	28.480	26.109	2.221	Open Manhole	10000
S12.005	o	1500	S7	26.000	24.369	0.131	Open Manhole	10000
S12.006	o	750	S4	26.000	24.159	1.091	Open Manhole	2400
S16.000	o	375	S10	28.450	27.025	1.050	Open Manhole	1200
S16.001	o	300	S11	28.020	26.595	1.125	Open Manhole	1200
S17.000	o	375	S11	28.530	27.300	0.855	Open Manhole	1350
S17.001	o	600	S14	27.940	26.751	0.589	Open Manhole	1500
S18.000	o	300	S17	29.300	28.000	1.000	Open Manhole	1200
S17.002	o	600	S6	28.190	26.142	1.448	Open Manhole	1500
S19.000	o	450	S8	28.750	27.250	1.050	Open Manhole	1350
S19.001	o	450	S9	27.610	26.487	0.673	Open Manhole	1350
S16.002	o	600	S7	27.276	25.632	1.044	Open Manhole	1500
S16.003	o	600	S8	27.550	25.607	1.343	Open Manhole	1500
S16.004	4 \=/	600	S9	27.530	25.545	1.835	Open Manhole	1500
S16.005	3 \=/	600	S10	26.720	25.558	1.012	Junction	

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)
S12.001	45.813	299.4	S3	28.440	25.835	1.855	Open Manhole	1800
S15.000	57.183	168.2	S3	28.440	26.985	1.080	Open Manhole	1800
S12.002	45.813	299.4	S2	28.440	26.333	1.582	Open Manhole	1500
S12.003	26.883	361.8	S3	28.480	26.109	1.771	Open Manhole	10000
S12.004	102.802	263.9	S7	26.000	25.719	0.131	Open Manhole	10000
S12.005	104.957	499.8	S4	26.000	24.159	0.341	Open Manhole	2400
S12.006	44.603	144.8	S5	24.752	23.851	0.151	Open Manhole	2400
S16.000	60.711	141.2	S11	28.020	26.595	1.050	Open Manhole	1200
S16.001	38.530	100.0	S7	27.276	26.210	0.766	Open Manhole	1500
S17.000	90.297	279.0	S14	27.940	26.976	0.589	Open Manhole	1500
S17.001	60.861	99.9	S6	28.190	26.142	1.448	Open Manhole	1500
S18.000	88.800	100.0	S6	28.190	27.112	0.778	Open Manhole	1500
S17.002	43.575	99.9	S7	27.276	25.706	0.970	Open Manhole	1500
S19.000	76.277	66.9	S9	27.610	26.110	1.050	Open Manhole	1350
S19.001	44.044	100.1	S7	27.276	26.047	0.779	Open Manhole	1500
S16.002	12.369	494.7	S8	27.550	25.607	1.343	Open Manhole	1500
S16.003	30.392	490.2	S9	27.530	25.545	1.385	Open Manhole	1500
S16.004	42.116	501.4	S10	26.720	25.461	1.109	Junction	
S16.005	109.837	80.0	S11	25.520	24.185	1.185	Open Manhole	1500

PIPELINE SCHEDULES for Network North

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)
S16.006	o	600	S11	25.520	24.185	0.735	Open Manhole	1500
S12.007	o	1200	S5	24.752	23.388	0.164	Open Manhole	2400
S12.008	o	1200	S6	25.270	23.110	0.960	Open Manhole	2400
S12.009	o	1200	S7	24.650	23.219	0.231	Open Manhole	1950
S12.010	o	1200	S8	24.600	22.640	0.760	Open Manhole	1950
S12.011	o	1200	S9	24.410	22.285	0.925	Open Manhole	1950
S20.000	3 \=/	1500	S24	24.830	23.480	1.200	Junction	
S21.000	3 \=/	1500	S25	26.140	24.790	1.200	Junction	
S20.001	o	900	S25	24.250	23.197	0.153	Open Manhole	1200
S12.012	o	1200	S24	23.500	21.612	0.688	Open Manhole	2400
S12.013	o	1500	S27	23.500	21.287	0.713	Open Manhole	3000
S12.014	o	1500	S48	26.500	21.277	3.723	Open Manhole	3000
S8.005	o	1200	S22	28.358	25.653	1.505	Open Manhole	4000
S8.006	o	1200	S23	28.700	25.643	1.857	Open Manhole	4000
S8.007	o	300	S51	29.000	25.637	3.063	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S16.006	42.249	100.1	S5	24.752	23.763	0.389	Open Manhole	2400
S12.007	22.494	80.9	S6	25.270	23.110	0.960	Open Manhole	2400
S12.008	18.911	331.8	S7	24.650	23.053	0.397	Open Manhole	1950
S12.009	11.370	19.8	S8	24.600	22.645	0.755	Open Manhole	1950
S12.010	61.289	240.3	S9	24.410	22.385	0.825	Open Manhole	1950
S12.011	33.560	49.9	S24	23.500	21.612	0.688	Open Manhole	2400
S20.000	83.677	400.4	S25	24.250	23.271	0.829	Open Manhole	1200
S21.000	50.967	32.0	S25	24.250	23.197	0.903	Open Manhole	1200
S20.001	53.969	43.2	S24	23.500	21.947	0.653	Open Manhole	2400
S12.012	37.603	115.7	S27	23.500	21.287	1.013	Open Manhole	3000
S12.013	8.803	880.3	S48	26.500	21.277	3.723	Open Manhole	3000
S12.014	605.446	-138.4	S22	28.358	25.653	1.205	Open Manhole	4000
S8.005	5.015	501.5	S23	28.700	25.643	1.857	Open Manhole	4000
S8.006	3.000	500.0	S51	29.000	25.637	2.163	Open Manhole	1500
S8.007	2.000	54.1	S	28.800	25.600	2.900	Open Manhole	0

Area Summary for Network North

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
8.000	User	-	100	0.382	0.382	0.382
8.001	User	-	100	0.453	0.453	0.453
8.002	User	-	100	0.418	0.418	0.418
9.000	User	-	100	0.033	0.033	0.033
9.001	User	-	100	0.322	0.322	0.322
10.000	User	-	50	1.335	0.668	0.668
9.002	User	-	100	0.338	0.338	0.338
8.003	-	-	100	0.000	0.000	0.000
8.004	-	-	100	0.000	0.000	0.000
11.000	-	-	100	0.720	0.720	0.720
11.001	User	-	50	1.330	0.665	0.665
11.002	User	-	40	1.742	0.697	0.697
12.000	User	-	100	0.246	0.246	0.246
13.000	User	-	100	0.263	0.263	0.263
14.000	User	-	100	0.441	0.441	0.441
14.001	User	-	50	0.209	0.104	0.104
13.001	-	-	100	0.000	0.000	0.000
12.001	User	-	100	0.152	0.152	0.152
15.000	User	-	100	0.178	0.178	0.178
12.002	User	-	100	0.198	0.198	0.198
12.003	User	-	100	0.175	0.175	0.175
	User	-	100	0.142	0.142	0.318
12.004	User	-	100	0.573	0.573	0.573
12.005	User	-	100	0.606	0.606	0.606
12.006	-	-	100	0.000	0.000	0.000
16.000	User	-	100	0.313	0.313	0.313
16.001	User	-	100	0.103	0.103	0.103
17.000	User	-	100	0.441	0.441	0.441
17.001	User	-	75	0.684	0.513	0.513
18.000	User	-	100	0.344	0.344	0.344
17.002	User	-	100	0.223	0.223	0.223
19.000	User	-	100	0.282	0.282	0.282
	User	-	100	0.239	0.239	0.521
19.001	User	-	100	0.292	0.292	0.292
16.002	-	-	100	0.000	0.000	0.000
16.003	-	-	100	0.000	0.000	0.000
16.004	User	-	100	0.456	0.456	0.456
16.005	User	-	100	0.813	0.813	0.813
	User	-	100	0.294	0.294	1.106
16.006	User	-	100	0.174	0.174	0.174
12.007	User	-	100	0.199	0.199	0.199
12.008	User	-	100	0.104	0.104	0.104
12.009	User	-	100	0.206	0.206	0.206
12.010	User	-	100	0.158	0.158	0.158
12.011	User	-	100	0.226	0.226	0.226
20.000	User	-	100	0.256	0.256	0.256
21.000	User	-	100	0.233	0.233	0.233
20.001	-	-	100	0.000	0.000	0.000
12.012	User	-	100	0.333	0.333	0.333
12.013	-	-	100	0.000	0.000	0.000
12.014	-	-	100	0.000	0.000	0.000
8.005	-	-	100	0.000	0.000	0.000
8.006	-	-	100	0.000	0.000	0.000
8.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				16.630	13.976	13.976

Network Classifications for Network North

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S8.000	S12	600	0.700	1.282	Unclassified	1500	0	0.700	Unclassified
S8.001	S13	600	1.282	1.323	Unclassified	1500	0	1.282	Unclassified
S8.002	S14	600	1.323	1.864	Unclassified	1500	0	1.323	Unclassified
S9.000	S16	300	1.075	1.128	Unclassified	2400	0	1.075	Unclassified
S9.001	S17	450	0.978	1.201	Unclassified	1350	0	0.978	Unclassified
S10.000	S18	600	0.875	1.126	Unclassified	1500	0	0.875	Unclassified
S9.002	S18	600	1.201	1.864	Unclassified	1500	0	1.201	Unclassified
S8.003	S31	675	1.939	2.125	Unclassified	1500	0	1.939	Unclassified
S8.004	S32	675	1.805	2.125	Unclassified	1500	0	2.125	Unclassified
S11.000	S19	750	0.580	0.976	Unclassified	1800	0	0.580	Unclassified
S11.001	S20	600	1.126	2.097	Unclassified	1800	0	1.126	Unclassified
S11.002	S21	600	1.805	2.097	Unclassified	1500	0	2.097	Unclassified
S12.000	S1	300	1.125	1.641	Unclassified	1500	0	1.125	Unclassified
S13.000	S15	300	1.070	1.634	Unclassified	1200	0	1.070	Unclassified
S14.000	S17	375	0.925	1.315	Unclassified	1350	0	0.925	Unclassified
S14.001	S4	1500	1.540	1.634	Unclassified	10000	0	1.540	Unclassified
S13.001	S3	1500	1.784	1.842	Unclassified	10000	0	1.784	Unclassified
S12.001	S1	750	1.842	1.855	Unclassified	10000	0	1.842	Unclassified
S15.000	S3	375	1.050	1.080	Unclassified	1200	0	1.050	Unclassified
S12.002	S3	525	1.429	1.582	Unclassified	1800	0	1.429	Unclassified
S12.003	S2	600	1.657	1.771	Unclassified	1500	0	1.657	Unclassified
S12.004	S3	1500	0.131	2.221	Unclassified	10000	0	2.221	Unclassified
S12.005	S7	1500	0.131	0.341	Unclassified	10000	0	0.131	Unclassified
S12.006	S4	750	0.151	1.091	Unclassified	2400	0	1.091	Unclassified
S16.000	S10	375	1.050	1.050	Unclassified	1200	0	1.050	Unclassified
S16.001	S11	300	0.766	1.125	Unclassified	1200	0	1.125	Unclassified
S17.000	S11	375	0.589	0.855	Unclassified	1350	0	0.855	Unclassified
S17.001	S14	600	0.589	1.448	Unclassified	1500	0	0.589	Unclassified
S18.000	S17	300	0.778	1.000	Unclassified	1200	0	1.000	Unclassified
S17.002	S6	600	0.970	1.448	Unclassified	1500	0	1.448	Unclassified
S19.000	S8	450	1.050	1.050	Unclassified	1350	0	1.050	Unclassified
S19.001	S9	450	0.673	0.779	Unclassified	1350	0	0.673	Unclassified
S16.002	S7	600	1.044	1.343	Unclassified	1500	0	1.044	Unclassified
S16.003	S8	600	1.343	1.385	Unclassified	1500	0	1.343	Unclassified
S16.004	S9	600	1.109	1.835	Unclassified	1500	0	1.835	Unclassified
S16.005	S10	600	1.012	1.185	Unclassified				Junction
S16.006	S11	600	0.389	0.735	Unclassified	1500	0	0.735	Unclassified
S12.007	S5	1200	0.164	0.960	Unclassified	2400	0	0.164	Unclassified
S12.008	S6	1200	0.397	0.960	Unclassified	2400	0	0.960	Unclassified
S12.009	S7	1200	0.231	0.755	Unclassified	1950	0	0.231	Unclassified
S12.010	S8	1200	0.760	0.825	Unclassified	1950	0	0.760	Unclassified
S12.011	S9	1200	0.688	0.925	Unclassified	1950	0	0.925	Unclassified
S20.000	S24	1500	0.829	1.200	Unclassified				Junction
S21.000	S25	1500	0.903	1.200	Unclassified				Junction
S20.001	S25	900	0.153	0.653	Unclassified	1200	0	0.153	Unclassified
S12.012	S24	1200	0.688	1.013	Unclassified	2400	0	0.688	Unclassified
S12.013	S27	1500	0.713	3.723	Unclassified	3000	0	0.713	Unclassified
S12.014	S48	1500	1.205	3.723	Unclassified	3000	0	3.723	Unclassified
S8.005	S22	1200	1.505	1.857	Unclassified	4000	0	1.505	Unclassified
S8.006	S23	1200	1.857	2.163	Unclassified	4000	0	1.857	Unclassified
S8.007	S51	300	2.900	3.063	Unclassified	1500	0	3.063	Unclassified

Free Flowing Outfall Details for Network North

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S8.007	S	28.800	25.600	0.000	0	0

Simulation Criteria for Network North

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

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 2	Number of Storage Structures 6	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	Cv (Winter)	0.840
Data Type	Point	Storm Duration (mins)	30

Online Controls for Network North

Pump Manhole: S48, DS/PN: S12.014, Volume (m³): 47.2

Invert Level (m) 21.277

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.000	0.0000	2.000	0.0000	3.000	0.0000	4.000	0.0000	6.000	0.0000

Pump Manhole: S23, DS/PN: S8.006, Volume (m³): 39.6

Invert Level (m) 25.643

Storage Structures for Network North

Tank or Pond Manhole: S6, DS/PN: S17.002

Invert Level (m) 26.142

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	509.0	1.600	1389.0

Tank or Pond Manhole: S7, DS/PN: S16.002

Invert Level (m) 25.632

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	870.0	1.500	1700.0

Tank or Pond Manhole: S6, DS/PN: S12.008

Invert Level (m) 23.110

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1073.0	1.550	1643.0

Cellular Storage Manhole: S8, DS/PN: S12.010

Invert Level (m) 22.640 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	2640.0	0.0	1.700	2640.0	0.0	1.701	0.0	0.0

Tank or Pond Manhole: S27, DS/PN: S12.013

Invert Level (m) 21.287

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3820.0	2.200	5620.0

Infiltration Basin Manhole: S23, DS/PN: S8.006

Invert Level (m) 25.643 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.18600 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.18600

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3349.0	3.000	5220.0

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	30 Winter	2	+0%	100/15 Summer				27.341	-0.489	0.000	0.08
S8.001	S13	15 Winter	2	+0%	100/15 Summer				27.154	-0.404	0.000	0.22
S8.002	S14	15 Winter	2	+0%	100/15 Summer				26.920	-0.377	0.000	0.29
S9.000	S16	15 Winter	2	+0%	100/30 Winter				27.637	-0.238	0.000	0.05
S9.001	S17	15 Winter	2	+0%					27.627	-0.315	0.000	0.19
S10.000	S18	30 Winter	2	+0%					27.603	-0.452	0.000	0.14
S9.002	S18	15 Winter	2	+0%	100/15 Summer				27.149	-0.420	0.000	0.19
S8.003	S31	15 Winter	2	+0%	30/15 Summer				26.614	-0.257	0.000	0.69
S8.004	S32	15 Winter	2	+0%	100/15 Summer				26.406	-0.379	0.000	0.40
S11.000	S19	30 Winter	2	+0%	100/15 Summer				26.996	-0.604	0.000	0.08
S11.001	S20	15 Winter	2	+0%	100/15 Summer				26.699	-0.355	0.000	0.34
S11.002	S21	15 Winter	2	+0%	30/15 Winter				26.493	-0.280	0.000	0.55
S12.000	S1	30 Winter	2	+0%	100/15 Winter				27.125	-0.200	0.000	0.24
S13.000	S15	30 Winter	2	+0%	100/15 Summer				27.115	-0.185	0.000	0.31
S14.000	S17	30 Winter	2	+0%	100/15 Winter				27.722	-0.243	0.000	0.27
S14.001	S4	30 Winter	2	+0%					27.334	-1.616	0.000	0.00
S13.001	S3	30 Winter	2	+0%					26.840	-1.820	0.000	0.00
S12.001	S1	120 Summer	2	+0%	30/15 Summer				26.726	-0.012	0.000	0.36
S15.000	S3	30 Winter	2	+0%					27.404	-0.296	0.000	0.10
S12.002	S3	120 Summer	2	+0%	100/30 Summer				26.695	-0.316	0.000	0.33
S12.003	S2	120 Summer	2	+0%	100/30 Summer				26.421	-0.362	0.000	0.33
S12.004	S3	120 Summer	2	+0%					26.279	-2.201	0.000	0.00
S12.005	S7	15 Winter	2	+0%					24.773	-1.096	0.000	0.15
S12.006	S4	120 Winter	2	+0%					24.363	-0.546	0.000	0.17
S16.000	S10	30 Winter	2	+0%					27.125	-0.275	0.000	0.16
S16.001	S11	15 Winter	2	+0%	100/15 Summer				26.714	-0.181	0.000	0.33
S17.000	S11	30 Winter	2	+0%	100/15 Summer				27.444	-0.231	0.000	0.31
S17.001	S14	15 Winter	2	+0%					26.905	-0.446	0.000	0.15
S18.000	S17	30 Winter	2	+0%	100/30 Winter				28.103	-0.197	0.000	0.26
S17.002	S6	30 Winter	2	+0%					26.281	-0.461	0.000	0.12
S19.000	S8	30 Winter	2	+0%					27.351	-0.349	0.000	0.11
S19.001	S9	15 Winter	2	+0%	100/15 Winter				26.639	-0.298	0.000	0.25
S16.002	S7	180 Winter	2	+0%	100/30 Summer				25.894	-0.338	0.000	0.40
S16.003	S8	180 Winter	2	+0%	100/30 Winter				25.838	-0.369	0.000	0.25
S16.004	S9	15 Winter	2	+0%					25.789	-1.741	0.000	0.00

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

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		30.9	OK	
S8.001	S13		78.4	OK	
S8.002	S14		123.8	OK	
S9.000	S16		2.9	OK	
S9.001	S17		43.0	OK	
S10.000	S18		53.6	OK	
S9.002	S18		125.7	OK	
S8.003	S31		243.6	OK	
S8.004	S32		242.8	OK	
S11.000	S19		58.0	OK	
S11.001	S20		124.6	OK	
S11.002	S21		195.9	OK	
S12.000	S1		19.9	OK	
S13.000	S15		21.2	OK	
S14.000	S17		35.6	OK	
S14.001	S4		42.7	OK	
S13.001	S3		62.7	OK	
S12.001	S1		65.0	OK	
S15.000	S3		14.4	OK	
S12.002	S3		80.8	OK	
S12.003	S2		94.1	OK	
S12.004	S3		120.2	OK	
S12.005	S7		136.6	OK	
S12.006	S4		140.8	OK	
S16.000	S10		25.3	OK	
S16.001	S11		33.8	OK	
S17.000	S11		35.8	OK	
S17.001	S14		91.4	OK	
S18.000	S17		27.9	OK	
S17.002	S6		72.9	OK	
S19.000	S8		42.2	OK	
S19.001	S9		71.7	OK	
S16.002	S7		63.5	OK	
S16.003	S8		63.6	OK	
S16.004	S9		47.2	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S16.005	S10	15 Winter	2	+0%					25.769	-0.951	0.000
S16.006	S11	15 Winter	2	+0%	100/15 Summer				24.417	-0.368	0.000
S12.007	S5	15 Winter	2	+0%					23.692	-0.896	0.000
S12.008	S6	180 Winter	2	+0%					23.459	-0.851	0.000
S12.009	S7	180 Winter	2	+0%					23.421	-0.998	0.000
S12.010	S8	360 Winter	2	+0%					22.842	-0.998	0.000
S12.011	S9	360 Winter	2	+0%					22.442	-1.043	0.000
S20.000	S24	30 Winter	2	+0%					23.550	-1.280	0.000
S21.000	S25	30 Winter	2	+0%					24.820	-1.320	0.000
S20.001	S25	30 Winter	2	+0%					23.264	-0.833	0.000
S12.012	S24	5760 Winter	2	+0%	100/360 Winter				22.220	-0.592	0.000
S12.013	S27	5760 Winter	2	+0%	100/360 Winter				22.220	-0.567	0.000
S12.014	S48	5760 Winter	2	+0%	30/5760 Winter				22.308	-0.469	0.000
S8.005	S22	15 Winter	2	+0%					26.213	-0.640	0.000
S8.006	S23	240 Winter	2	+0%					25.820	-1.023	0.000
S8.007	S51	240 Winter	2	+0%					25.637	-0.300	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.005	S10	0.02		172.0	OK	
S16.006	S11	0.32		188.1	OK	
S12.007	S5	0.14		305.9	OK	
S12.008	S6	0.15		199.5	OK	
S12.009	S7	0.07		203.4	OK	
S12.010	S8	0.07		135.3	OK	
S12.011	S9	0.04		137.2	OK	
S20.000	S24	0.00		20.8	OK	
S21.000	S25	0.00		18.9	OK	
S20.001	S25	0.02		39.6	OK	
S12.012	S24	0.01		29.9	OK	
S12.013	S27	0.01		16.1	OK	
S12.014	S48	0.00		0.0	OK	
S8.005	S22	0.44		413.0	OK	
S8.006	S23	0.00		0.0	OK	
S8.007	S51	0.00		0.0	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	30 Winter	30	+0%	100/15 Summer				27.399	-0.431	0.000	0.18
S8.001	S13	15 Winter	30	+0%	100/15 Summer				27.293	-0.265	0.000	0.55
S8.002	S14	15 Winter	30	+0%	100/15 Summer				27.141	-0.156	0.000	0.67
S9.000	S16	15 Winter	30	+0%	100/30 Winter				27.736	-0.139	0.000	0.13
S9.001	S17	15 Winter	30	+0%					27.731	-0.211	0.000	0.52
S10.000	S18	30 Winter	30	+0%					27.685	-0.370	0.000	0.31
S9.002	S18	15 Winter	30	+0%	100/15 Summer				27.266	-0.303	0.000	0.48
S8.003	S31	15 Winter	30	+0%	30/15 Summer				26.983	0.112	0.000	1.61
S8.004	S32	15 Winter	30	+0%	100/15 Summer				26.713	-0.073	0.000	0.88
S11.000	S19	15 Winter	30	+0%	100/15 Summer				27.080	-0.520	0.000	0.18
S11.001	S20	15 Winter	30	+0%	100/15 Summer				26.924	-0.130	0.000	0.68
S11.002	S21	15 Winter	30	+0%	30/15 Winter				26.796	0.023	0.000	1.09
S12.000	S1	30 Winter	30	+0%	100/15 Winter				27.184	-0.141	0.000	0.55
S13.000	S15	30 Winter	30	+0%	100/15 Summer				27.187	-0.113	0.000	0.70
S14.000	S17	30 Winter	30	+0%	100/15 Winter				27.802	-0.163	0.000	0.61
S14.001	S4	30 Winter	30	+0%					27.378	-1.572	0.000	0.00
S13.001	S3	30 Winter	30	+0%					26.980	-1.680	0.000	0.01
S12.001	S1	30 Winter	30	+0%	30/15 Summer				26.960	0.222	0.000	0.89
S15.000	S3	30 Winter	30	+0%					27.446	-0.254	0.000	0.23
S12.002	S3	30 Winter	30	+0%	100/30 Summer				26.841	-0.170	0.000	0.79
S12.003	S2	60 Winter	30	+0%	100/30 Summer				26.581	-0.202	0.000	0.77
S12.004	S3	30 Winter	30	+0%					26.381	-2.099	0.000	0.01
S12.005	S7	15 Winter	30	+0%					25.065	-0.804	0.000	0.39
S12.006	S4	30 Winter	30	+0%					24.504	-0.405	0.000	0.44
S16.000	S10	30 Winter	30	+0%					27.181	-0.219	0.000	0.36
S16.001	S11	15 Winter	30	+0%	100/15 Summer				26.795	-0.100	0.000	0.76
S17.000	S11	30 Winter	30	+0%	100/15 Summer				27.534	-0.141	0.000	0.71
S17.001	S14	15 Winter	30	+0%					26.992	-0.360	0.000	0.33
S18.000	S17	30 Winter	30	+0%	100/30 Winter				28.166	-0.134	0.000	0.59
S17.002	S6	30 Winter	30	+0%					26.381	-0.362	0.000	0.33
S19.000	S8	30 Winter	30	+0%					27.405	-0.295	0.000	0.26
S19.001	S9	15 Winter	30	+0%	100/15 Winter				26.744	-0.193	0.000	0.60
S16.002	S7	120 Winter	30	+0%	100/30 Summer				26.083	-0.149	0.000	0.92
S16.003	S8	120 Winter	30	+0%	100/30 Winter				25.955	-0.252	0.000	0.58
S16.004	S9	15 Winter	30	+0%					25.916	-1.614	0.000	0.01

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

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		69.9	OK	
S8.001	S13		194.6	OK	
S8.002	S14		283.6	OK	
S9.000	S16		7.5	OK	
S9.001	S17		115.9	OK	
S10.000	S18		121.4	OK	
S9.002	S18		311.2	OK	
S8.003	S31		566.3	SURCHARGED	
S8.004	S32		538.1	OK	
S11.000	S19		127.2	OK	
S11.001	S20		249.5	OK	
S11.002	S21		387.8	SURCHARGED	
S12.000	S1		44.9	OK	
S13.000	S15		47.9	OK	
S14.000	S17		80.5	OK	
S14.001	S4		94.7	OK	
S13.001	S3		123.4	OK	
S12.001	S1		163.0	SURCHARGED	
S15.000	S3		32.7	OK	
S12.002	S3		195.7	OK	
S12.003	S2		221.0	OK	
S12.004	S3		301.1	OK	
S12.005	S7		352.7	OK	
S12.006	S4		370.9	OK	
S16.000	S10		57.3	OK	
S16.001	S11		78.4	OK	
S17.000	S11		81.0	OK	
S17.001	S14		201.8	OK	
S18.000	S17		63.2	OK	
S17.002	S6		198.0	OK	
S19.000	S8		95.6	OK	
S19.001	S9		174.8	OK	
S16.002	S7		147.5	OK	
S16.003	S8		147.6	OK	
S16.004	S9		129.7	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S16.005	S10	15 Winter	30	+0%					25.885	-0.835	0.000
S16.006	S11	15 Winter	30	+0%	100/15 Summer				24.584	-0.201	0.000
S12.007	S5	15 Winter	30	+0%					23.878	-0.710	0.000
S12.008	S6	120 Winter	30	+0%					23.619	-0.691	0.000
S12.009	S7	120 Winter	30	+0%					23.552	-0.867	0.000
S12.010	S8	180 Winter	30	+0%					22.980	-0.860	0.000
S12.011	S9	5760 Winter	30	+0%					22.782	-0.703	0.000
S20.000	S24	30 Winter	30	+0%					23.592	-1.238	0.000
S21.000	S25	30 Winter	30	+0%					24.841	-1.299	0.000
S20.001	S25	30 Winter	30	+0%					23.306	-0.791	0.000
S12.012	S24	5760 Winter	30	+0%	100/360 Winter				22.782	-0.030	0.000
S12.013	S27	5760 Winter	30	+0%	100/360 Winter				22.782	-0.005	0.000
S12.014	S48	5760 Winter	30	+0%	30/5760 Winter				22.782	0.005	0.000
S8.005	S22	15 Winter	30	+0%					26.558	-0.295	0.000
S8.006	S23	360 Winter	30	+0%					26.054	-0.789	0.000
S8.007	S51	240 Winter	30	+0%					25.637	-0.300	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.005	S10	0.05		419.8	OK	
S16.006	S11	0.77		452.5	OK	
S12.007	S5	0.35		736.7	OK	
S12.008	S6	0.38		513.2	OK	
S12.009	S7	0.17		522.9	OK	
S12.010	S8	0.18		361.4	OK	
S12.011	S9	0.01		48.0	OK	
S20.000	S24	0.01		47.0	OK	
S21.000	S25	0.00		42.8	OK	
S20.001	S25	0.04		89.5	OK	
S12.012	S24	0.02		52.3	OK	
S12.013	S27	0.02		18.9	OK	
S12.014	S48	0.00		0.0	SURCHARGED	
S8.005	S22	0.92		857.6	OK	
S8.006	S23	0.00		0.0	OK	
S8.007	S51	0.00		0.0	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S8.000	S12	15 Winter	100	+40%	100/15 Summer				28.083	0.253	0.000	0.34
S8.001	S13	15 Winter	100	+40%	100/15 Summer				28.056	0.498	0.000	0.76
S8.002	S14	15 Winter	100	+40%	100/15 Summer				27.913	0.616	0.000	1.05
S9.000	S16	30 Winter	100	+40%	100/30 Winter				27.876	0.001	0.000	0.26
S9.001	S17	30 Winter	100	+40%					27.865	-0.077	0.000	0.74
S10.000	S18	30 Winter	100	+40%					27.934	-0.121	0.000	0.57
S9.002	S18	30 Winter	100	+40%	100/15 Summer				27.805	0.236	0.000	0.65
S8.003	S31	15 Winter	100	+40%	30/15 Summer				27.587	0.716	0.000	2.22
S8.004	S32	15 Winter	100	+40%	100/15 Summer				27.204	0.418	0.000	1.26
S11.000	S19	30 Winter	100	+40%	100/15 Summer				28.020	0.420	0.000	0.37
S11.001	S20	30 Winter	100	+40%	100/15 Summer				27.974	0.920	0.000	1.17
S11.002	S21	30 Winter	100	+40%	30/15 Winter				27.589	0.816	0.000	1.78
S12.000	S1	30 Winter	100	+40%	100/15 Winter				27.595	0.270	0.000	0.96
S13.000	S15	30 Winter	100	+40%	100/15 Summer				27.657	0.357	0.000	1.23
S14.000	S17	30 Winter	100	+40%	100/15 Winter				28.018	0.053	0.000	1.10
S14.001	S4	30 Winter	100	+40%					27.424	-1.526	0.000	0.01
S13.001	S3	30 Winter	100	+40%					27.315	-1.345	0.000	0.01
S12.001	S1	30 Winter	100	+40%	30/15 Summer				27.313	0.575	0.000	1.35
S15.000	S3	30 Winter	100	+40%					27.492	-0.208	0.000	0.41
S12.002	S3	30 Winter	100	+40%	100/30 Summer				27.050	0.039	0.000	1.19
S12.003	S2	30 Winter	100	+40%	100/30 Summer				26.816	0.033	0.000	1.27
S12.004	S3	30 Winter	100	+40%					26.495	-1.985	0.000	0.02
S12.005	S7	30 Winter	100	+40%					25.467	-0.402	0.000	0.82
S12.006	S4	30 Winter	100	+40%					24.693	-0.216	0.000	0.85
S16.000	S10	30 Winter	100	+40%					27.290	-0.110	0.000	0.67
S16.001	S11	30 Winter	100	+40%	100/15 Summer				27.106	0.211	0.000	1.26
S17.000	S11	30 Winter	100	+40%	100/15 Summer				27.865	0.190	0.000	1.27
S17.001	S14	15 Winter	100	+40%					27.084	-0.267	0.000	0.58
S18.000	S17	30 Winter	100	+40%	100/30 Winter				28.377	0.077	0.000	1.05
S17.002	S6	30 Winter	100	+40%					26.495	-0.247	0.000	0.65
S19.000	S8	30 Winter	100	+40%					27.466	-0.234	0.000	0.47
S19.001	S9	15 Winter	100	+40%	100/15 Winter				26.962	0.025	0.000	1.04
S16.002	S7	60 Winter	100	+40%	100/30 Summer				26.317	0.085	0.000	2.16
S16.003	S8	120 Winter	100	+40%	100/30 Winter				26.233	0.026	0.000	1.37
S16.004	S9	15 Winter	100	+40%					26.022	-1.508	0.000	0.02

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

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S12		135.5	SURCHARGED	
S8.001	S13		269.5	SURCHARGED	
S8.002	S14		446.1	SURCHARGED	
S9.000	S16		14.7	SURCHARGED	
S9.001	S17		164.6	OK	
S10.000	S18		223.9	OK	
S9.002	S18		416.6	SURCHARGED	
S8.003	S31		781.5	SURCHARGED	
S8.004	S32		765.9	SURCHARGED	
S11.000	S19		257.2	FLOOD RISK	
S11.001	S20		428.1	FLOOD RISK	
S11.002	S21		637.3	SURCHARGED	
S12.000	S1		78.1	SURCHARGED	
S13.000	S15		83.6	SURCHARGED	
S14.000	S17		145.5	SURCHARGED	
S14.001	S4		169.2	OK	
S13.001	S3		186.7	OK	
S12.001	S1		246.5	SURCHARGED	
S15.000	S3		59.4	OK	
S12.002	S3		294.0	SURCHARGED	
S12.003	S2		364.5	SURCHARGED	
S12.004	S3		599.6	OK	
S12.005	S7		740.9	OK	
S12.006	S4		725.6	OK	
S16.000	S10		105.2	OK	
S16.001	S11		129.5	SURCHARGED	
S17.000	S11		144.6	SURCHARGED	
S17.001	S14		359.2	OK	
S18.000	S17		112.6	SURCHARGED	
S17.002	S6		384.9	OK	
S19.000	S8		173.8	OK	
S19.001	S9		301.1	SURCHARGED	
S16.002	S7		347.1	SURCHARGED	
S16.003	S8		347.0	SURCHARGED	
S16.004	S9		241.3	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S16.005	S10	15 Winter	100	+40%					25.986	-0.734	0.000
S16.006	S11	15 Winter	100	+40%	100/15 Summer				24.945	0.160	0.000
S12.007	S5	30 Winter	100	+40%					24.093	-0.495	0.000
S12.008	S6	60 Winter	100	+40%					23.865	-0.445	0.000
S12.009	S7	120 Winter	100	+40%					23.689	-0.730	0.000
S12.010	S8	5760 Winter	100	+40%					23.462	-0.378	0.000
S12.011	S9	5760 Winter	100	+40%					23.461	-0.024	0.000
S20.000	S24	30 Winter	100	+40%					23.634	-1.196	0.000
S21.000	S25	30 Winter	100	+40%					24.862	-1.278	0.000
S20.001	S25	5760 Winter	100	+40%					23.461	-0.636	0.000
S12.012	S24	5760 Winter	100	+40%	100/360 Winter				23.461	0.649	0.000
S12.013	S27	5760 Winter	100	+40%	100/360 Winter				23.462	0.675	0.000
S12.014	S48	5760 Winter	100	+40%	30/5760 Winter				23.629	0.852	0.000
S8.005	S22	60 Summer	100	+40%					26.853	0.000	0.000
S8.006	S23	600 Winter	100	+40%					26.558	-0.285	0.000
S8.007	S51	240 Winter	100	+40%					25.637	-0.300	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.005	S10	0.09		767.1	OK	
S16.006	S11	1.20		709.5	SURCHARGED	
S12.007	S5	0.65		1367.6	OK	
S12.008	S6	0.72		975.8	OK	
S12.009	S7	0.33		987.6	OK	
S12.010	S8	0.04		86.9	OK	
S12.011	S9	0.03		88.7	OK	
S20.000	S24	0.01		85.5	OK	
S21.000	S25	0.00		77.8	OK	
S20.001	S25	0.00		5.2	OK	
S12.012	S24	0.04		96.2	FLOOD RISK	
S12.013	S27	0.05		59.5	FLOOD RISK	
S12.014	S48	0.00		0.0	SURCHARGED	
S8.005	S22	1.21		1127.8	OK	
S8.006	S23	0.00		0.0	OK	
S8.007	S51	0.00		0.0	OK	

APPENDIX G: POLLUTION MITIGATION MEASURES ASSESSMENT

Introduction

The purpose of this technical note is to provide an assessment to demonstrate that the proposed drainage infrastructure for the SP&R will provide treatment train facilities to mitigate unacceptable risk of pollution to the water environment. The CIRIA C753 SuDS Manual Simplified Index Approach has been applied as an appropriate tool.

Proposed Drainage Strategy

Following infiltration testing it is confirmed that removal of surface water runoff and disposal by infiltration to ground is viable. Therefore, all runoff will be disposed by infiltration to ground.

Proposed Drainage Infrastructure

The proposed drainage infrastructure is described in the Environmental Statement submitted as part of DCO submission. Its subsequent development and the current proposals are described in the more recent Southern Park and Ride Drainage Strategy issued with the intention that it would be acceptable to regulators such that it may be included in the statement of common ground at DCO Examination Stage.

In summary, for the main site, runoff from roofs will be drained via downpipes and gullies, as appropriate to underground carrier drains and discharge into attenuation basins and swales.

Runoff from the internal roads and the bus/HGV standing areas with impermeable surface will be drained via surface outlets, gullies, linear channels and drains etc. These will discharge into same underground carrier drains.

Bypass interceptors will be installed downstream of the bus/HGV standing areas in order to remove hydrocarbon and silt contaminants which will improve the water quality of discharge to the attenuation basins and swales.

The extensive car parking areas will have a permeable surface allowing runoff to permeate into and be temporarily stored in the sub-base. This will assist with attenuating peak flow rate, provide some storage and initial treatment of the runoff. The sub-base will allow flow to drain into the carrier drains.

The underground carrier drains will discharge all surface water into a series of basins and swales which will provide suitable treatment.

Unpaved areas will drain directly by infiltration to ground.

Simplified Index Approach (SIA) Assessment

The SIA methodology considers the relative potential pollution risk based on land use and assigns a level of risk. Based on the risk it then assigns indices for 3 pollutants, these being Total Suspended Solids, Metals and Hydrocarbons.

This is shown in Table 26.2, reproduced from the CIRIA SuDs Manual and reproduced below.

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

Notes

1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

2 These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

Where a site land use falls outside the defined categories, the indices should be adapted (and agreed with the drainage approving body) or else the more detailed risk assessment method should be adopted.

Where nutrient or bacteria and pathogen removal is important for a particular receiving water, equivalent indices should be developed for these pollutants (if acceptable to the drainage approving body) or the risk assessment method adopted.

Once the level of risk has been selected, the indices for the pollutants are confirmed. Appropriate pollution control measures are selected. These are shown in Table 26.4

below.

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates[1]	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.6[4]	0.5	0.6
A soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.4[4]	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.4[4]	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.8[4]	0.8	0.8
Proprietary treatment systems[5, 6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

Each measure is assigned an indice. If only one measure is used. then the indice for that measure is applied. Providing the Table 26.4 indices for each pollutant are equal or greater than those stated in Table 26.2 then the measure is considered to provide appropriate mitigation. If the value is less, then additional treatment measures are required. However, for each additional measure the mitigation indices values are divided by two.

It should be noted that Indices are not provided for Proprietary Treatment Systems. These be obtained from the manufacturer/supplier.

Application of SIA to SP&R

Based on Land Use descriptions it is considered that SP&R has a medium pollution hazard level.

Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Medium	0.7	0.6	0.7

The proposed drainage infrastructure which removes the surface water runoff and can mitigate pollutants consists in order use of the following

Gullies and linear channels
Catchpit manholes
Bypass Separators
Permeable Pavement
Swales
Attenuation Basins
Infiltration Basin

Regulators will often decline to recognise the use of gullies and catchpit manholes on the basis that whilst they will settle out solids and hold back liquids, everything can be remobilised during follow on more intense rainfall events. Therefore, no contribution to mitigation indices has been considered for SP&R.

Based on available information and consultation with supplier, mitigation indices for Bypass Separators have been obtained as below. Indices for the surface infrastructure are taken from Table 26.3 and reproduced below

Infrastructure	Total Suspended Solids	Metals	Hydrocarbons
Bypass Separator	0.4	0.4	0.8
Permeable Paving	0.7	0.6	0.7
Attenuation Basin taken from Table 26.3	0.5	0.5	0.6
Swale	0.5	0.6	0.6

Applying these values to the DCO design would give a total mitigation indices result as shown below for the impermeable roads and parking areas

Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Medium	0.7	0.6	0.7
Mitigation			
Attenuation Basin	0.5	0.5	0.6
Swale	0.5/2	0.5/2	0.6/2
Permeable Paving	0.7/2	0.6/2	0.7/2
Total Mitigation	> 0.95	> 0.95	> 0.95

This demonstrates that the DCO drainage design for the main site does provide sufficient mitigation.

Conclusion

The SIA calculations demonstrate that the mitigation indices exceed the Land Use Pollution Hazard indices. This demonstrates that the proposed treatment train infrastructure is sufficient to mitigate pollution risk to a low level such that no additional measures are required.

ANNEX 2A.8: FREIGHT MANAGEMENT FACILITY DRAINAGE DESIGN NOTE

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PLATES

APPENDICES

1 INTRODUCTION

1.1.1 NNB Generation Company (SZC) Limited (SZC Co.) submitted an application for a Development Consent Order (DCO) to the Planning Inspectorate under the Planning Act 2008 for the Sizewell C Project (referred to as the 'Application') in May 2020. The Application was accepted for examination in June 2020.

1.1.2 The freight management facility development was originally submitted to the Planning Inspectorate (PINS) as part of the Application to build and operate a new nuclear power station to the north of Sizewell B.

1.1.3 SZC Co. has undertaken work to validate and develop the design of the freight management facility that was originally submitted as part of the Application. This document forms one of a series of design validation and evolution documents being provided to the Examining Authority in support of the **Outline Drainage Strategy** [REP2-033] and subsequent **Drainage Strategy** (submitted at Deadline 7).

1.1.4 The freight management facility forms one of the Associated Developments (AD) which are required to mitigate traffic impacts arising from the main development site. The freight management facility is located alongside the A14 near to its interchange with the A12 at Seven Hills near Ipswich. Its function is to provide a hub from which a controlled pattern of deliveries to the main development site can be provided, reducing freight movements during peak and sensitive hours on the road network. It will act as a holding area in the event of problems or congestion on the approaches to the Sizewell C main development site. Full details of its facilities are contained in **Volume 8 Freight Management Facility Chapter 2 Description of the Freight Management Facility** [APP-151] and are described in summary below.

1.1.5 The site will consist of parking for approximately 150 HGVs, workforce parking, welfare, security and amenity buildings. The workforce parking includes car parking spaces, accessible spaces, cycle spaces and motorcycle spaces.

1.1.6 The site access will be from Felixstowe Road where the road will be widened to accommodate a right turn ghost island. The modification of the highway to accommodate the access will be designed to Suffolk County Council's (SCC) adoptable standards.

1.1.7 The freight management facility site will generate surface water runoff from paved areas and roofs which will require to be removed, treated as necessary and disposed.

1.1.8 The site entrance and access from Felixstowe Road will generate highway runoff which will require to be removed, treated as necessary and disposed.

1.1.9 The freight management facility welfare facilities will generate foul water flows which will require to be removed, treated as necessary and disposed.

1.1.10 The freight management facility and its associated access and local road changes will remain in place and use during construction of the Sizewell C power station. Once construction is complete the site will be closed and decommissioned. It will then return to current agricultural use.

1.1.11 It is intended that the proposed access will be removed and Felixstowe Road will be returned to its current alignment.

2 PURPOSE

2.1.1 The **Outline Drainage Strategy** [REP2-033] identified at concept level the proposed drainage approach required for:

- The effective removal of highway and surface water runoff from the proposed freight management facility and its site access entrance, together with its treatment and disposal; and
- The effective removal and treatment of foul water generated by the workforce from the proposed freight management facility.

2.1.2 The proposed drainage infrastructure was described in the concept drainage design submitted as part of the Application. This concept design was based on data and information available at that time. The design was supported by the submission of the **Freight Management Facility Flood Risk Assessment** (FRA) [APP-141].

2.1.3 The purpose of this technical note is to provide details of data which validate the **Outline Drainage Strategy** [REP2-033] and subsequent **Drainage Strategy** (submitted at Deadline 7), a description of how the proposed concept drainage infrastructure is developing and evolving and to demonstrate that it continues to provide for the effective and satisfactory drainage of the freight management facility and its associated external road modification, without unacceptable adverse impact on the water environment, both in terms of flood risk and pollution. This technical note was updated at revision 03 to include for new infiltration data that has become available, provide additional information and responses to points raised by SCC following their review during the DCO Examination Stage.

2.1.4 This technical note is updated at revision 04 to address comments raised by SCC following their review of revision 03. These are shown in Appendix G

2.1.5 It is intended that this updated drainage strategy and resultant drainage infrastructure will remain in accordance with the with the **Outline Drainage Strategy** [REP2-033] submitted to the Examining Authority. It is further intended that following consultation with the Lead Local Flood Authority, it will be submitted to and approved by East Suffolk Council.

3 DESCRIPTION OF DCO DRAINAGE CONCEPT DESIGN

3.1.1 The freight management facility concept drainage at DCO stage was developed by SZC Co. Proposals were developed for both the freight management facility development site and associated modification of existing public highway required in order to provide access to and from the site.

3.1.2 Given the proven infiltration rates, all surface water generated within the freight management facility red line boundary would be contained within the site and discharged to ground.

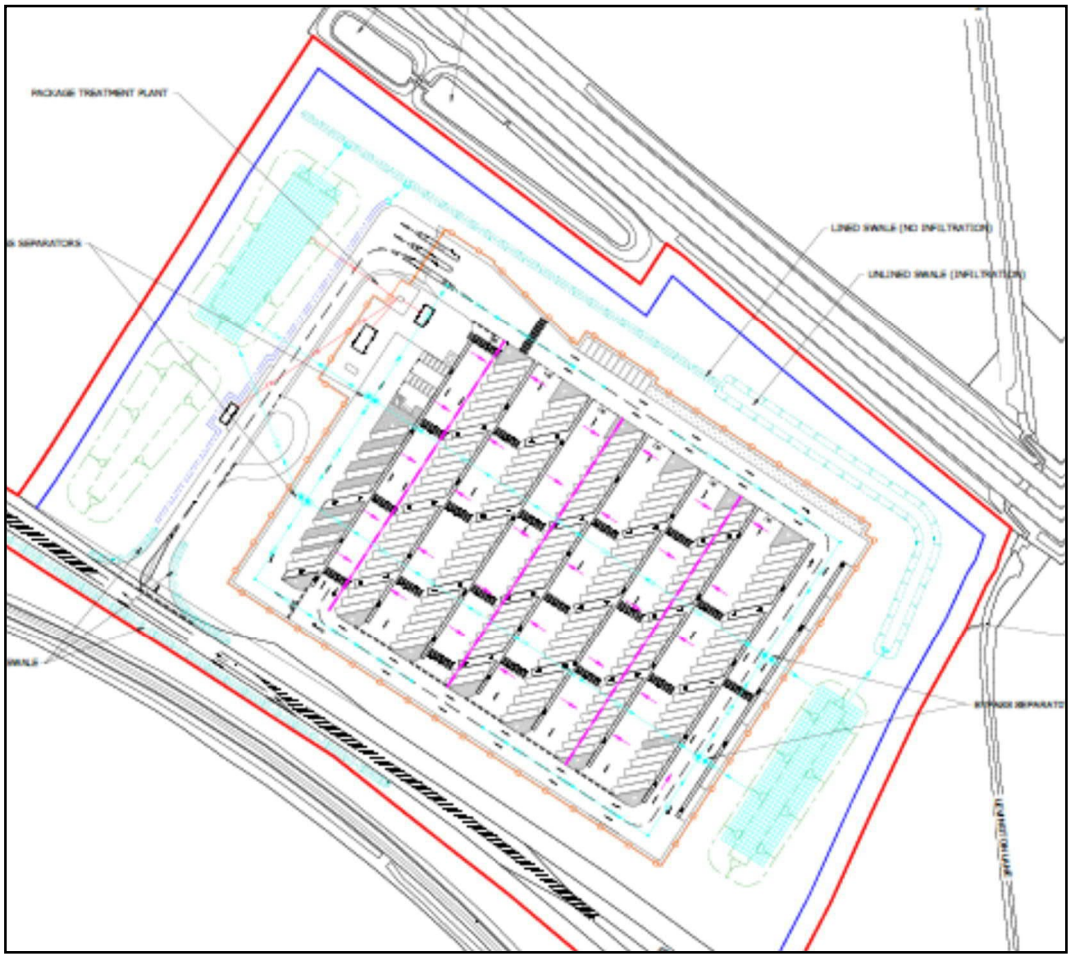
3.1.3 External roads modified to access the site would discharge surface water highway runoff to swales and filter drains where flows will infiltrate to ground.

3.1.4 Liaison took place with Anglian Water to establish whether there are any public foul sewers, in proximity to the freight management facility, to which foul water could be discharged by gravity. Since it was confirmed that there are no foul water sewers in vicinity it would be necessary to pump over long distance offsite to discharge into a public sewer.

3.1.5 Given that freight management facility is a temporary facility and will only operate during construction of Sizewell C the option of treatment on site using a package treatment plant is proposed. The treated effluent would discharge to ground by infiltration.

3.1.6 The internal site layout showing the proposed layout of drainage infrastructure and the sewage treatment plant is shown in **Plate 1**, an extract from the Application drawing ”Chapter 2 Description of the FMF Figure 2.4” [APP-153].

Plate 1: Freight management facility internal layout showing concept drainage infrastructure

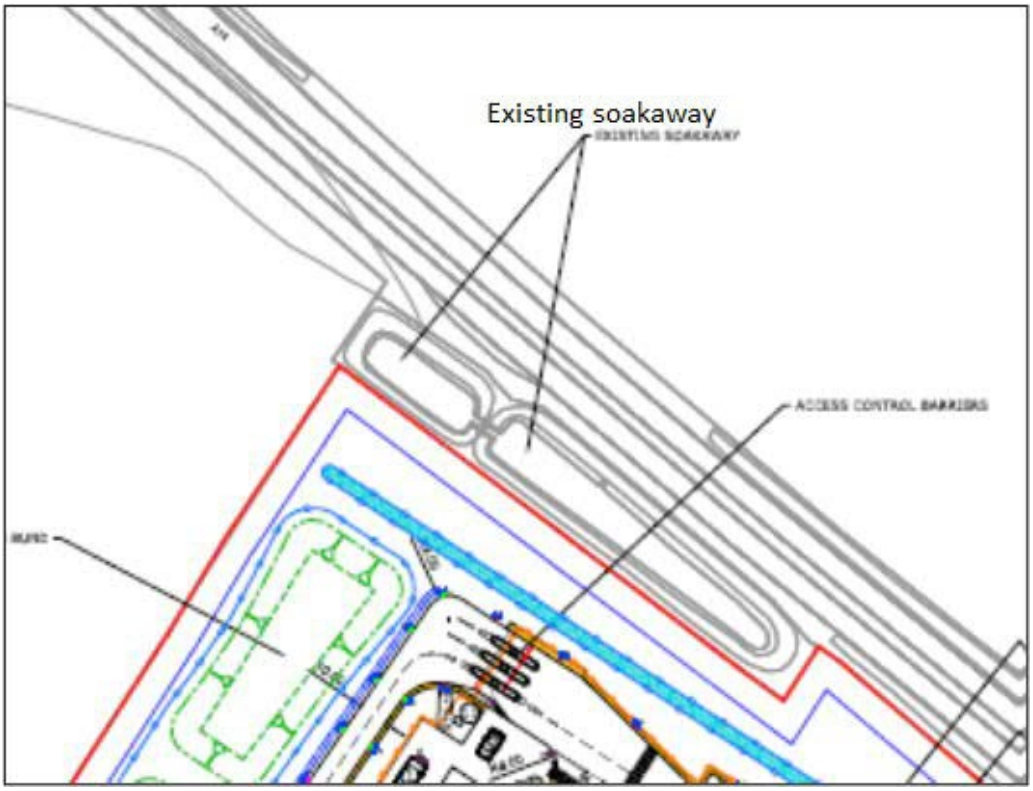


4 EXISTING SITE AND ADJACENT HIGHWAY DRAINAGE ARRANGEMENTS

4.1.1 The extent of the freight management facility within the red line boundary forms agricultural land and has no obvious sign of drainage infrastructure.

4.1.2 The A14 located to the north of the red line boundary appears to have highway drainage infrastructure which outfalls to an infiltration basin facility. This is shown in **Plate 2** and abuts the red line boundary.

Plate 2: Existing A14 infiltration basin location



4.1.3 Given the close proximity of the existing A14 infiltration basin adjacent to the site, the proposed freight management facility site drainage infrastructure must not provide for infiltration to ground in this area as this could compromise the absorption capacity of the ground for A14 highway runoff.

4.1.4 No detailed site inspection of Felixstowe Road was undertaken prior to development of the FMF drainage strategy. However, based on remote inspection of the road using Google Streetview there was no sign of obvious highway drainage infrastructure. It was assumed that currently highway runoff is removed “over the edge” with infiltration into the verge.

4.1.5 Felixstowe Road was subject to site inspection on 3 August 2021. The assumption that existing highway runoff is removed “over the edge” has been confirmed.

4.1.6 The Environment Agency Surface Water Flood Map shows a predicted overland flow path with minor flooding passing through the A14 infiltration basins and through the northwest corner of the freight management facility. This is shown in **Plate 3**.

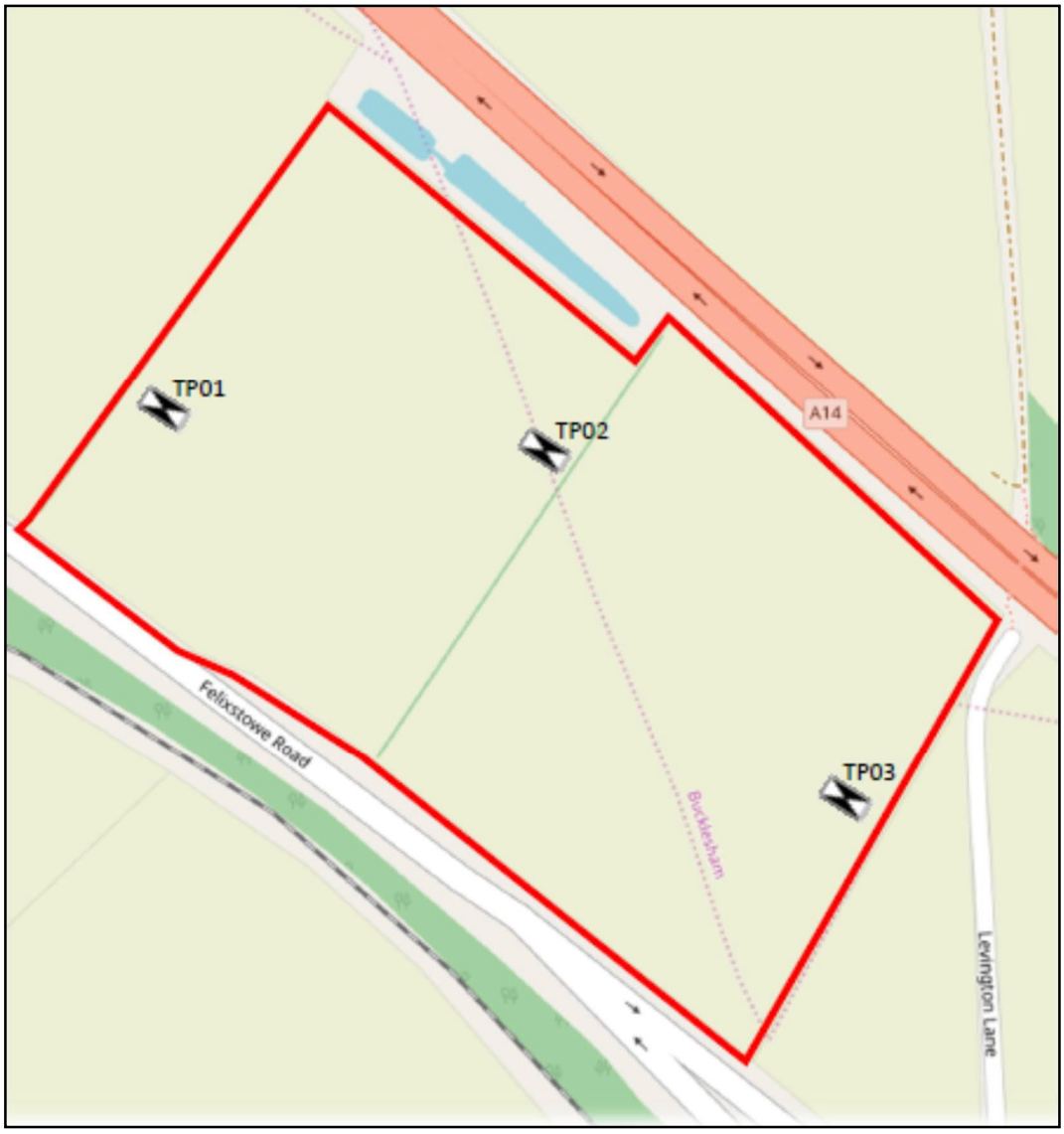
Plate 3: A14 predicted surface water flood risk at the freight management facility

4.1.7 If flooding does occur, it would be captured by the lined swale and would then be infiltrated to ground.

5 GROUND INVESTIGATION AND INFILTRATION TESTING RESULTS

5.1.1 In order to validate the Drainage Strategy of infiltration to ground three trial pits were excavated within the site at locations shown in **Plate 4**.

Plate 4: Freight management facility site infiltration test trial hole locations



5.1.2 Infiltration testing in accordance with BRE365 (Ref. 1) was undertaken and the results are shown in **Table 1**.

5.1.3 Subsequent to the first revision of this report, further infiltration testing has been undertaken. These results, STP203, 204,205 and 213 have been added to **Table 1.**

Table 1: Freight management facility site infiltration test trial hole results

Location	Test 1(m/s)	Test 2(m/s)	Test 3 (m/s)
TP01	3.53×10^{-6}	1.73×10^{-6}	9.89×10^{-7}
TP02	4.72×10^{-5}	4.66×10^{-5}	3.32×10^{-5}
TP03	5.80×10^{-7}	5.36×10^{-7}	5.70×10^{-7}
STP203	3.72×10^{-4}	2.40×10^{-4}	1.39×10^{-4}
STP204	2.30×10^{-4}	1.91×10^{-4}	1.53×10^{-4}
STP205	2.94×10^{-5}	3.24×10^{-5}	2.66×10^{-5}
STP213	3.51×10^{-5}	2.61×10^{-5}	1.46×10^{-5}

5.1.4 Full details of infiltration testing are provided in Appendix A.

5.1.5 These results demonstrate that whilst infiltration rates within the site are variable, they demonstrate that disposal of surface water runoff by infiltration is achievable. SCC consider that an infiltration rate in excess of 1.4×10^{-6} m/s is viable for infiltration to ground. However, the variation in infiltration rate is noted and has been taken into consideration as part of developing the concept layout as described in this technical note in Section 6.

6 UPDATED SURFACE WATER DRAINAGE DESIGN STRATEGY

6.1.1 The surface water arrangements for removal currently remain, in principle, as described in document “Environmental Statement Volume 8 Chapter 2 Description of the Freight Management Facility” dated July 2020 and shown in DCO Figure 2.4. An extract of this Figure is shown in **Plate 1** of this report. The Environmental Statement takes account of the infiltration test results obtained in October 2019.

6.1.2 Surface water runoff from roofs will be drained via downpipes and gullies, as appropriate to underground carrier drains.

6.1.3 All of the internal roads and the HGV parking areas will have an impermeable surface. Surface water runoff will be drained via surface

outlets, gullies, linear channels and drains, etc. These will discharge into underground carrier drains.

6.1.4 Following discussions with SCC, for the purpose of pollution mitigation, rather than drain via surface outlets, some areas with higher pollution risk will drain over the edge into bioretention trenches which will filter out dissolved pollutants before discharge into the underground carrier drains.

6.1.5 Bypass separators will be installed on the carrier drains downstream of the bus/HGV standing areas in order to remove hydrocarbon and silt contaminants which will improve the water quality of the runoff before discharge to ground.

6.1.6 Following then undertaking of pollution risk assessment, discussed in Section 8 below and shown in Appendix E, it is now proposed to add vortex separators to improve the efficiency of removal of hydrocarbon and silt contaminants.

6.1.7 The concept design submitted for DCO and shown in **Plate 1** provided for underground carrier drains which will discharge all surface water runoff into two underground attenuation storage tanks from where it will infiltrate to ground. The tanks were proposed to be located beneath the landscape bunds located on the east and west sides of the site. Following discussion with SCC further justification for the use of underground tanks as opposed to surface storage is provided in Section 7.

6.1.8 The size of the tanks calculated for concept design stage was 88 m long x 22 m wide x 0.6 m deep. The surface water drainage network capacity was assessed by hydraulic calculation. The calculation was based on the average of measured infiltration rates at TP01, TP02 and TP03 and a requirement for the tanks to drain down by half their storage volume in 24 hours. For a 1 in 30 year return period rainfall event, it was found that there was insufficient storage and as a result it is proposed that additional storage volume be provided by swales.

6.1.9 The swales were located over the full length of the northern side of the site and the lowest part of the eastern side of the site. Since ground levels fall from south to north the swales will also intercept runoff from surface water overland flow which does not drain into the underground drainage network.

6.1.10 The swales will also remove surface water runoff by infiltration to ground. However due to the proximity of the western portion of the swale to the A14 infiltration basin facility, this length of the swale is lined making it impermeable. This will avoid any risk of infiltration causing adverse impact on the performance of the A14 infiltration basin.

6.1.11 Whilst the concept design provided sufficient evidence and confidence that removal of surface water runoff by infiltration is viable, as part of development of the concept drainage design the location and performance of the two storage tanks has been reviewed.

6.1.12 The position of the west storage tank is noted to be in proximity to TP01 infiltration test trial hole whilst the east storage tank is noted to be in proximity to TP03. These tanks are located clear of the paved area and beneath the landscaping bunds. It was considered desirable to avoid locating tanks beneath the paved area in order to minimise loading issues on the tank.

6.1.13 In review of the storage tank sizes it has been considered more appropriate to use infiltration rates obtained in proximity to the tank location rather than an average value. This is because of the variation in infiltration rates, as shown in **Table 1.**

6.1.14 In using individual infiltration rates, it is apparent that the east storage basin is unfavourably located because the infiltration rate stated in **Table 1** is less than the 1.4×10^{-6} m/s considered by SCC as the minimum viable value for infiltration to ground. Accordingly, the location of a storage tank at this location is discounted.

6.1.15 Calculations have been undertaken for two alternative options. Option 1 provides for a single tank in the west and Option 2 provides for a single tank in the centre of the site in proximity to the TP02 location. The approximate location and footprint of the tanks is shown in Appendix B. Hydraulic calculations which validate the tank sizes are provided in Appendices C and D.

6.1.16 The Option 1 tank size has been determined by a requirement for it to be located within the unpaved area to the west. The available size has been used in hydraulic modelling. A summary of predicted hydraulic performance is shown in Table 2 with full results in Appendix C.

Table 2: Freight management facility option 1 storage tank parameters

Parameters	Values
Cellular Soakaway Storage Dimension	168m (L) x 22m (B) x 1.7m (D)
Volume Available	3564 m^3
Average Infiltration Rate at TP01	7.5 mm/hour
Half Drain Time	13200 minutes (~9.2days)

6.1.17 The results demonstrate that infiltration is viable in that the stored volume will eventually be removed by infiltration. However, the half drain time is excessive. In the event of follow on rainfall events within days of the design event, there may not be sufficient storage volume which could result in surface flooding. For this reason, Option 1 is not acceptable.

6.1.18 The Option 2 tank size is not constrained since it can be located anywhere within the central paved area. As a result, the tank size has been determined by the hydraulic modelling. A summary of predicted hydraulic performance is shown in Table 3 with full results in Appendix D.

Table 3: Freight management facility option 2 storage tank parameters

Parameters	Values
Cellular Soakaway Storage Dimension	55m (L) x 64m (B) x 1.6m (D)
Volume Available	3,584 m^3
Average Infiltration Rate at TP02	152.4 mm/hour
Half Drain Time	618 minutes (~10 hours)

6.1.19 The infiltration rate at TP02 is significantly greater that that at TP01, and thus the required storage tank volume is substantially less. Accordingly, it is proposed that the site be drained to a storage tank for infiltration to ground located within the central paved area. The shape of the tank whether square or rectangular will be developed as design progresses. This will also need to take account of the structural design of the tank and the required depth of cover to accommodate surface loading.

6.1.20 Whilst Option 2 demonstrates a solution that provides an acceptable level of flood protection, sufficient to validate the Drainage Strategy and deliver normal planning requirements, following the provision of additional infiltration rate data shown in **Table 1**, it is apparent that there is flexibility to move the location of the tank at detailed design or to provide alternative smaller tanks in areas having proven acceptable infiltration rates. The distribution of infiltration over a wider area, could improve the efficiency of infiltration.

6.1.21 Although the storage tank can accommodate all surface water runoff within the site, it is intended to retain the swale at the northern and eastern sides of the site in order to intercept and capture exceedance overland flow from adjacent 3rd party land.

7 JUSTIFICATION FOR USE OF UNDERGROUND STORAGE

7.1.1 In their response to the proposals for use of underground storage tanks and as stated during examination on 14 September 2021 SCC expressed concern and stated “the drainage strategy is heavily reliant on below ground attenuation to provide sufficient storage of the sites required attenuation volume. This is not compliant with Local Plan Policy SCLP9.6, with particular attention drawn to paragraph 5.59 which states “Presently, there is a tendency for required attenuation volumes to be accommodated below ground. In order to discourage this, preference should be given to the installation of blue-green surface infrastructure, as opposed to hardscape or underground solutions, due to the wider benefits attained through ecosystem services provided by natural capital”.

7.1.2 Subsequent to Examination and following liaison, it was agreed that SZC Co would provide a response explaining why temporary underground storage rather than above ground storage is reasonable at the FMF.

7.1.3 SZC Co agree that where possible it is more desirable to provide open basins. These have the benefits recognised by East Suffolk Council as incorporated in planning policy SCLP9.6 and identified in the CIRIA SuDS Manual C753.

7.1.4 However, the reason why this is not possible at the FMF is that, as can be seen in **Plate 1**, there is no available space for infiltration basins within the current red line boundary.

7.1.5 It is the case that if more land is available open basins could be provided. However, there is a requirement for balance. The land take for FMF has been limited to that sufficient for the required infrastructure and to minimise impact on adjacent land. The extent of land take must be justified.

7.1.6 It is noted that the site will remain in use for approximately 10 years maximum and then be remediated and returned to current use. The wider biodiversity and environmental benefits of open basins are not immediately available and develop over years. In this case they will only reach full potential and be available for limited timescale. The additional land required to provide space for open basins would lose any existing value and also take time to recover on restoration.

7.1.7 It is considered that the benefit of temporary open basins is outweighed by the adverse impact on the additional land take.

7.1.8 Local Plan Policy SCLP9.6 clearly states that preference should be given to selection of above ground storage. This is not a requirement thus if there are good reasons or constraints that prevent use of above ground storage, underground storage is compliant with planning policy.

7.1.9 It is also noted that SCC SuDS Guidance Appendix A does not prohibit use of underground storage. It is stated that the Guiding Principle will be "Wherever possible, the use multifunctional above ground SUDS that deliver drainage, enhancement of biodiversity, improvements in water quality and amenity benefits.

7.1.10 The FMF site will be secured and remain unavailable to the public so there are no public amenity benefits that would normally be obtained from above ground storage.

7.1.11 The SCC guidance links to and does not replace the CIRA SuDS Manual C753. In Chapter 21 this document provides details and guidance of underground storage tanks.

7.1.12 This justification was sent to SCC by email on 7 October 2021. Following discussion on 11 October and as part of SCC response by email on 12 October relating to pollution mitigation infrastructure, which includes the underground storage tanks, it is understood that subject to the inclusion of bioretention in the treatment train, SCC are prepared to accept in principle the use of underground storage at FMF.

8 UPDATED SURFACE WATER POLLUTION MITIGATION STRATEGY

8.1.1 In addition to the provision of drainage infrastructure for the removal of surface water runoff and avoidance of unacceptable flood risk, it is also necessary to ensure that the runoff is disposed in a way that avoids pollution of the receiving water, whether watercourse or aquafer/groundwater.

8.1.2 An assessment of the ability of the proposed drainage infrastructure to mitigate pollution risk to an acceptable level has been undertaken using the CIRIA C753 SuDS Manual Simplified Index Approach methodology. A sample calculation has been shared with SCC who have confirmed acceptance of this approach.

8.1.3 Details of the calculations and results are shown in Appendix E. They demonstrate that with the addition of vortex separators, there is sufficient mechanical treatment provided to mitigate pollution to an acceptable level. These results were shared with SCC.

8.1.4 Following an initial review SCC confirmed by email dated 12 October 2021 that whilst the results do show sufficient mitigation, they have reservations about reliance solely on proprietary mechanical products. This is because quoting CIRIA SuDS Manual, page 563 states “recently, the project has also been extended to analyse performance of ‘manufactured devices’. This concluded that performance levels can be comparable with vegetated components, but that manufactured devices only remove the pollutants for which they are designed, for their specific range of design flows. For example, sediment and particulate-bound pollutants may be removed by sedimentation, but dissolved constituents may require adsorptive filtration or some type of biochemical process to be removed effectively”.

8.1.5 Following discussion SCC indicated that their concerns could be addressed by the addition of some element of natural treatment in the treatment train. It is proposed that collection of runoff from areas at higher risk of pollution and discharge through some form of bioretention trench would deliver this requirement. Further details are provided in Section 11.

9 UPDATED FOUL WATER DRAINAGE DESIGN STRATEGY

9.1.1 The foul water drainage strategy remains unchanged with foul water flows collected by an underground drainage network and discharged into a package sewage treatment plant. Treated effluent is drained into an attenuation tank from where it will infiltrate to ground. The question as to whether it is more appropriate to provide a separate treated effluent attenuation tank or to discharge into the surface water storage tank, as currently proposed will be determined as design progresses and in accordance with environmental permit requirements.

9.1.2 It is noted that foul water flow rates generated will be low and intermittent with a range of flow. This makes the delivery of a consistent treated effluent more challenging. Once the environmental permit requirements – which will set quality standards – have been determined, it will be necessary to ensure that a suitable package plant and associated treatment infrastructure can reliably produce a compliant treated effluent.

9.1.3 In the event of any doubt regarding the ability of a package treatment plant being able to produce the required quality of treated effluent, the alternative will be to collect the foul water sewage in an underground sealed cess tank from which it can be collected and removed by tanker for treatment offsite.

10 UPDATED SURFACE WATER DRAINAGE DESIGN STRATEGY – MODIFIED FELIXSTOWE ROAD SITE ACCESS ENTRANCE

10.1.1 The surface water drainage strategy for the highway drainage subject to adoption by SCC remains unchanged being infiltration to ground.

10.1.2 Surface water highway runoff will be removed by “over the edge” flow and collected in swales for disposal by infiltration to ground. The proven infiltration rates in the locale demonstrate that this is feasible. When the swales dimensions are determined at detailed design, if necessary, an underlying filter drain will be provided to increase the efficiency of infiltration.

11 ADDITIONAL POLLUTION CONTROL INFRASTRUCTURE

11.1.1 As noted in 8.1.5, in response to SCC concerns, SZC committed to the incorporation of some form of biological treatment for runoff in addition to the mechanical treatment proposed with the DCO submission.

11.1.2 The area at greatest risk of producing polluted runoff is the lorry parking bays and it is proposed that runoff from the bays is discharged into Greenblue Hydroplanters. These units are 1 m wide and have a depth of 0.8 m. The units are filled with a specified soil mix.

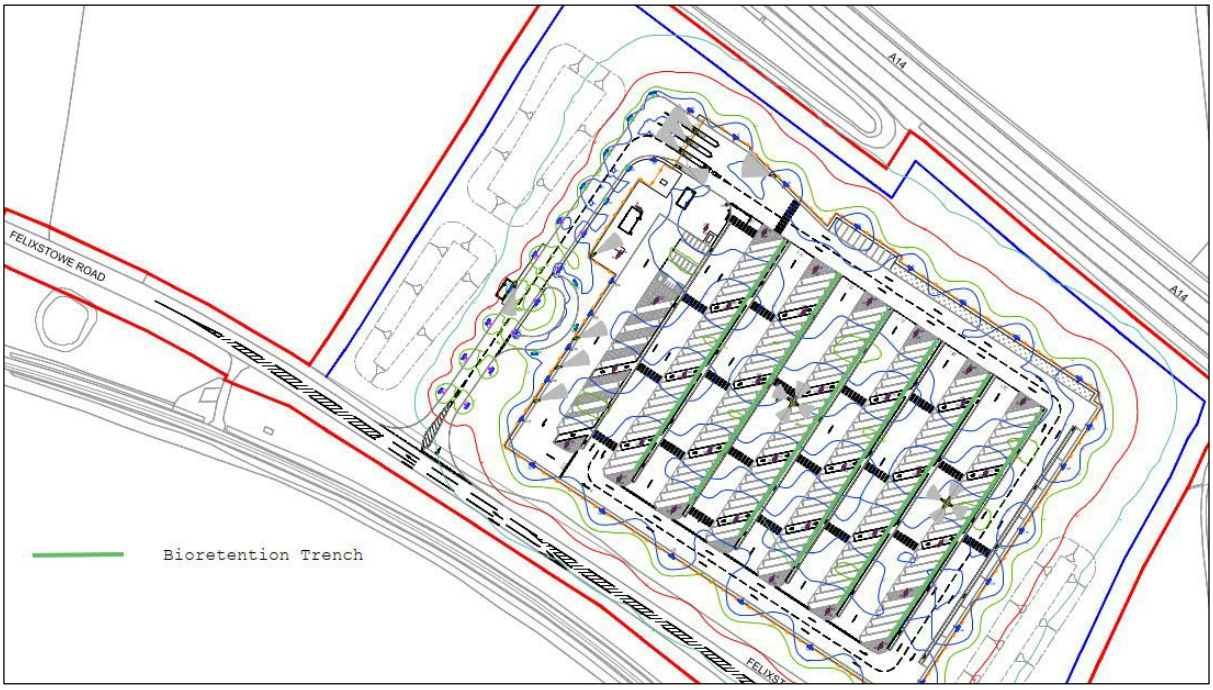
11.1.3 Runoff percolates through the planter and will infiltrate through the base into a filter drain. Given the relatively good infiltration potential of the strata, some of the runoff will be removed by infiltration but the remainder will flow to the underground storage tank for removal by infiltration.

11.1.4 Design data provided indicates that the hydraulic capacity of the hydroplanters is such that for each 1 m2 of planter it provides attenuation storage for a surface area ranging from 27.5 m2 for a I in 1 year return period rainfall event reducing to 12.5 m2 for a 1 in 30 year event and 5.0 m2 for a 1 in 100 year event plus 30% climate change.

11.1.5 In order to ensure that runoff is removed from the contributing surface without flood risk overflow pipes are recommended. It this case the overflow pipes would have a high level inlet and would discharge into the underlying filter drain pipe.

11.1.6 The Pollution Mitigation Measures calculations shown in Appendix E have been updated to include for the use of the hydroplaneters. The intended location of the hydroplanters is shown in **Plate 5.**

Plate 5: Freight management facility lorry parking bay hydroplanter locations



11.1.7 Since the 6 rows of hydroplanters will occupy a total width of 6 m, the location of the parking bays will be adjusted to accommodate them. However, as can be seen in Plate 5 there is sufficient space to move the eastern perimeter road closer to the landscaping bund to the east.

12 SUMMARY AND CONCLUSION

12.1.1 The purpose of this technical note is to validate the **Outline Drainage Strategy** [REP2-033] and subsequent **Drainage Strategy** (submitted at Deadline 7) for the freight management facility. It describes how the concept design is evolving to provide for the effective drainage of the freight management facility.

12.1.2 The drainage design for both the internal freight management facility and modification to Felixstowe Road and site entrance has been developed to a level of detail to provide sufficient evidence of an achievable drainage strategy that is compliant with national planning and environmental regulatory requirements.

12.1.3 Subject to the acceptance of the drainage design strategy principles contained in this updated report, which are intended to address SCC review comments, the drainage designs will be developed to preliminary design stage.

12.1.4 The freight management facility drainage design will be based on CIRIA C753 SuDS Manual (Ref. 2), Design and Construction Guidance for Foul and Surface Water Sewers (formerly Sewers for Adoption) (Ref. 3), and PPG4 Treatment and Disposal of Sewage where no Foul Water Sewer is Available (Ref. 4).

12.1.5 The adoptable highway drainage design will be based on Design Manual for Roads and Bridges (DMRB) (Ref. 5), Manual of Contract Documents for Highway Works (MCHW) (Ref. 6) and SCC specific guidance (Refs. 7 and 8).

12.1.6 As preliminary design progresses, SZC Co. will liaise with SCC and the Environment Agency through design review meetings to build acceptance of the drainage infrastructure and to enable compliance with regulatory requirements and environmental permits.

REFERENCES

1. BRE Digest Soakaway design: DG 365 – 2016, BRE, 2016 [redacted]

2. The SUDs Manual (C753), CIRIA, 2015, ISBN 978-0-86017-760-9.

3. SSG Appendix C - Design and construction guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England ("the Code"). Approved Version 2.0. 10 March 2020. Water UK. [redacted]

4. Pollution Prevention Guidelines PPG4: Treatment and disposal of sewage where no foul sewer is available, Environment and Heritage Service / Scottish Environment Protection Agency / Environment Agency, July 2006. PMHO0706BJGL-E-E. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/485181/pmho0706bjgl-e-e.pdf

5. Highways Agency et al. (2009). Volume 11, Section 3, Part 10: Road Drainage and the Water Environment, HD45/09. [redacted]

6. Manual of Contract Documents for Highway Works (MCHW), Highways Agency. [redacted]

7. Design Guide, Suffolk County Council, 2000, https://www.suffolk.gov.uk/planning-waste-and-environment/planning-and-development-advice/suffolk-design-guide-for-residential-areas/

8. Sustainable Drainage Systems (SuDS) a Local Design Guide Appendix A to the Suffolk Flood Risk Management Strategy, Suffolk County Council, May 2018 [redacted]

APPENDIX A: INFILTRATION TEST DATA AND RESULTS

GEOSPHERE ENVIRONMENTAL

Our Ref: 4029,SK,JDo,JD

Your Ref: 4029,SK

Royal Haskoning DHV
9TH Floor, Manchester One
Portland St
Manchester
M1 3LF

Date: 18 October 2019

For the attention of **Kwasi Amoah**

By Email: [redacted]

Dear Mr Amoah,

INFILTRATION TESTING AT: SEVEN HILLS FREIGHT MANAGEMENT SYSTEM

1. Introduction

This report has been prepared for Royal Haskoning DHV, specific to the Seven Hills Freight Management Site, Grid Reference TM 23896 40641.

The primary objective of this ground investigation was to assess the infiltration potential of the natural soils beneath the site and provide a factual report.

This is to be achieved by:

- Excavating three machine-dug trial pits across the site;
- Undertaking soakage testing in line with BRE Digest 365 guidance; and
- Undertaking infiltration calculations to assess the suitability of soakaways for the future development of the site.

It is understood that the proposed development will comprise of a freight management facility to service the Sizewell C expansion.

2. Site Works

2.1 Methodology

This ground investigation was carried out on the basis of the practices set out in BRE Digest 365, 'Soakaway Design' 2016, which requires, in summary, a total of three infiltration tests to be undertaken in succession over a 24-hour period, where possible, or the infiltration test to run for up to 24 hours.

The exploratory holes were positioned based upon client approval to avoid environmental, ecological and archaeological damage, whilst providing a representative spread across the site, to provide an appropriate assessment of infiltration for conventional soakaways.

In general, where a test location showed limited or no infiltration, it was allowed to continue for circa 24 hours, the data obtained and the test ceased. Where a test exhibited appreciable infiltration and the "75%" infiltration level was achieved, a further infiltration "run", or more was undertaken.

2.2 Scope

Site works were carried out on 18 September through to 20 of September, and comprised of the following:

- Excavation of three machine excavated trial pits, (TP01 to TP03), to depths ranging from 1.50 to 1.93m bgl;
- Undertaking infiltration testing generally in line with BRE Digest 365 guidance; and
- Undertaking infiltration calculations to allow for assessment of the suitability of soakaways for the future development of the site.

An Exploratory Hole Location Plan, Drawing ref. 4029,SK/001/Rev0, is presented at the end of this letter.

2.3 Ground Conditions Encountered

The sequence of the strata encountered during the investigation generally confirms with the anticipated geology as interpreted from the geological map which indicates Kesgrave Catchment Subgroup (Sand and Gravel) overlying Red Crag Formation (also granular deposits).

The sequence and indicative thickness of strata are summarised in Table 1 below, with logs provided in Appendix 2:

Table 1 - Ground Conditions

Strata	Depth Encountered (mbgl)		Strata Thickness (m)	Location and Composition
	From	To		
Topsoil	0.00	0.25 – 0.50	0.25 – 0.50	**All exploratory holes:** A slightly sandy, slightly gravelly clay.
Kesgrave Catchment Subgroup (predominantly granular).	0.40-0.50	1.00-1.50	0.50-1.00	**All exploratory holes:** Yellowish brown, gravelly medium and coarse sand with fine to coarse flint and chert content.
Kesgrave Catchment Subgroup (Localised cohesive strata).	1.00-1.10	1.80-1.93	unproven	**TP02 and TP03:** Stiff, light yellowish brown and greyish brown, slightly sandy clay.

2.4 Groundwater

No groundwater was encountered in any of the exploratory holes during the intrusive investigation.

2.5 Infiltration Testing Results

Soil infiltration testing was undertaken in general accordance with BRE 365, 2016. The results are summarised in Table 2 overleaf and are provided in full in Appendix 3:

Table 2 - Summary of Soil Infiltration Results				
Location	**Test 1 (m/s)**	**Test 2 (m/s)**	**Test 3 (m/s)**	**Notes**
TP01	3.53×10^{-06}	1.73×10^{-06}	9.89×10^{-07}	None
TP02	4.72×10^{-05}	4.66×10^{-05}	3.32×10^{-05}	None
TP03	5.80×10^{-07}	5.36×10^{-07}	5.7×10^{-07}	None

We trust the above is clear and acceptable; however, if you have any further comments or queries then please do not hesitate to contact us.

Yours sincerely

[redacted]

James Donlin,
Graduate Engineer,
Geosphere Environmental Ltd.
[redacted]

Enclosures:
Appendix 1 – Report Limitations and Conditions
Appendix 2 – Exploratory Hole Logs
Appendix 3 – Infiltration Testing Results
Appendix 4 – Drawings

GEOSPHERE ENVIRONMENTAL

APPENDICES

GEOSPHERE ENVIRONMENTAL LTD

Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

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APPENDIX 1 – REPORT LIMITATIONS AND CONDITIONS

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report has been prepared for the sole use of the Client for the purposes described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

This report is prepared and written for the use stated herein; it should not be used for any other purposes without reference to Geosphere Environmental Limited. The report has been prepared in relation to the proposed end use, should another end use be intended, a further re-assessment may be required. It is likely that over time practises will improve and the relevant guidance and legislation be amended or superseded, which may necessitate a re-assessment of the site.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed onsite, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes discussed or on the possible presence of features based upon visual, verbal or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

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APPENDIX 2 – EXPLORATORY HOLE LOGS

Trial Pit Logs

(TP1 – TP3)

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
IP10 0BJ
Telephone: 01603 298 076

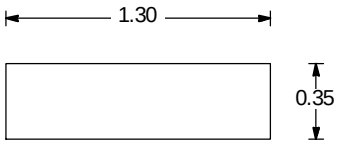
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Seven Hills Freight Management System	Royal Haskoning DHV	**TP01**

Job No	Date	Ground Level (m)	Coordinates ()
4029,SK	18-09-19 18-09-19		623792, 240748

Fieldwork By	Logged By	Sheet
GEL	AT	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.50	Brown, slightly sandy, slightly gravelly, friable ORGANIC CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to rounded flint and chert. (TOPSOIL)				
0.50-1.00	Orangeish brown and yellowish brown, gravelly, medium and coarse SAND. Gravel is medium and coarse, sub rounded and rounded flint and chert.				
1.00-1.93	Stiff, light yellowish brown and greyish brown, slightly sandy CLAY. Sand is fine and medium.				
1.93	TRIAL PIT COMPLETED AT 1.93m BGL TRIAL PIT DRY UPON COMPLETION				



Shoring/Support: 20mm Gravel Filled
Stability: Stable

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used 3t 360 Excavator	Checked By GF

GEL AGS TP BETA 4029,SK SEVEN HILLS.GPJ GINT STD AGS 3_1.GDT 17/10/19

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
IP10 0BJ
Telephone: 01603 298 076

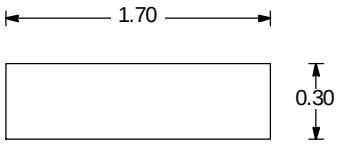
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Seven Hills Freight Management System	Royal Haskoning DHV	**TP02**

Job No	Date	Ground Level (m)	Coordinates ()
4029,SK	18-09-19 18-09-19		623958, 240723

Fieldwork By	Logged By	Sheet
GEL	AT	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.50	Dark brown, slightly sandy, slightly gravelly ORGANIC CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to rounded flint and chert. (TOPSOIL)				
0.50-1.50	Orangeish brown and yellowish brown, gravelly, medium and coarse SAND. Gravel is fine and medium, sub rounded and rounded flint and chert.				
1.50	TRIAL PIT COMPLETED AT 1.5m BGL TRIAL PIT DRY UPON COMPLETION				



Shoring/Support: 20mm Gravel Filled
Stability: Stable

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used 3t 360 Excavator	Checked By GF

Geosphere Environmental Ltd
Brightwell Barns, Ipswich Road,
IP10 0BJ
Telephone: 01603 298 076

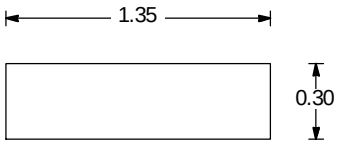
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Seven Hills Freight Management System	Royal Haskoning DHV	**TP03**

Job No	Date	Ground Level (m)	Coordinates ()
4029,SK	18-09-19 18-09-19		624115, 240589

Fieldwork By	Logged By	Sheet
GEL	AT	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.25	Brown, slightly gravelly, sandy, friable ORGANIC CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to rounded flint and chert. (TOPSOIL)				
0.25-0.40	Stiff brown, slightly gravelly, slightly sandy, friable CLAY. Sand is fine to coarse. Gravel is fine to coarse, sub angular to rounded flint with a low cobble content of subrounded flint up to 100mm.				
0.40-1.10	Yellowish brown, gravelly, medium and coarse SAND. Gravel is fine to coarse, sub angular to rounded flint and chert.				
1.10-1.80	Stiff, light yellowish brown and greysh brown, slightly sandy CLAY. Sand is fine to coarse.				
1.80	TRIAL PIT COMPLETED AT 1.80m BGL TRIAL PIT DRY UPON COMPLETION				



Shoring/Support: 20mm Gravel Filled
Stability: Stable

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used 3t 360 Excavator	Checked By GF

GEOSPHERE ENVIRONMENTAL

APPENDIX 3 – INFILTRATION TEST RESULTS

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 25/09/2019

Project Name: Seven Hills Freight Management System

Time [min]	Depth to Water [mbgl]
0	1.10
2	1.12
6	1.15
7	1.17
8	1.19
9	1.19
10	1.19
15	1.24
20	1.32
30	1.39
45	1.47
60	1.53
120	1.68
135	1.70
195	1.75

Pit Size [m]		
Length	Width	Depth
1.30	0.35	1.94

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.730
h_{25}	[m]	1.310
h_{75}-h_{25}	[m]	0.420
time		
t_{75}	[s]	9960.00
t_{25}	[s]	1140.00
t_{75} - t_{25}	[s]	8820.00
effective volume		
v_{75-25}	[m^3]	0.057
effective area		
ap_{50}	[m^2]	1.841
soil infiltration rate		
f	[m/s]	3.53E-06

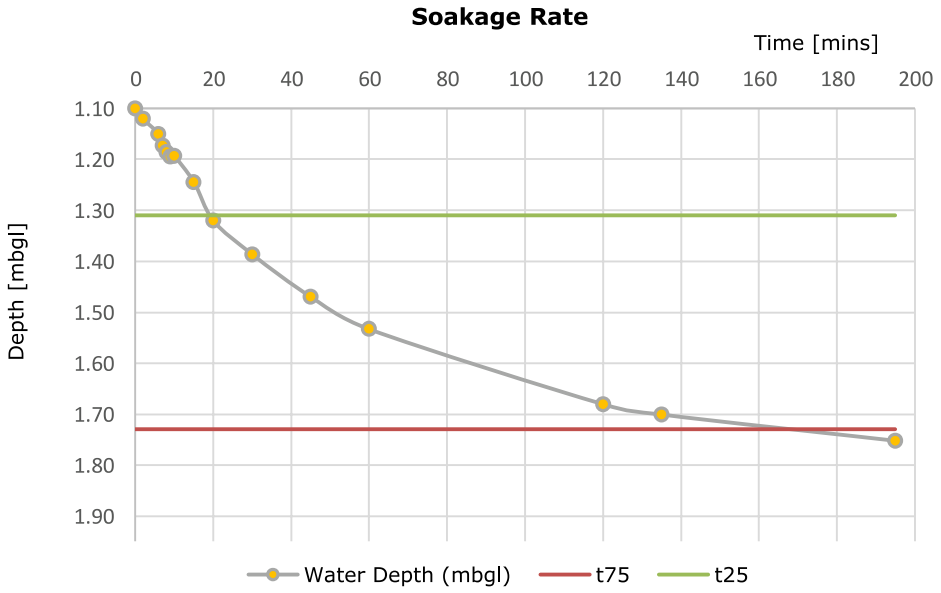
Trial Pit TP01

Run 1 of 3

Test Date 18/09/2019

Groundwater Encountered: n/a

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

Checked by: JD

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 25/09/2019

Project Name: Seven Hills Freight Management System

Time [min]	Depth to Water [mbgl]
0	0.99
1	0.98
3	1.00
4	1.01
5	1.02
10	1.07
15	1.11
20	1.15
30	1.22
45	1.30
60	1.37
120	1.53
180	1.61
240	1.66
257	1.663
340	1.700

Pit Size [m]		
Length	Width	Depth
1.30	0.35	1.94

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.701
h_{25}	[m]	1.224
h_{75}-h_{25}	[m]	0.478
time		
t_{75}	[s]	20400.00
t_{25}	[s]	1890.00
t_{75} - t_{25}	[s]	18510.00
effective volume		
v_{75-25}	[m^3]	0.065
effective area		
ap_{50}	[m^2]	2.031
soil infiltration rate		
f	[m/s]	1.73E-06

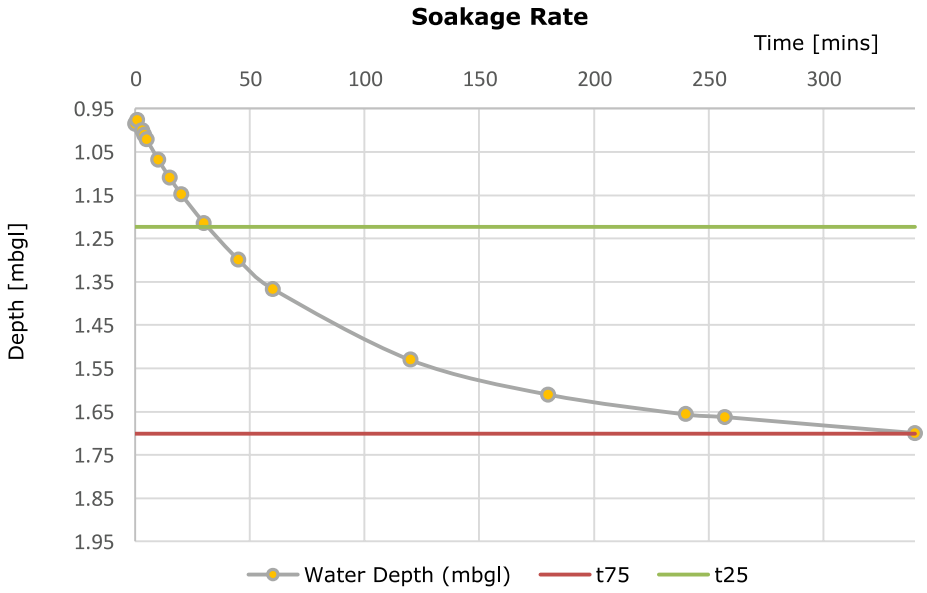
Trial Pit TP01

Run 2 of 3

Test Date 19/09/2019

Groundwater Encountered: n/a

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

Checked by: JD

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 25/09/2019

Project Name: Seven Hills Freight Management System

Time [min]	Depth to Water [mbgl]
0	0.95
1	0.96
2	0.97
3	0.98
4	0.99
5	0.99
10	1.02
15	1.05
20	1.08
30	1.12
45	1.19
60	1.24
120	1.40
180	1.50
240	1.56
300	1.61
360	1.64
420	1.66
480	1.67
540	1.68
600	1.69
673	1.70

Pit Size [m]		
Length	**Width**	**Depth**
1.30	0.35	1.94

Infiltration Rate Calculations		
Parameter	**Unit**	**Result**
height		
h_{75}	[m]	1.693
h_{25}	[m]	1.198
h_{75}-h_{25}	[m]	0.495
time		
t_{75}	[s]	36000.00
t_{25}	[s]	3300.00
t_{75} - t_{25}	[s]	32700.00
effective volume		
v_{75-25}	[m^3]	0.068
effective area		
ap_{50}	[m^2]	2.089
soil infiltration rate		
f	[m/s]	9.89E-07

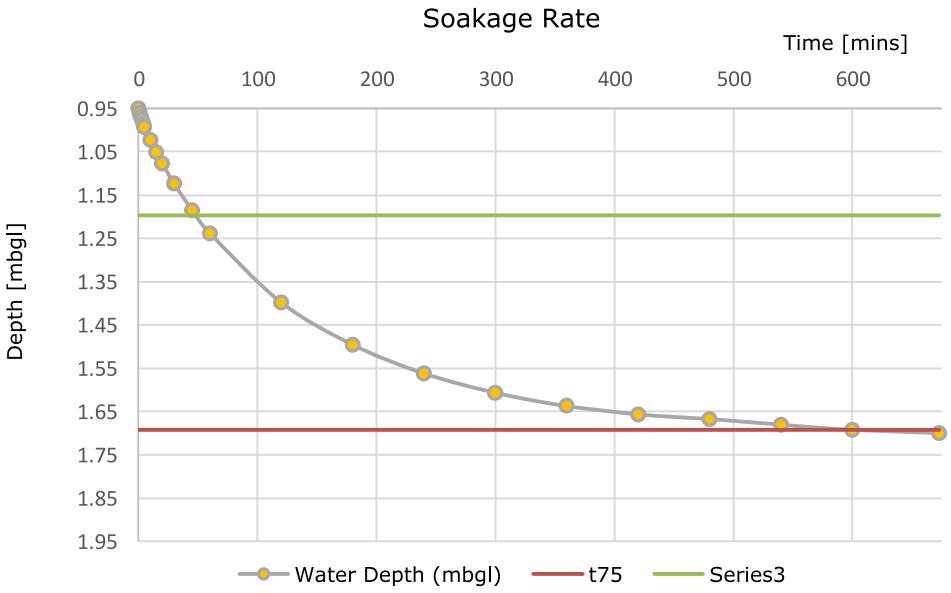
Trial Pit TP01

Run 3 of 3

Test Date 20/09/2019

Groundwater Encountered: n/a

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

Checked by: JD

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 25/09/2019

Project Name: Seven Hills Freight Management System

Time [min]	Depth to Water [mbgl]
0	1.30
1	1.49
2	1.56
3	1.62
4	1.67
5	1.7
10	1.77
11	1.78
14	1.83
15	1.85

Pit Size [m]		
Length	**Width**	**Depth**
1.30	0.35	1.94

Infiltration Rate Calculations		
Parameter	**Unit**	**Result**
height		
h_{75}	[m]	1.780
h_{25}	[m]	1.460
h_{75}-h_{25}	[m]	0.320
time		
t_{75}	[s]	660.00
t_{25}	[s]	48.00
t_{75} - t_{25}	[s]	612.00
effective volume		
v_{75-25}	[m^3]	0.044
effective area		
ap_{50}	[m^2]	1.511
soil infiltration rate		
f	[m/s]	4.72E-05

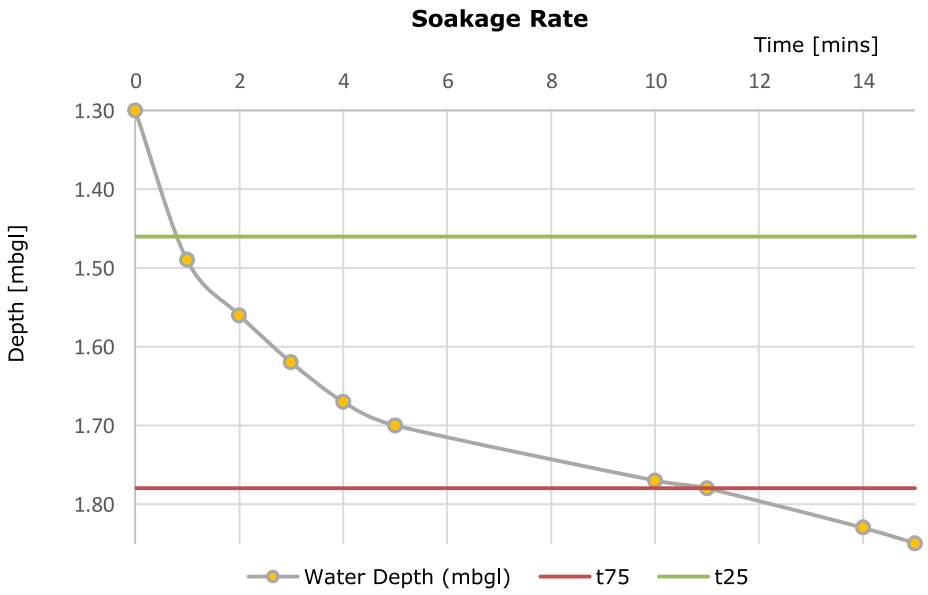
Trial Pit TP02

Run 1 of 3

Test Date 18/09/2019

Groundwater Encountered: n/a

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

Checked by: JD

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 25/09/2019

Project Name: Seven Hills Freight Management System

Time [min]	Depth to Water [mbgl]
0	0.98
1	1.11
2	1.18
3	1.29
4	1.34
5	1.40
10	1.59
15	1.72
20	1.76

Pit Size [m]		
Length	Width	Depth
1.30	0.35	1.94

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.700
h_{25}	[m]	1.221
h_{75}-h_{25}	[m]	0.480
time		
t_{75}	[s]	840.00
t_{25}	[s]	150.00
t_{75} - t_{25}	[s]	690.00
effective volume		
v_{75-25}	[m^3]	0.065
effective area		
ap_{50}	[m^2]	2.038
soil infiltration rate		
f	[m/s]	4.66E-05

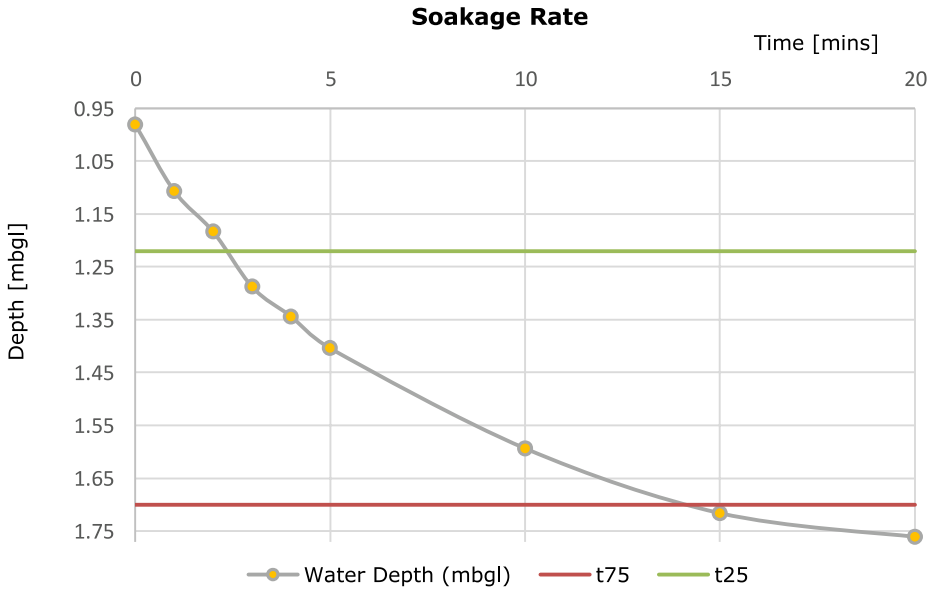
Trial Pit TP02

Run 2 of 3

Test Date 19/09/2019

Groundwater Encountered: n/a

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

Checked by: JD

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 25/09/2019

Project Name: Seven Hills Freight Management System

Time [min]	Depth to Water [mbgl]
0	1.02
1	1.04
2	1.13
3	1.20
4	1.26
5	1.32
10	1.47
15	1.60
20	1.70
25	1.77
26	1.78

Pit Size [m]		
Length	**Width**	**Depth**
1.30	0.35	1.94

Infiltration Rate Calculations		
Parameter	**Unit**	**Result**
height		
h_{75}	[m]	1.709
h_{25}	[m]	1.247
h_{75}-h_{25}	[m]	0.462
time		
t_{75}	[s]	1200.00
t_{25}	[s]	240.00
t_{75} - t_{25}	[s]	960.00
effective volume		
v_{75-25}	[m^3]	0.063
effective area		
ap_{50}	[m^2]	1.980
soil infiltration rate		
f	[m/s]	3.32E-05

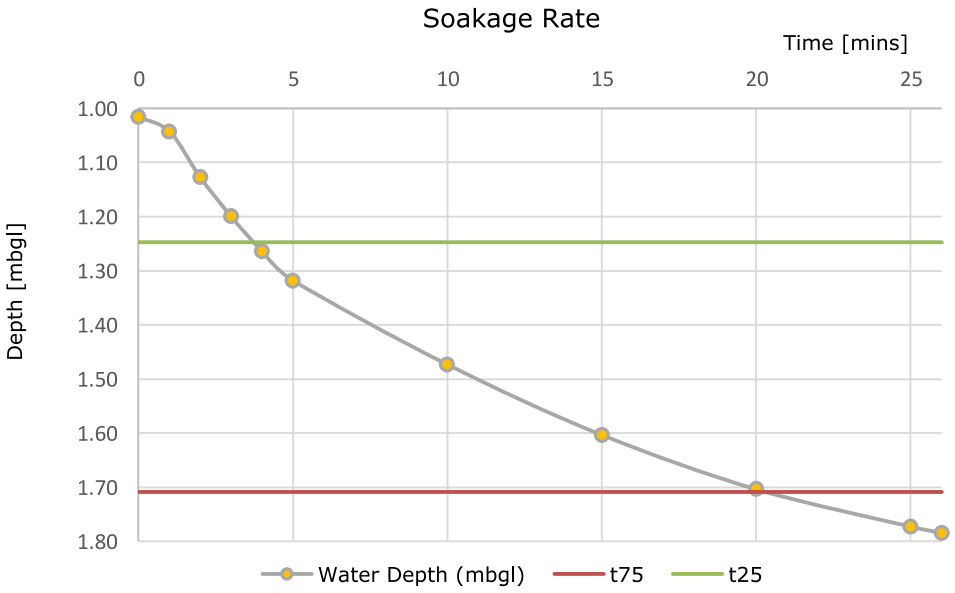
Trial Pit TP02

Run 3 of 3

Test Date 20/09/2019

Groundwater Encountered: n/a

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

Checked by: JD

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 25/09/2019

Project Name: Seven Hills Freight Management System

Time [min]	Depth to Water [mbgl]
0	1.20
1	1.20
2	1.20
3	1.20
4	1.20
5	1.20
10	1.19
15	1.20
20	1.18
30	1.23
45	1.25
60	1.26
120	1.30
180	1.33
240	1.36
300	1.38
360	1.40
420	1.42
470	1.43
800	1.52
1000	1.550

Pit Size [m]		
Length	Width	Depth
1.50	0.35	1.65

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.538
h_{25}	[m]	1.313
h_{75}-h_{25}	[m]	0.225
time		
t_{75}	[s]	53400.00
t_{25}	[s]	8400.00
t_{75} - t_{25}	[s]	45000.00
effective volume		
v_{75-25}	[m^3]	0.035
effective area		
ap_{50}	[m^2]	1.358
soil infiltration rate		
f	[m/s]	5.80E-07

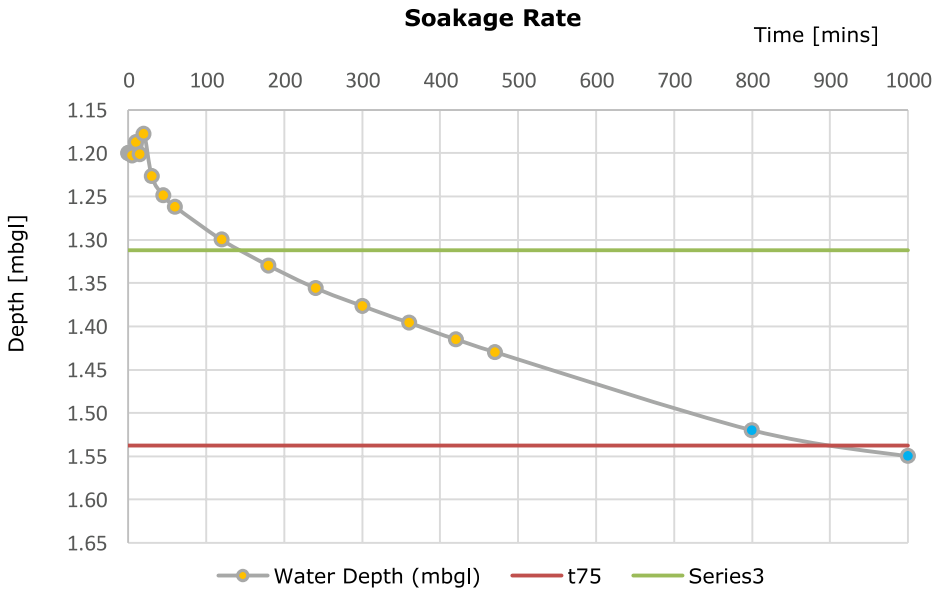
Trial Pit TP03

Run 1 of 3

Test Date 19/09/2019

Groundwater Encountered: n/a

Remarks: Final two data points extrapolated to allow for re-filling of pit for consecutive testing. Pit gravel backfilled.



Calculated by: AT

Checked by: JD

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 25/09/2019

Project Name: Seven Hills Freight Management System

Time [min]	Depth to Water [mbgl]
0	1.14
1	1.14
2	1.14
3	1.15
4	1.15
5	1.15
10	1.17
15	1.19
20	1.20
30	1.21
45	1.23
60	1.24
120	1.28
180	1.30
240	1.33
300	1.35
360	1.37
420	1.39
480	1.41
540	1.42
600	1.44
660	1.46
720	1.47
780	1.48
840	1.50
900	1.51
924	1.52
962	1.54

Pit Size [m]		
Length	**Width**	**Depth**
1.50	0.35	1.65

Infiltration Rate Calculations		
Parameter	**Unit**	**Result**
height		
h_{75}	[m]	1.522
h_{25}	[m]	1.266
h_{75}-h_{25}	[m]	0.256
time		
t_{75}	[s]	54240.00
t_{25}	[s]	3180.00
t_{75} - t_{25}	[s]	51060.00
effective volume		
v_{75-25}	[m^3]	0.040
effective area		
ap_{50}	[m^2]	1.472
soil infiltration rate		
f	[m/s]	5.36E-07

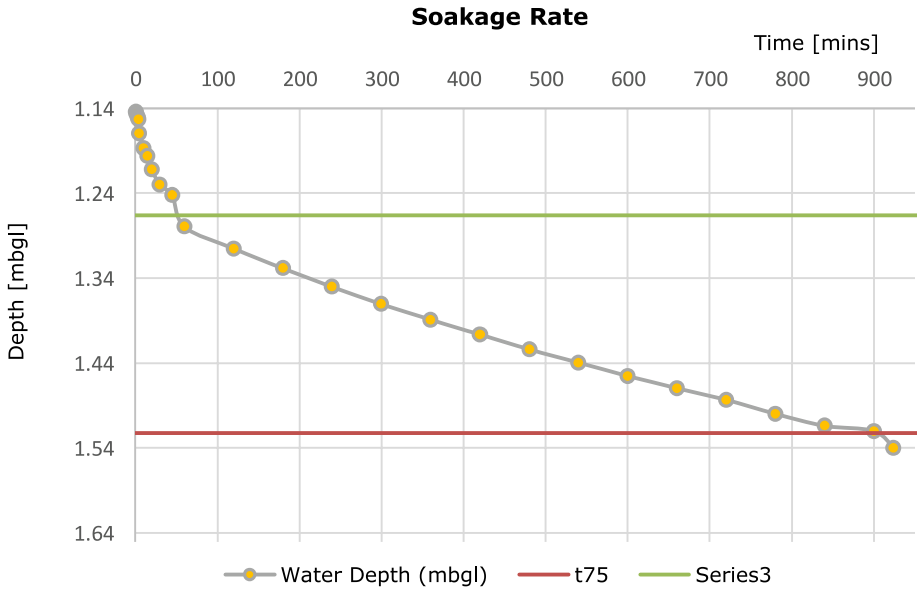
Trial Pit TP03

Run 2 of 3

Test Date 19/09/2019

Groundwater Encountered: n/a

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

Checked by: JD

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 4029,SK

Date: 25/09/2019

Project Name: Seven Hills Freight Management System

Time [min]	Depth to Water [mbgl]
0	1.02
1	1.19
2	1.20
3	1.20
4	1.20
5	1.20
10	1.21
15	1.21
20	1.22
30	1.23
45	1.23
60	1.25
120	1.27
180	1.29
240	1.31
300	1.33
360	1.35
420	1.37
540	1.41
600	1.43
660	1.44
720	1.46
780	1.47
840	1.49
900	1.50
960	1.51
1020	1.53
1080	1.54
1112	1.54

Pit Size [m]		
Length	Width	Depth
1.50	0.35	1.65

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.491
h_{25}	[m]	1.174
h_{75}-h_{25}	[m]	0.317
time		
t_{75}	[s]	51600.00
t_{25}	[s]	48.00
t_{75} - t_{25}	[s]	51552.00
effective volume		
v_{75-25}	[m^3]	0.050
effective area		
ap_{50}	[m^2]	1.698
soil infiltration rate		
f	[m/s]	5.70E-07

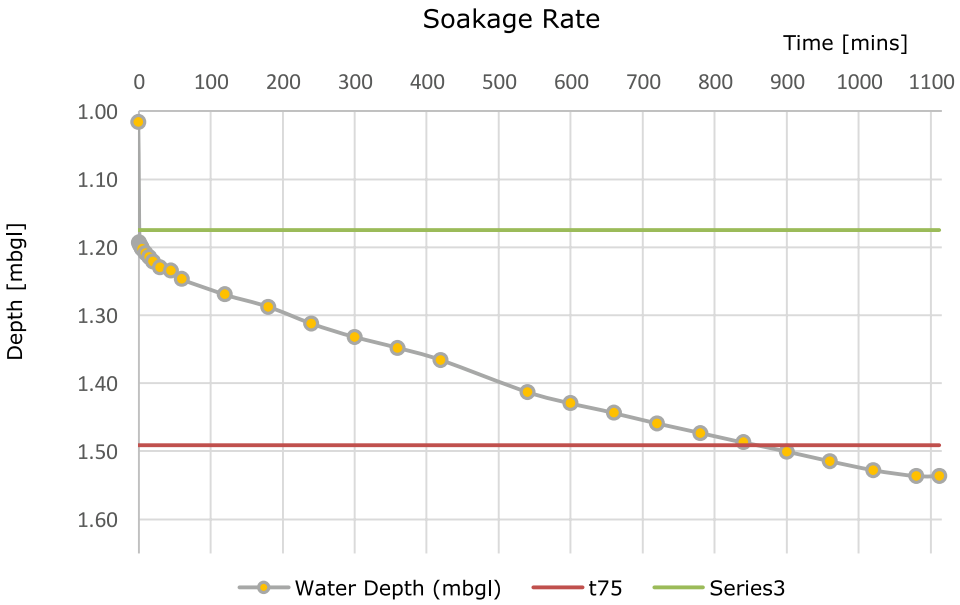
Trial Pit TP03

Run 3 of 3

Test Date 20/09/2019

Groundwater Encountered: n/a

Remarks: Pit gravel backfilled. This is accounted for within the effective volume.



Calculated by: AT

Checked by: JD

APPENDIX 4 – DRAWINGS

Exploratory Hole Location Plan - Drawing ref. 4029,SK/001/Rev0

GEOSPHERE ENVIRONMENTAL

LEGEND

Trial Pit

SOURCE

© OpenStreetMap contributors

PROJECT

Seven Hills Freight Management System

TITLE

Exploratory Hole Location Plan

DRAWING NUMBER

4029,SK/001/Rev1

SCALE	DATE
As marked	17/10/2019
DRAWN BY	**CHECKED BY**
AT	JD

GEOSPHERE ENVIRONMENTAL

Ec Ecology.

Fr Flood Risk.

Ge Geotechnical.

En Environmental.

Kw Knotweed.

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FUGRO	Contract Name	Sizewell C Associated Developments, Northern and Southern Park and Ride and Freight Management Facility Sites			Location ID **STP203**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	F187026			
	Coordinates (m)	E623937.81 N240795.04	Ground Elevation (m Datum)	24.66	Sheet 1 of 1
	Hole Type	Trial Pit			Status: Final

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	3.00	TP	26-07-2021	26-07-2021	Machine excavated : 8 Tonne			PS, DS	HS	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
26-07-2021	14:30	0.00			Clear, dry and warm
26-07-2021	15:00	3.00		Dry	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater not encountered during excavation

General Remarks

1. Prior to excavating, a Cable Avoidance Tool (CAT) survey was undertaken to check for services; services were not located.
2. Plate load testing carried out at 0.40m below ground level; results reported separately.
3. A soakaway test was performed on 26/07/2021 at 2.50 m, after the soakaway test the trial pit was extended from 2.50 m to 3.00 m; results presented separately.
4. As-built coordinates and level presented are the setting out coordinates and level obtained prior to intrusive works were used.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	3.00	Arisings	26-07-2021

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	JD	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB
Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW				Print Date	23-12-2021

FUGRO	Contract Name	Sizewell C Associated Developments, Northern and Southern Park and Ride and Freight Management Facility Sites			Location ID **STP203**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	F187026			
	Coordinates (m)	E623937.81 N240795.04	Ground Elevation (m Datum)	24.66	Sheet 1 of 1
	Hole Type	Trial Pit / Trench			Status: Final

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
0.00 - 0.40	B	1			TOPSOIL. Dark brown slightly gravelly slightly sandy SILT with occasional rootlets (<10mm x 30mm). Sand is fine to coarse. Gravel is subrounded and rounded fine and medium of flint. [TOPSOIL] [SILT]	(0.40)				
0.10 - 0.20	D	2								
0.20 - 0.40	ES	3								
0.20	PID		< 0.1 ppm							
0.40 - 1.20	B	4			Orangish brown very gravelly silty SAND. Sand fine to coarse. Gravel is subrounded and rounded fine and medium of flint. [KESGRAVE CATCHMENT SUBGROUP] [SAND]	0.40	24.26			
0.65 - 0.80	D	5			0.40m to 0.80m; mottled orangish brown and yellowish brown.					
0.80 - 1.05	ES	6								
0.80	PID		< 0.1 ppm	1						
1.50 - 2.50	B	7								
1.70 - 1.95	D	8				(2.60)				
2.00 - 2.30	ES	9		2						
2.00	PID		0.1 ppm							
2.50 - 3.00	LB	10								
2.75 - 3.00	D	11								
				3	End of Trial Pit / Trench at 3.00 m	3.00	21.66			
				4						

Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Stable	3.20 m 0.90 m → 17°

FUGRO	Contract Name	Sizewell C Associated Developments, Northern and Southern Park and Ride and Freight Management Facility Sites			Location ID **STP204**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	F187026			
	Coordinates (m)	E624030.61 N240749.46	Ground Elevation (m Datum)	25.32	Sheet 1 of 1
	Hole Type	Trial Pit			Status: Final

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	3.00	TP	21-07-2021	22-07-2021	Machine excavated : 80CR9A			AH	AH	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
21-07-2021	10:45	0.00			Hot
22-07-2021	00:00	3.00		Dry	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater not encountered during excavation

General Remarks

1. Prior to excavating, a Cable Avoidance Tool (CAT) survey was undertaken to check for services; services were not located.
2. A soakaway test was performed on 21/07/2021 at 2.50 m, after the soakaway test the trial pit was extended from 2.50 m to 3.00 m; results presented separately.
3. As-built coordinates and level presented are the setting out coordinates and level obtained prior to intrusive works were used.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	3.00	Arisings	21-07-2021

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	JD	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB
Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW				Print Date	23-12-2021

FUGRO	Contract Name	Sizewell C Associated Developments, Northern and Southern Park and Ride and Freight Management Facility Sites			Location ID **STP204**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	F187026			
	Coordinates (m)	E624030.61 N240749.46	Ground Elevation (m Datum)	25.32	Sheet 1 of 1
	Hole Type	Trial Pit / Trench			Status: Final

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
0.10	D	2			TOPSOIL. Dark brown gravelly silty SAND. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of flint and quartzite. [TOPSOIL] [SAND]	(0.30)				
0.10	ES	3								
0.10	LB	1								
0.10	PID		0.7 ppm			0.30	25.02			
0.50 - 0.70	D	5			Orangish brown very gravelly very silty SAND. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of flint and quartzite. [KESGRAVE CATCHMENT SUBGROUP] [SAND]					
0.50 - 0.70	ES	6								
0.50 - 0.70	LB	4								
0.50	PID		0.6 ppm	1						
1.50 - 1.70	D	8								
1.50 - 1.70	ES	9								
1.50 - 1.70	LB	7				(2.70)				
1.50	PID		0.2 ppm							
1.80	D	10			1.80m and 2.00m; pockets (<100mm x 130mm x 200mm) of firm reddish brown and grey slightly sandy clay.					
1.80 - 2.00	ES	12								
1.80 - 2.00	LB	11								
1.80	PID		0.2 ppm	2						
				3	End of Trial Pit / Trench at 3.00 m	3.00	22.32			
				4						

Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Unstable	4.20 m 0.80 m → 35°

FUGRO	Contract Name	Sizewell C Associated Developments, Northern and Southern Park and Ride and Freight Management Facility Sites			Location ID **STP205**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	F187026			
	Coordinates (m)	E624138.39 N240671.84	Ground Elevation (m Datum)	26.26	Sheet 1 of 1
	Hole Type	Trial Pit			Status: Final

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	2.00	TP	22-07-2021	22-07-2021	Machine excavated : 80CR9A			AH	AH	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
22-07-2021	15:31	0.00			Hot
22-07-2021	17:00	2.00		Dry	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater not encountered during excavation

General Remarks

1. Prior to excavating, a Cable Avoidance Tool (CAT) survey was undertaken to check for services; services were not located.
2. Plate load testing carried out at 0.40m below ground level; results reported separately.
3. A soakaway test was performed on 22/07/2021 at 2.00 m, after the soakaway test the trial pit was found unstable (further excavation was not carried out); results presented separately.
4. As-built coordinates and level presented are the setting out coordinates and level obtained prior to intrusive works were used.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	2.00	Arisings	22-07-2021

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	JD	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB
Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW				Print Date	23-12-2021

FUGRO	Contract Name	Sizewell C Associated Developments, Northern and Southern Park and Ride and Freight Management Facility Sites			Location ID **STP205**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	F187026			
	Coordinates (m)	E624138.39 N240671.84	Ground Elevation (m Datum)	26.26	Sheet 1 of 1
	Hole Type	Trial Pit / Trench			Status: Final

Sampling and In Situ Testing				Strata Details						Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend		Water Strike	Backfill / Installation
0.10	D	2			TOPSOIL. Dark brown slightly gravelly silty SAND. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of flint and quartzite. [TOPSOIL] [SAND]	(0.40)					
0.10	ES	3									
0.10	LB	1									
0.10	PID		< 0.1 ppm								
						0.40	25.86				
0.50 - 0.70	D	5			Orangish brown very gravelly silty SAND with bands of dark orangish brown silty sandy gravel. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of flint and quartzite. [KESGRAVE CATCHMENT SUBGROUP] [SAND]						
0.50 - 0.70	ES	6									
0.50 - 0.70	LB	4									
0.50	PID		< 0.1 ppm	1							
						(1.60)					
1.50 - 1.70	D	8									
1.50 - 1.70	ES	9									
1.50 - 1.70	LB	7									
1.50	PID		< 0.1 ppm								
				2	End of Trial Pit / Trench at 2.00 m	2.00	24.26				
				3							
				4							

Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Uunstable	4.20 m 0.80 m → 50°

FUGRO	Contract Name	Sizewell C Associated Developments, Northern and Southern Park and Ride and Freight Management Facility Sites			Location ID **STP213**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	F187026			
	Coordinates (m)	E623810.92 N240660.90	Ground Elevation (m Datum)	26.02	Sheet 1 of 1
	Hole Type	Trial Pit			Status: Final

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	3.00	TP	27-07-2021	27-07-2021	Machine excavated : 8 Tonne			PS, UM	HS	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
27-07-2021	10:30	0.00			Overcast and light rain
27-07-2021	11:00	3.00		Dry	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater not encountered during excavation

General Remarks

1. Prior to excavating, a Cable Avoidance Tool (CAT) survey was undertaken to check for services; services were not located.
2. Plate load testing carried out at 0.40m below ground level; results reported separately.
3. A soakaway test was performed on 27/07/2021 at 2.50 m, after the soakaway test the trial pit was extended from 2.50 m to 3.00 m; results presented separately.
4. As-built coordinates and level presented are the setting out coordinates and level obtained prior to intrusive works were used.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	3.00	Arisings	27-07-2021

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	JD	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB
Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW				Print Date	23-12-2021

FUGRO	Contract Name	Sizewell C Associated Developments, Northern and Southern Park and Ride and Freight Management Facility Sites			Location ID **STP213**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	F187026			
	Coordinates (m)	E623810.92 N240660.90	Ground Elevation (m Datum)	26.02	Sheet 1 of 1
	Hole Type	Trial Pit / Trench			Status: Final

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
0.00 - 0.40	LB	1			TOPSOIL. Dark greyish brown slightly gravelly slightly silty SAND with occasional rootlets (<10mm x 30mm). Sand is fine and medium. Gravel is subangular and subrounded fine and medium of flint. [TOPSOIL] [SAND]	(0.40)				
0.10 - 0.25	D	2								
0.30 - 0.40	ES	3								
0.30	PID		< 0.1 ppm							
0.40 - 0.80	LB	4			Orangish brown mottled dark brown gravelly very silty SAND. Sand is fine and medium. Gravel is subangular and subrounded fine and medium of flint. [KESGRAVE CATCHMENT SUBGROUP] [SAND]	0.40	25.62			
0.45 - 0.60	D	5				(0.40)				
0.60 - 0.80	ES	6								
0.60	PID		< 0.1 ppm			0.80	25.22			
				1	Yellowish brown slightly gravelly very silty SAND. Sand is fine and medium. [KESGRAVE CATCHMENT SUBGROUP] [SAND]					
1.20 - 2.50	LB	7								
1.60 - 1.80	D	8								
1.95 - 2.20	ES	9				(2.20)				
1.95	PID		< 0.1 ppm	2						
2.50 - 3.00	LB	10								
2.65 - 2.90	D	11								
				3	End of Trial Pit / Trench at 3.00 m	3.00	23.02			
				4						

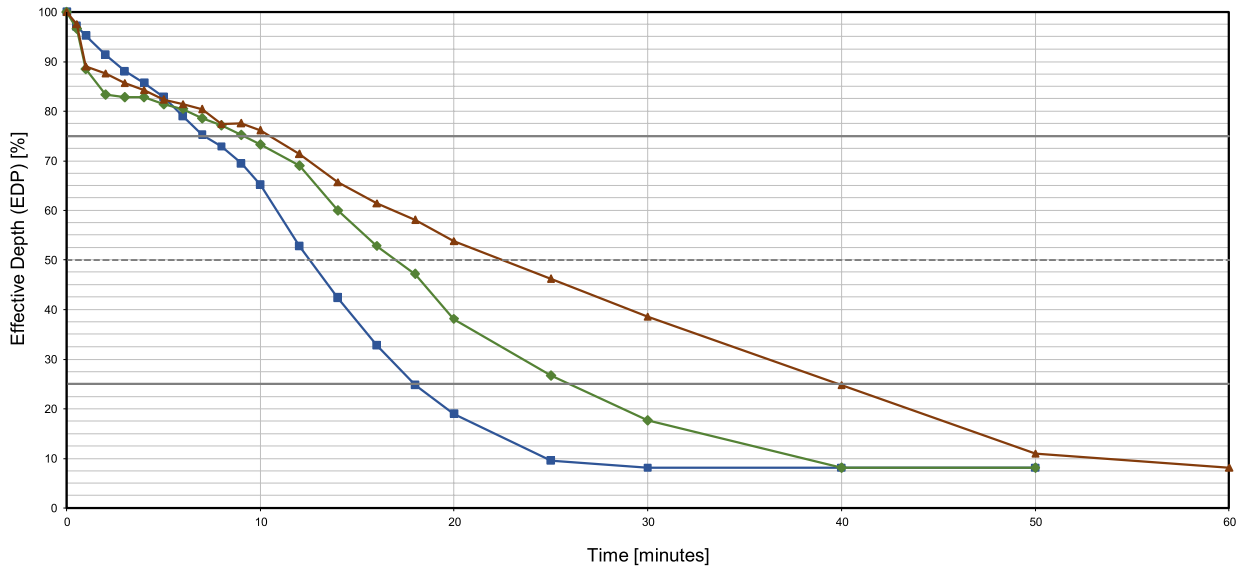
Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Stable	3.00 m 0.80 m → 184°

NNB GENERATION COMPANY (SZC) LIMITED
Sizewell C Associated Developments: Northern and Southern Park and Ride, and Freight Management Facilites Sites

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	7/26/2021	Operator	JL	Pit Depth	2.50 m	Location ID	STP203



Test 1			Test 2			Test 3		
Start Time =	15:40		Start Time =	10:30		Start Time =	11:35	
Test Top =	0.40	m BGL	Test Top =	0.40	m BGL	Test Top =	0.40	m BGL
Test Base =	2.50	m BGL	Test Base =	2.50	m BGL	Test Base =	2.50	m BGL
75% EDP =	0.93	m BGL	75% EDP =	0.93	m BGL	75% EDP =	0.93	m BGL
50% EDP =	1.45	m BGL	50% EDP =	1.45	m BGL	50% EDP =	1.45	m BGL
25% EDP =	1.98	m BGL	25% EDP =	1.98	m BGL	25% EDP =	1.98	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
0:00:00		0.40	100	0:00:00		0.40	100	0:00:00		0.40	100
0:00:30		0.46	97	0:00:30		0.47	97	0:00:30		0.45	98
0:01:00		0.50	95	0:01:00		0.64	89	0:01:00		0.63	89
0:02:00		0.58	91	0:02:00		0.75	83	0:02:00		0.66	88
0:03:00		0.65	88	0:03:00		0.76	83	0:03:00		0.70	86
0:04:00		0.70	86	0:04:00		0.76	83	0:04:00		0.73	84
0:05:00		0.76	83	0:05:00		0.79	81	0:05:00		0.77	82
0:06:00		0.84	79	0:06:00		0.81	80	0:06:00		0.79	81
0:07:00		0.92	75	0:07:00		0.85	79	0:07:00		0.81	80
0:08:00		0.97	73	0:08:00		0.88	77	0:08:00		0.87	77
0:09:00		1.04	70	0:09:00		0.92	75	0:09:00		0.87	78
0:10:00		1.13	65	0:10:00		0.96	73	0:10:00		0.90	76
0:12:00		1.39	53	0:12:00		1.05	69	0:12:00		1.00	71
0:14:00		1.61	42	0:14:00		1.24	60	0:14:00		1.12	66
0:16:00		1.81	33	0:16:00		1.39	53	0:16:00		1.21	61
0:18:00		1.98	25	0:18:00		1.51	47	0:18:00		1.28	58
0:20:00		2.10	19	0:20:00		1.70	38	0:20:00		1.37	54
0:25:00		2.30	10	0:25:00		1.94	27	0:25:00		1.53	46
0:30:00		2.33	8	0:30:00		2.13	18	0:30:00		1.69	39
0:40:00		2.33	8	0:40:00		2.33	8	0:40:00		1.98	25
0:50:00		2.33	8	0:50:00		2.33	8	0:50:00		2.27	11
								1:00:00		2.33	8

Datum (-ve denotes AGL) = 0.00 m BGL.
Ground Level taken as Datum.

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

Contract No. F187026

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	7/26/2021	Operator	JL	Pit Depth	2.50 m	Location ID	STP203

Test Details

Datum (-ve denotes AGL) =	0.00	m BGL	Well Screen Well screen not used
Pit Length =	3.20	m	Filter Material
Pit Width =	0.80	m	Filter not used
Pit Depth =	2.50	m BGL	

Weather: Hot but grey

Geology: SAND and GRAVEL

Remarks

Test 1 silted up at base. Test 2 and 3 performed the following day.

Calculation

Test 1			Test 2			Test 3		
Start Time =	15:40		Start Time =	10:30		Start Time =	11:35	
Test Top =	0.40	m BGL	Test Top =	0.40	m BGL	Test Top =	0.40	m BGL
Test Base =	2.50	m BGL	Test Base =	2.50	m BGL	Test Base =	2.50	m BGL
EDP =	2.10	m	EDP =	2.10	m	EDP =	2.10	m
75% EDP =	0.93	m BGL	75% EDP =	0.93	m BGL	75% EDP =	0.93	m BGL
50% EDP =	1.45	m BGL	50% EDP =	1.45	m BGL	50% EDP =	1.45	m BGL
25% EDP =	1.98	m BGL	25% EDP =	1.98	m BGL	25% EDP =	1.98	m BGL
V =	5.38	m^3	V =	5.38	m^3	V =	5.38	m^3
Vg =		m^3	Vg =		m^3	Vg =		m^3
Vp =		m^3	Vp =		m^3	Vp =		m^3
Vp75-25 =	2.69	m^3	Vp75-25 =	2.69	m^3	Vp75-25 =	2.69	m^3
ap =	10.96	m^2	ap =	10.96	m^2	ap =	10.96	m^2
Tp75 =	420	s	Tp75 =	540	s	Tp75 =	630	s
Tp25 =	1080	s	Tp25 =	1560	s	Tp25 =	2400	s
Infiltration Rate, f =	3.72E-04	m/s	Infiltration Rate, f =	2.40E-04	m/s	Infiltration Rate, f =	1.39E-04	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of the pit.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-2}}{ap \times Tp_{75-25}}$$

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

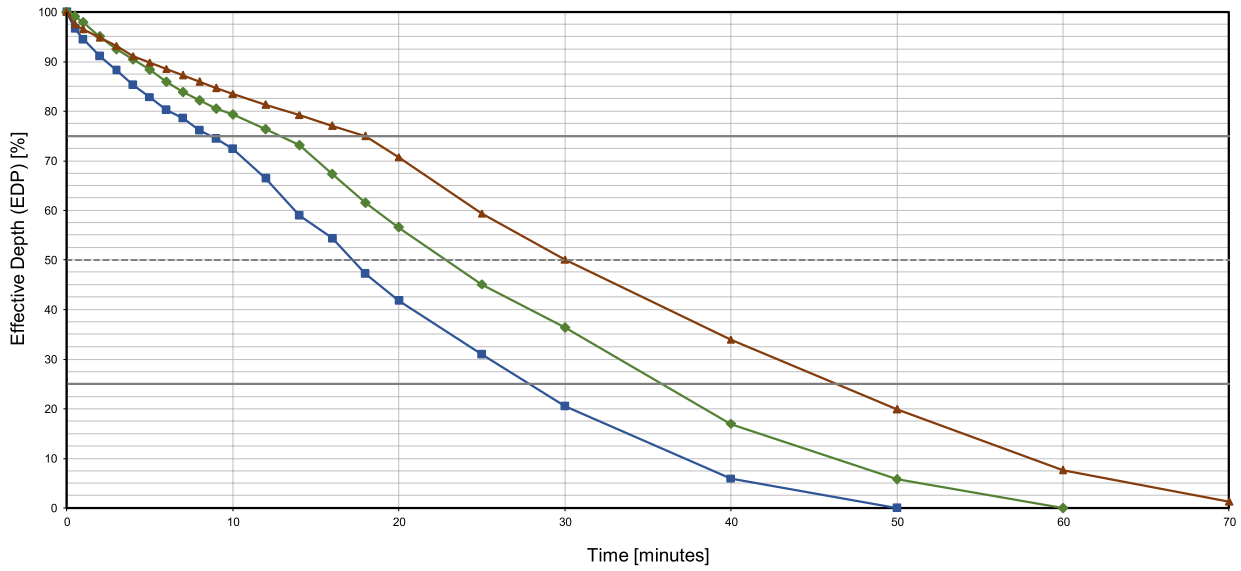
NNB GENERATION COMPANY (SZC) LIMITED

Sizewell C Associated Developments: Nothern and Southern Park and Ride, and Freight Management Facility sites

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	7/21/2021	Operator	JL	Pit Depth	2.50 m	Location ID	STP204



Test 1			Test 2			Test 3		
Start Time =	13:11		Start Time =	10:25		Start Time =	11:50	
Test Top =	0.11	m BGL	Test Top =	0.08	m BGL	Test Top =	0.14	m BGL
Test Base =	2.50	m BGL	Test Base =	2.50	m BGL	Test Base =	2.50	m BGL
75% EDP =	0.71	m BGL	75% EDP =	0.69	m BGL	75% EDP =	0.73	m BGL
50% EDP =	1.31	m BGL	50% EDP =	1.29	m BGL	50% EDP =	1.32	m BGL
25% EDP =	1.90	m BGL	25% EDP =	1.90	m BGL	25% EDP =	1.91	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
0:00:00		0.11	100	0:00:00		0.08	100	0:00:00		0.14	100
0:00:30		0.19	97	0:00:30		0.10	99	0:00:30		0.20	97
0:01:00		0.24	95	0:01:00		0.13	98	0:01:00		0.22	97
0:02:00		0.32	91	0:02:00		0.20	95	0:02:00		0.26	95
0:03:00		0.39	88	0:03:00		0.26	93	0:03:00		0.30	93
0:04:00		0.46	85	0:04:00		0.31	90	0:04:00		0.35	91
0:05:00		0.52	83	0:05:00		0.36	88	0:05:00		0.38	90
0:06:00		0.58	80	0:06:00		0.42	86	0:06:00		0.41	89
0:07:00		0.62	79	0:07:00		0.47	84	0:07:00		0.44	87
0:08:00		0.68	76	0:08:00		0.51	82	0:08:00		0.47	86
0:09:00		0.72	74	0:09:00		0.55	81	0:09:00		0.50	85
0:10:00		0.77	72	0:10:00		0.58	79	0:10:00		0.53	83
0:12:00		0.91	67	0:12:00		0.65	76	0:12:00		0.58	81
0:14:00		1.09	59	0:14:00		0.73	73	0:14:00		0.63	79
0:16:00		1.20	54	0:16:00		0.87	67	0:16:00		0.68	77
0:18:00		1.37	47	0:18:00		1.01	62	0:18:00		0.73	75
0:20:00		1.50	42	0:20:00		1.13	57	0:20:00		0.83	71
0:25:00		1.76	31	0:25:00		1.41	45	0:25:00		1.10	59
0:30:00		2.01	21	0:30:00		1.62	36	0:30:00		1.32	50
0:40:00		2.36	6	0:40:00		2.09	17	0:40:00		1.70	34
0:50:00		2.50	0	0:50:00		2.36	6	0:50:00		2.03	20
				1:00:00		2.50	0	1:00:00		2.32	8
								1:10:00		2.47	1

Datum (-ve denotes AGL) = 0.00 m BGL.
Ground Level taken as Datum.

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

Contract No. F187026

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	7/21/2021	Operator	JL	Pit Depth	2.50 m	Location ID	STP204

Test Details

Datum (-ve denotes AGL) =	0.00	m BGL	Well Screen Well screen not used
Pit Length =	4.20	m	Filter Material
Pit Width =	0.80	m	Filter not used
Pit Depth =	2.50	m BGL	

Weather: Hot

Geology: SAND and GRAVEL

Remarks

Tests 2 and 3 carried out the following day.

Calculation

Test 1			Test 2			Test 3		
Start Time =	13:11		Start Time =	10:25		Start Time =	11:50	
Test Top =	0.11	m BGL	Test Top =	0.08	m BGL	Test Top =	0.14	m BGL
Test Base =	2.50	m BGL	Test Base =	2.50	m BGL	Test Base =	2.50	m BGL
EDP =	2.39	m	EDP =	2.42	m	EDP =	2.36	m
75% EDP =	0.71	m BGL	75% EDP =	0.69	m BGL	75% EDP =	0.73	m BGL
50% EDP =	1.31	m BGL	50% EDP =	1.29	m BGL	50% EDP =	1.32	m BGL
25% EDP =	1.90	m BGL	25% EDP =	1.90	m BGL	25% EDP =	1.91	m BGL
V =	8.03	m^3	V =	8.13	m^3	V =	7.93	m^3
Vg =		m^3	Vg =		m^3	Vg =		m^3
Vp =		m^3	Vp =		m^3	Vp =		m^3
Vp75-25 =	4.02	m^3	Vp75-25 =	4.07	m^3	Vp75-25 =	3.96	m^3
ap =	15.31	m^2	ap =	15.46	m^2	ap =	15.16	m^2
Tp75 =	510	s	Tp75 =	780	s	Tp75 =	1080	s
Tp25 =	1650	s	Tp25 =	2160	s	Tp25 =	2790	s
Infiltration Rate, f =	2.30E-04	m/s	Infiltration Rate, f =	1.91E-04	m/s	Infiltration Rate, f =	1.53E-04	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of the pit.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$

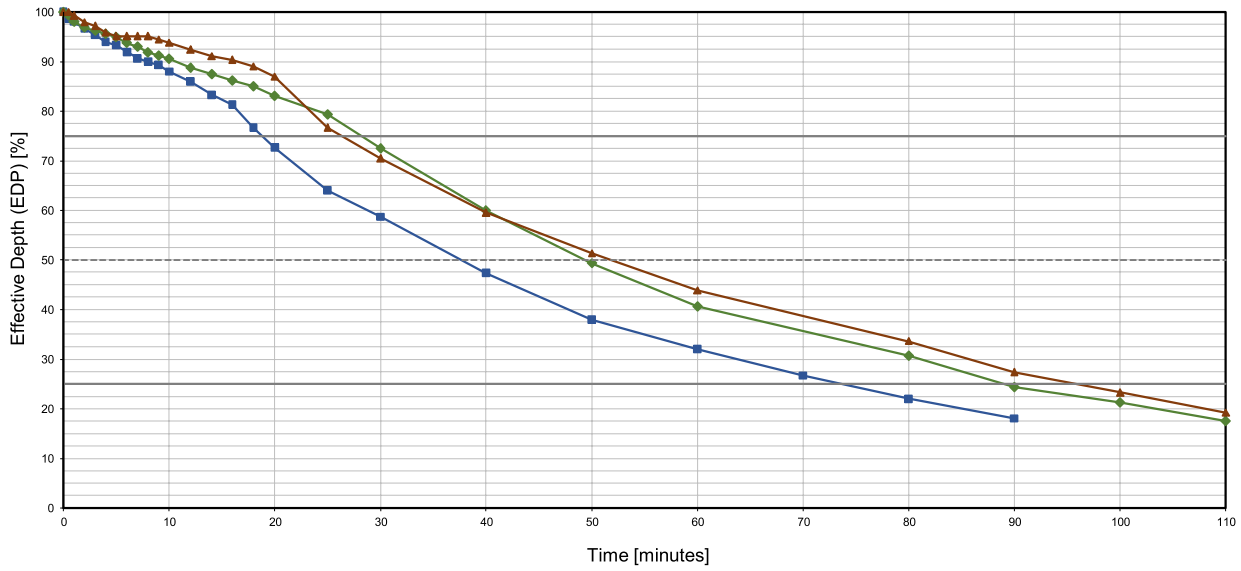
Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

NNB GENERATION COMPANY (SZC) LIMITED
Sizewell C Associated Developments: Nothern and Southern Park and Ride, and Freight Management Facility Sites

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	7/22/2021	Operator	JL	Pit Depth	2.00 m	Location ID	STP205



Test 1			Test 2			Test 3		
Start Time =	16:40		Start Time =	8:45		Start Time =	10:40	
Test Top =	0.50	m BGL	Test Top =	0.40	m BGL	Test Top =	0.54	m BGL
Test Base =	2.00	m BGL	Test Base =	2.00	m BGL	Test Base =	2.00	m BGL
75% EDP =	0.88	m BGL	75% EDP =	0.80	m BGL	75% EDP =	0.91	m BGL
50% EDP =	1.25	m BGL	50% EDP =	1.20	m BGL	50% EDP =	1.27	m BGL
25% EDP =	1.63	m BGL	25% EDP =	1.60	m BGL	25% EDP =	1.64	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
0:00:00		0.50	100	0:00:00		0.40	100	0:00:00		0.54	100
0:00:30		0.52	99	0:00:30		0.41	99	0:00:30		0.54	100
0:01:00		0.53	98	0:01:00		0.43	98	0:01:00		0.55	99
0:02:00		0.55	97	0:02:00		0.45	97	0:02:00		0.57	98
0:03:00		0.57	95	0:03:00		0.46	96	0:03:00		0.58	97
0:04:00		0.59	94	0:04:00		0.47	96	0:04:00		0.60	96
0:05:00		0.60	93	0:05:00		0.48	95	0:05:00		0.61	95
0:06:00		0.62	92	0:06:00		0.50	94	0:06:00		0.61	95
0:07:00		0.64	91	0:07:00		0.51	93	0:07:00		0.61	95
0:08:00		0.65	90	0:08:00		0.53	92	0:08:00		0.61	95
0:09:00		0.66	89	0:09:00		0.54	91	0:09:00		0.62	95
0:10:00		0.68	88	0:10:00		0.55	91	0:10:00		0.63	94
0:12:00		0.71	86	0:12:00		0.58	89	0:12:00		0.65	92
0:14:00		0.75	83	0:14:00		0.60	88	0:14:00		0.67	91
0:16:00		0.78	81	0:16:00		0.62	86	0:16:00		0.68	90
0:18:00		0.85	77	0:18:00		0.64	85	0:18:00		0.70	89
0:20:00		0.91	73	0:20:00		0.67	83	0:20:00		0.73	87
0:25:00		1.04	64	0:25:00		0.73	79	0:25:00		0.88	77
0:30:00		1.12	59	0:30:00		0.84	73	0:30:00		0.97	71
0:40:00		1.29	47	0:40:00		1.04	60	0:40:00		1.13	60
0:50:00		1.43	38	0:50:00		1.21	49	0:50:00		1.25	51
1:00:00		1.52	32	1:00:00		1.35	41	1:00:00		1.36	44
1:10:00		1.60	27	1:20:00		1.51	31	1:20:00		1.51	34
1:20:00		1.67	22	1:30:00		1.61	24	1:30:00		1.60	27
1:30:00		1.73	18	1:40:00		1.66	21	1:40:00		1.66	23
				1:50:00 AM		1.72	18	1:50:00 AM		1.72	19

Datum (-ve denotes AGL) = 0.00 m BGL.
Ground Level taken as Datum.

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

Contract No. F187026

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	7/22/2021	Operator	JL	Pit Depth	2.00 m	Location ID	STP205

Test Details

Datum (-ve denotes AGL) =	0.00	m BGL	Well Screen		
			Well screen not used		
Pit Length =	4.20	m	Filter Material		
Pit Width =	0.80	m	Assumed Solid Fraction =	57.13	%
Pit Depth =	2.00	m BGL	Assumed Porosity =	42.87	%

Weather: Hot

Geology: SAND and GRAVEL

Remarks

Test 3: partial collapse of one edge between 6 and 9 minutes. Test 2 and 3 were performed the following day.

Calculation

Test 1			Test 2			Test 3		
Start Time =	16:40		Start Time =	8:45		Start Time =	10:40	
Test Top =	0.50	m BGL	Test Top =	0.40	m BGL	Test Top =	0.54	m BGL
Test Base =	2.00	m BGL	Test Base =	2.00	m BGL	Test Base =	2.00	m BGL
EDP =	1.50	m	EDP =	1.60	m	EDP =	1.46	m
75% EDP =	0.88	m BGL	75% EDP =	0.80	m BGL	75% EDP =	0.91	m BGL
50% EDP =	1.25	m BGL	50% EDP =	1.20	m BGL	50% EDP =	1.27	m BGL
25% EDP =	1.63	m BGL	25% EDP =	1.60	m BGL	25% EDP =	1.64	m BGL
V =	5.04	m^3	V =	5.38	m^3	V =	4.91	m^3
Vg =	2.59	m^3	Vg =	2.59	m^3	Vg =	2.59	m^3
Vp =	2.45	m^3	Vp =	2.78	m^3	Vp =	2.31	m^3
Vp75-25 =	1.22	m^3	Vp75-25 =	1.39	m^3	Vp75-25 =	1.16	m^3
ap =	10.86	m^2	ap =	11.36	m^2	ap =	10.66	m^2
Tp75 =	1140	s	Tp75 =	1560	s	Tp75 =	1680	s
Tp25 =	4980	s	Tp25 =	5340	s	Tp25 =	5760	s
Infiltration Rate, f =	2.94E-05	m/s	Infiltration Rate, f =	3.24E-05	m/s	Infiltration Rate, f =	2.66E-05	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of the pit.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$

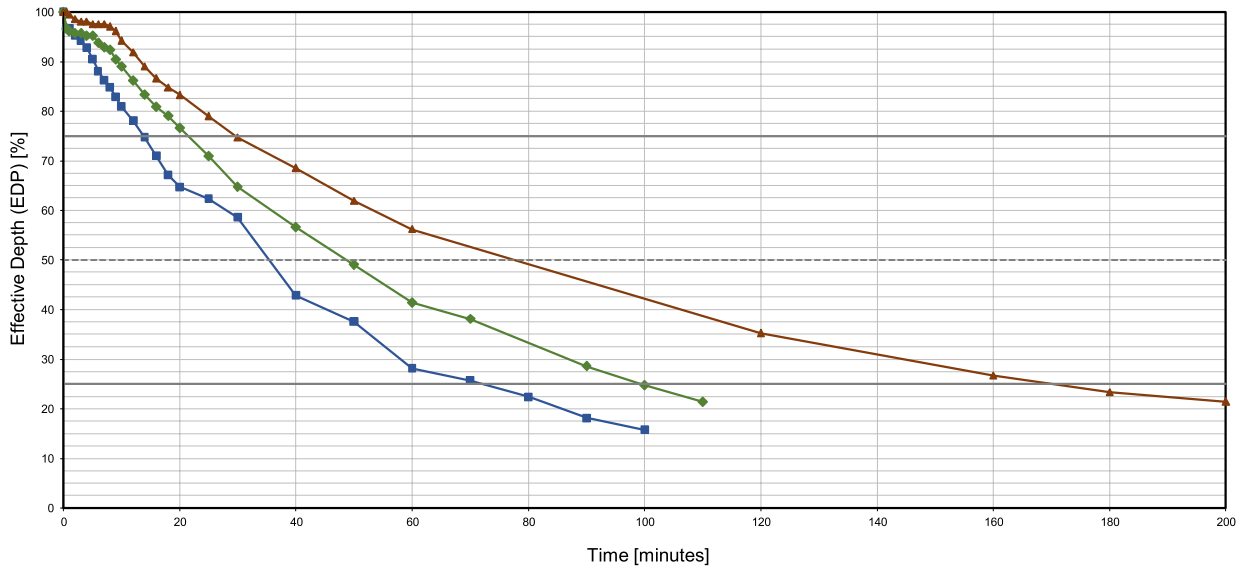
Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

NNB GENERATION COMPANY (SZC) LIMITED
Sizewell C Associated Developments: Northern and Southern Park and Ride, and Freight Mangement Facility Sites

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	7/27/2021	Operator	Ushie	Pit Depth	2.50 m	Location ID	STP213



Test 1			Test 2			Test 3		
Start Time =	13:40		Start Time =	15:20		Start Time =	9:15	
Test Top =	0.40	m BGL	Test Top =	0.40	m BGL	Test Top =	0.40	m BGL
Test Base =	2.50	m BGL	Test Base =	2.50	m BGL	Test Base =	2.50	m BGL
75% EDP =	0.93	m BGL	75% EDP =	0.93	m BGL	75% EDP =	0.93	m BGL
50% EDP =	1.45	m BGL	50% EDP =	1.45	m BGL	50% EDP =	1.45	m BGL
25% EDP =	1.98	m BGL	25% EDP =	1.98	m BGL	25% EDP =	1.98	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
0:00:00		0.40	100	0:00:00		0.40	100	0:00:00		0.40	100
0:00:30		0.47	97	0:00:30		0.47	97	0:00:30		0.40	100
0:01:00		0.47	97	0:01:00		0.48	96	0:01:00		0.41	100
0:02:00		0.50	95	0:02:00		0.49	96	0:02:00		0.43	99
0:03:00		0.52	94	0:03:00		0.49	96	0:03:00		0.44	98
0:04:00		0.55	93	0:04:00		0.50	95	0:04:00		0.44	98
0:05:00		0.60	90	0:05:00		0.50	95	0:05:00		0.45	98
0:06:00		0.65	88	0:06:00		0.53	94	0:06:00		0.45	98
0:07:00		0.69	86	0:07:00		0.55	93	0:07:00		0.45	98
0:08:00		0.72	85	0:08:00		0.56	92	0:08:00		0.46	97
0:09:00		0.76	83	0:09:00		0.60	90	0:09:00		0.48	96
0:10:00		0.80	81	0:10:00		0.63	89	0:10:00		0.52	94
0:12:00		0.86	78	0:12:00		0.69	86	0:12:00		0.57	92
0:14:00		0.93	75	0:14:00		0.75	83	0:14:00		0.63	89
0:16:00		1.01	71	0:16:00		0.80	81	0:16:00		0.68	87
0:18:00		1.09	67	0:18:00		0.84	79	0:18:00		0.72	85
0:20:00		1.14	65	0:20:00		0.89	77	0:20:00		0.75	83
0:25:00		1.19	62	0:25:00		1.01	71	0:25:00		0.84	79
0:30:00		1.27	59	0:30:00		1.14	65	0:30:00		0.93	75
0:40:00		1.60	43	0:40:00		1.31	57	0:40:00		1.06	69
0:50:00		1.71	38	0:50:00		1.47	49	0:50:00		1.20	62
1:00:00		1.91	28	1:00:00		1.63	41	1:00:00		1.32	56
1:10:00		1.96	26	1:10:00		1.70	38	2:00:00		1.76	35
1:20:00		2.03	22	1:30:00		1.90	29	2:40:00		1.94	27
1:30:00		2.12	18	1:40:00		1.98	25	3:00:00		2.01	23
1:40:00		2.17	16	1:50:00 AM		2.05	21	3:20:00 AM		2.05	21

Datum (-ve denotes AGL) = 0.00 m BGL.
Ground Level taken as Datum.

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021

Contract No. F187026

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	7/27/2021	Operator	Ushie	Pit Depth	2.50 m	Location ID	STP213

Test Details

Datum (-ve denotes AGL) =	0.00 m BGL	Well Screen	
		Well screen not used	
Pit Length =	4.00 m	Filter Material	
Pit Width =	0.80 m	Assumed Solid Fraction =	57.13 %
Pit Depth =	2.50 m BGL	Assumed Porosity =	42.87 %

Weather: Hot but grey

Geology: SAND and GRAVEL

Remarks

Test 3 tested on the following day.

Calculation

Test 1			Test 2			Test 3		
Start Time =	13:40		Start Time =	15:20		Start Time =	9:15	
Test Top =	0.40	m BGL	Test Top =	0.40	m BGL	Test Top =	0.40	m BGL
Test Base =	2.50	m BGL	Test Base =	2.50	m BGL	Test Base =	2.50	m BGL
EDP =	2.10	m	EDP =	2.10	m	EDP =	2.10	m
75% EDP =	0.93	m BGL	75% EDP =	0.93	m BGL	75% EDP =	0.93	m BGL
50% EDP =	1.45	m BGL	50% EDP =	1.45	m BGL	50% EDP =	1.45	m BGL
25% EDP =	1.98	m BGL	25% EDP =	1.98	m BGL	25% EDP =	1.98	m BGL
V =	6.72	m^3	V =	6.72	m^3	V =	6.72	m^3
Vg =	3.47	m^3	Vg =	3.47	m^3	Vg =	3.47	m^3
Vp =	3.25	m^3	Vp =	3.25	m^3	Vp =	3.25	m^3
Vp75-25 =	1.62	m^3	Vp75-25 =	1.62	m^3	Vp75-25 =	1.62	m^3
ap =	13.28	m^2	ap =	13.28	m^2	ap =	13.28	m^2
Tp75 =	840	s	Tp75 =	1320	s	Tp75 =	1800	s
Tp25 =	4320	s	Tp25 =	6000	s	Tp25 =	10200	s
Infiltration Rate, f =	3.51E-05	m/s	Infiltration Rate, f =	2.61E-05	m/s	Infiltration Rate, f =	1.46E-05	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of the pit.

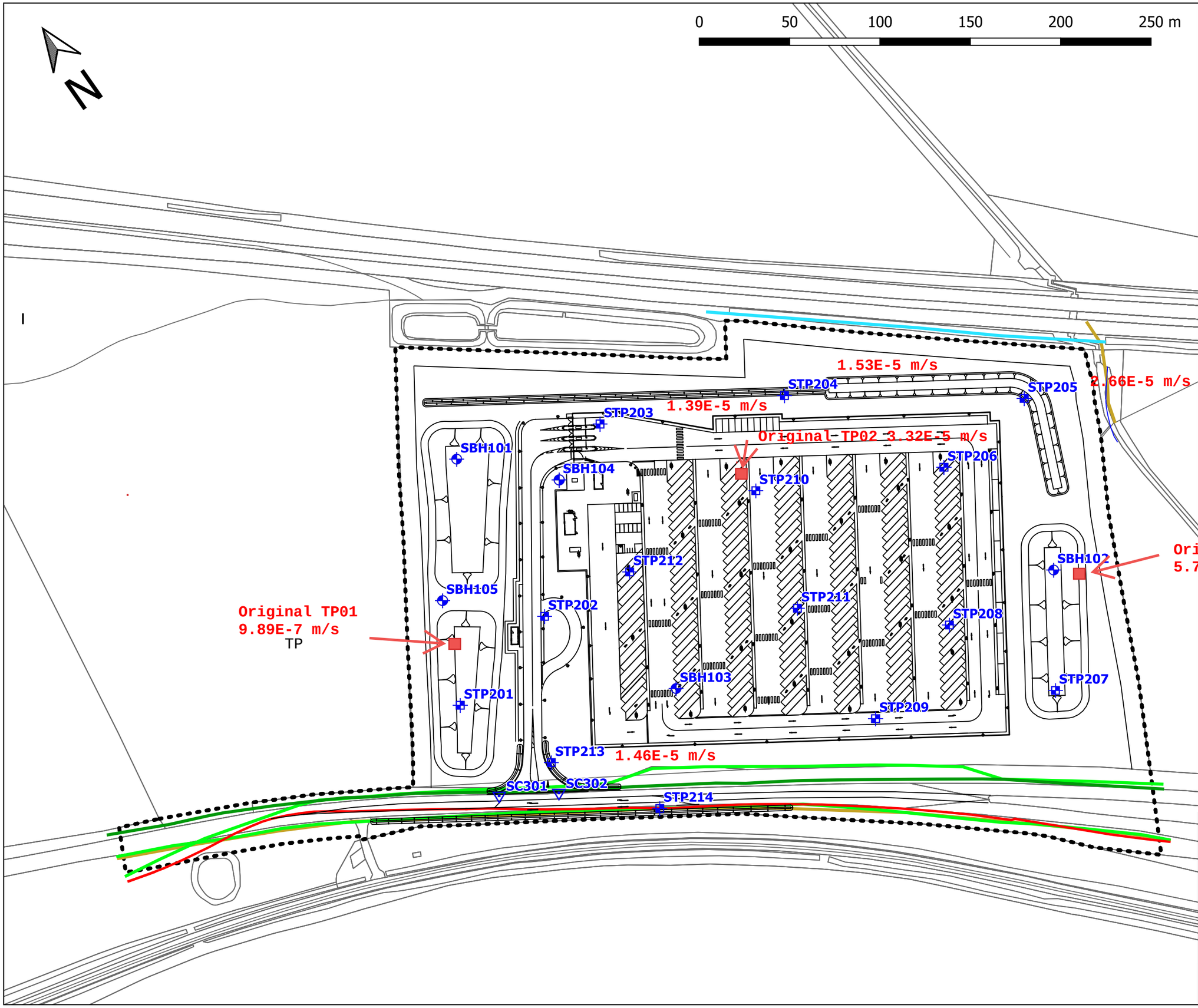
V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$

Input by AH 01/09/2021 Checked by JD 03/11/2021 Approved by SAF 04/11/2021



NOTES

1. All Dimensions in metres unless otherwise noted.

2. All coordinates are in metres relative to ordnance survey national grid (OS GB 36).

3. Utilities provided by Atkins on drawing no. 96057, dated 10/06/2021. Drawing notes: "Information on buried services is provided for information only and is based upon records available at the time of issue. Accuracy of information cannot be guaranteed and must be verified prior to undertaking any works."

4. STP214 to be located a minimum safe distance from adjacent utilities in accordance with requirements of all utility providers. Relocation of position to be agreed with Investigation Supervisor if necessary.

LEGEND

- Site Boundary

Proposed GI Locations

- Proposed Borehole
- Proposed Trial Pit
- Proposed Pavement Core

Utilities (Atkins, 10/06/2021)

- Anglian Water Water
- BT Openreach Telecoms
- Cadent Gas
- Highways Telent Telecoms
- UK Power Networks
- Virgin Media Telecoms

FOR CONSTRUCTION

PROJECT

Sizewell C
Associated Developments

eDF

TITLE

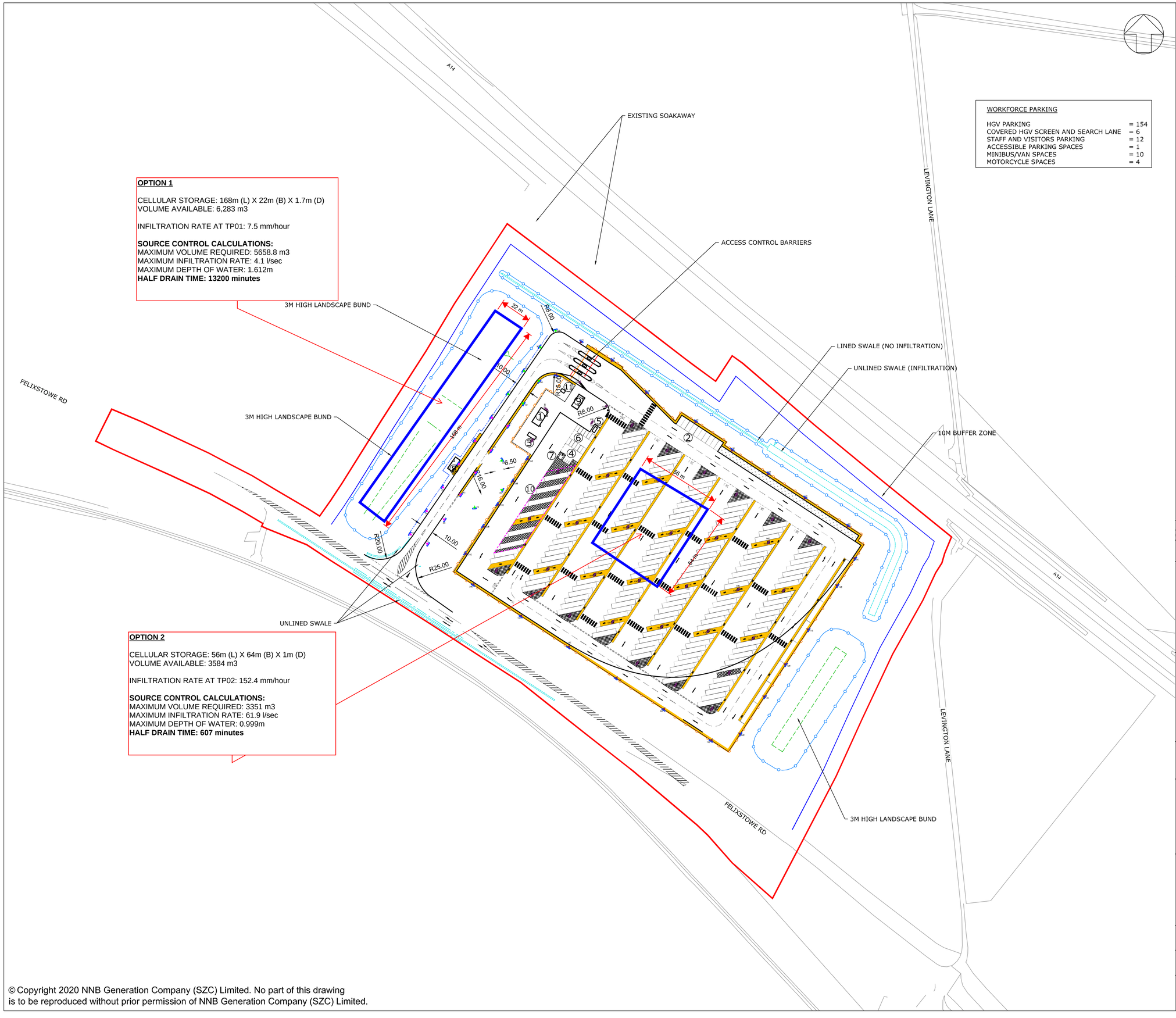
Freight Management Facility Site
Ground Investigation Layout

Royal HaskoningDHV
Enhancing Society Together

DRAWN	CHECKED	APPROVED
MGD	CH	PJ
DATE	SCALE AT A3	REF
24/06/2021	1:2000	-

DRAWING No.	Revision
PC1834-RHD-GI-ZZ-DR-G-0005	C1

APPENDIX B: OPTIONS 1 AND 2 STORAGE TANK LOCATIONS



OPTION 1

CELLULAR STORAGE: 168m (L) X 22m (B) X 1.7m (D)
VOLUME AVAILABLE: 6,283 m3

INFILTRATION RATE AT TP01: 7.5 mm/hour

SOURCE CONTROL CALCULATIONS:
MAXIMUM VOLUME REQUIRED: 5658.8 m3
MAXIMUM INFILTRATION RATE: 4.1 l/sec
MAXIMUM DEPTH OF WATER: 1.612m
HALF DRAIN TIME: 13200 minutes

OPTION 2

CELLULAR STORAGE: 56m (L) X 64m (B) X 1m (D)
VOLUME AVAILABLE: 3584 m3

INFILTRATION RATE AT TP02: 152.4 mm/hour

SOURCE CONTROL CALCULATIONS:
MAXIMUM VOLUME REQUIRED: 3351 m3
MAXIMUM INFILTRATION RATE: 61.9 l/sec
MAXIMUM DEPTH OF WATER: 0.999m
HALF DRAIN TIME: 607 minutes

WORKFORCE PARKING

HGV PARKING	= 154
COVERED HGV SCREEN AND SEARCH LANE	= 6
STAFF AND VISITORS PARKING	= 12
ACCESSIBLE PARKING SPACES	= 1
MINIBUS/VAN SPACES	= 10
MOTORCYCLE SPACES	= 4

NOTES:

1. Do not scale from this drawing. All dimensions are in metres unless noted otherwise.
2. For Lighting Column specifications see drawings SZC-SZ0204-FP-000-DRW-100031-32.
3. For HGV Search and Screen canopy see drawing SZC-SZ0204-FP-000-DRW-100104.

KEY:

- DEVELOPMENT SITE BOUNDARY
- (1) AMENITY AND WELFARE BUILDING (12M X 6M)
- (2) VAN / MINIBUS PARKING
- (3) SMOKING SHELTER (6M X 2.5M)
- (4) MOTORCYCLE PARKING
- (5) CYCLE SHELTER (4M X 2M)
- (6) STAFF AND VISITORS PARKING
- (7) ACCESSIBLE PARKING
- (8) SECURITY BOOTH (10M X 4M)
- (9) SECURITY BUILDING (10M X 5M)
- (10) COVERED HGV SCREEN & SEARCH LANE
- (11) PACKAGE TREATMENT PLANT
- BUFFER ZONE
- SECURITY FENCE (1.8M HIGH)
- ECOLOGICAL FENCING
- GATE
- SWALE (INDICATIVE)
- LANDSCAPE BUND
- PROPOSED DITCH (INDICATIVE)
- LANDSCAPING
- PEDESTRIAN WALKWAY
- MANUAL RISING ARM BARRIERS
- BOLLARD
- TACTILE PAVING
- PROPOSED LIGHTING COLUMNS (INDICATIVE)
- LIGHTING LANTERN DEMOUNTABLE SHIELD
- COVERED HGV SCREEEN AND SEARCH LANE

REVISION	DATE	DRAWN	CHECKED	REASONS FOR REVISION / COMMENTS	APPROVED
01	FEB 2020	NKS	KA	DCO SUBMISSION	PJ

NOT PROTECTIVELY MARKED

PROJECT:
SIZEWELL C

DOCUMENT:
APPLICATION DRAWING - FOR APPROVAL
REGULATION 5(2)(o)

DRAWING TITLE:
FREIGHT MANAGEMENT FACILITY
PROPOSED GENERAL ARRANGEMENT

DRAWING NO:	REVISION:
SZC-SZ0204-FP-000-DRW-100026	01

DATE:	DRAWN:	SCALE:
FEB 2020	NKS	1:1250@A1

SCALE BAR:
25m 0 25 50 75 100m
SCALE IN METRES 1:1250

APPENDIX C: OPTION 1 STORAGE TANK HYDRAULIC CALCULATIONS

Summary of Results for 100 year Return Period (+30%)

Half Drain Time exceeds 7 days.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	24.318	0.318	0.8	1117.5	O K
30 min Summer	24.418	0.418	1.1	1469.0	O K
60 min Summer	24.523	0.523	1.3	1835.6	O K
120 min Summer	24.652	0.652	1.7	2287.8	O K
180 min Summer	24.746	0.746	1.9	2620.5	O K
240 min Summer	24.823	0.823	2.1	2890.0	O K
360 min Summer	24.945	0.945	2.4	3317.0	O K
480 min Summer	25.037	1.037	2.6	3642.3	O K
600 min Summer	25.109	1.109	2.8	3892.8	O K
720 min Summer	25.165	1.165	3.0	4091.5	O K
960 min Summer	25.247	1.247	3.2	4377.5	O K
1440 min Summer	25.340	1.340	3.4	4704.4	O K
2160 min Summer	25.401	1.401	3.6	4919.6	Flood Risk
2880 min Summer	25.427	1.427	3.6	5011.2	Flood Risk
4320 min Summer	25.436	1.436	3.7	5041.6	Flood Risk
5760 min Summer	25.429	1.429	3.6	5018.9	Flood Risk
15 min Winter	24.356	0.356	0.9	1251.6	O K
30 min Winter	24.469	0.469	1.2	1645.3	O K
60 min Winter	24.586	0.586	1.5	2055.9	O K
120 min Winter	24.730	0.730	1.9	2562.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	127.140	0.0	31
30 min Summer	83.590	0.0	46
60 min Summer	52.260	0.0	76
120 min Summer	32.611	0.0	136
180 min Summer	24.934	0.0	196
240 min Summer	20.651	0.0	256
360 min Summer	15.843	0.0	376
480 min Summer	13.081	0.0	494
600 min Summer	11.214	0.0	614
720 min Summer	9.847	0.0	734
960 min Summer	7.943	0.0	974
1440 min Summer	5.750	0.0	1452
2160 min Summer	4.072	0.0	2172
2880 min Summer	3.160	0.0	2892
4320 min Summer	2.186	0.0	4328
5760 min Summer	1.683	0.0	5768
15 min Winter	127.140	0.0	31
30 min Winter	83.590	0.0	46
60 min Winter	52.260	0.0	76
120 min Winter	32.611	0.0	134

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
180 min Winter	24.836	0.836	2.1	2935.1	O K
240 min Winter	24.922	0.922	2.4	3237.0	O K
360 min Winter	25.058	1.058	2.7	3715.5	O K
480 min Winter	25.162	1.162	3.0	4080.0	O K
600 min Winter	25.242	1.242	3.2	4360.8	O K
720 min Winter	25.305	1.305	3.3	4583.5	O K
960 min Winter	25.397	1.397	3.6	4904.2	O K
1440 min Winter	25.501	1.501	3.8	5271.3	Flood Risk
2160 min Winter	25.570	1.570	4.0	5514.2	Flood Risk
2880 min Winter	25.600	1.600	4.1	5618.8	Flood Risk
4320 min Winter	25.612	1.612	4.1	5658.8	Flood Risk
5760 min Winter	25.607	1.607	4.1	5640.9	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
180 min Winter	24.934	0.0	194
240 min Winter	20.651	0.0	254
360 min Winter	15.843	0.0	372
480 min Winter	13.081	0.0	490
600 min Winter	11.214	0.0	608
720 min Winter	9.848	0.0	726
960 min Winter	7.943	0.0	964
1440 min Winter	5.750	0.0	1436
2160 min Winter	4.072	0.0	2144
2880 min Winter	3.160	0.0	2852
4320 min Winter	2.186	0.0	4240
5760 min Winter	1.683	0.0	5600

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	5760
Climate Change %	+30

Time Area Diagram

Total Area (ha) 4.691

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	1.172	4	8	1.173	8	12	1.173	12	16	1.173

Model Details

Storage is Online Cover Level (m) 25.700

Cellular Storage Structure

Invert Level (m) 24.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00750 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00750

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	3696.0	0.0	1.700	3696.0	4164.8

APPENDIX D: OPTION 2 STORAGE TANK HYDRAULIC CALCULATIONS

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 618 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	24.023	0.323	20.0	1099.9	O K
30 min Summer	24.122	0.422	26.1	1435.1	O K
60 min Summer	24.219	0.519	32.1	1766.7	O K
120 min Summer	24.328	0.628	38.9	2138.1	O K
180 min Summer	24.398	0.698	43.3	2377.5	O K
240 min Summer	24.448	0.748	46.3	2545.7	O K
360 min Summer	24.509	0.809	50.1	2755.0	O K
480 min Summer	24.544	0.844	52.3	2874.5	O K
600 min Summer	24.567	0.867	53.7	2952.3	O K
720 min Summer	24.581	0.881	54.6	3000.6	O K
960 min Summer	24.591	0.891	55.2	3033.6	O K
1440 min Summer	24.572	0.872	54.0	2969.7	O K
2160 min Summer	24.514	0.814	50.4	2770.6	O K
2880 min Summer	24.453	0.753	46.7	2564.5	O K
4320 min Summer	24.348	0.648	40.2	2208.0	O K
5760 min Summer	24.271	0.571	35.4	1944.7	O K
15 min Winter	24.062	0.362	22.4	1232.2	O K
30 min Winter	24.172	0.472	29.3	1608.3	O K
60 min Winter	24.282	0.582	36.0	1981.2	O K
120 min Winter	24.405	0.705	43.7	2400.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	127.140	0.0	30
30 min Summer	83.590	0.0	44
60 min Summer	52.260	0.0	72
120 min Summer	32.611	0.0	130
180 min Summer	24.934	0.0	188
240 min Summer	20.651	0.0	244
360 min Summer	15.843	0.0	360
480 min Summer	13.081	0.0	414
600 min Summer	11.214	0.0	474
720 min Summer	9.847	0.0	534
960 min Summer	7.943	0.0	668
1440 min Summer	5.750	0.0	942
2160 min Summer	4.072	0.0	1352
2880 min Summer	3.160	0.0	1756
4320 min Summer	2.186	0.0	2524
5760 min Summer	1.683	0.0	3296
15 min Winter	127.140	0.0	30
30 min Winter	83.590	0.0	44
60 min Winter	52.260	0.0	72
120 min Winter	32.611	0.0	128

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
180 min Winter	24.485	0.785	48.6	2672.6	O K
240 min Winter	24.542	0.842	52.2	2865.3	O K
360 min Winter	24.613	0.913	56.6	3109.8	O K
480 min Winter	24.651	0.951	58.9	3236.5	O K
600 min Winter	24.672	0.972	60.2	3309.1	O K
720 min Winter	24.685	0.985	61.0	3355.0	O K
960 min Winter	24.688	0.988	61.2	3364.6	O K
1440 min Winter	24.650	0.950	58.8	3233.2	O K
2160 min Winter	24.563	0.863	53.5	2937.8	O K
2880 min Winter	24.481	0.781	48.4	2657.8	O K
4320 min Winter	24.347	0.647	40.1	2203.3	O K
5760 min Winter	24.253	0.553	34.2	1881.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
180 min Winter	24.934	0.0	184
240 min Winter	20.651	0.0	240
360 min Winter	15.843	0.0	350
480 min Winter	13.081	0.0	452
600 min Winter	11.214	0.0	484
720 min Winter	9.848	0.0	560
960 min Winter	7.943	0.0	712
1440 min Winter	5.750	0.0	1012
2160 min Winter	4.072	0.0	1444
2880 min Winter	3.160	0.0	1856
4320 min Winter	2.186	0.0	2676
5760 min Winter	1.683	0.0	3456

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	5760
Climate Change %	+30

Time Area Diagram

Total Area (ha) 4.691

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	1.172	4	8	1.173	8	12	1.173	12	16	1.173

Model Details

Storage is Online Cover Level (m) 25.700

Cellular Storage Structure

Invert Level (m) 23.700 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.15240 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.15240

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	3584.0	0.0	1.001	0.0	2927.2
1.000	3584.0	2927.2			

APPENDIX E: POLLUTION MITIGATION MEASURES ASSESSMENT

FMF POLLUTION MITIGATION MEASURES

12.2 Introduction

The purpose of this technical note is to provide an assessment to demonstrate that the proposed drainage infrastructure for the FMF will provide treatment train facilities to mitigate unacceptable risk of pollution to the water environment. As agreed with Suffolk County Council, the CIRIA C753 SuDS Manual Simplified Index Approach has been applied as an appropriate tool.

12.3 Proposed Drainage Strategy

Following infiltration testing it is confirmed that removal of surface water runoff and disposal by infiltration to ground is viable. There would normally be a preference for infiltration to be achieved by above ground infrastructure in the form of swales and infiltration basins etc, because they have better access for maintenance and provide biodiversity and amenity benefits. However, in this case given the development layout within the site extent, there is insufficient space for such infrastructure and so infiltration is proposed to be achieved predominantly by use of underground infrastructure within the site.

12.4 Proposed Drainage Infrastructure

The proposed drainage infrastructure is described in the Environmental Statement submitted as part of DCO submission. Its subsequent development and the current proposals are described in the main body of this report.

In summary, at DCO submission stage it was proposed that all the internal roads and the HGV parking areas will have an impermeable surface. Surface water runoff will be drained via surface outlets, gullies, linear channels and drains etc. These will discharge into underground carrier drains.

Bypass interceptors will be installed on the carrier drains downstream of the bus/HGV standing areas in order to remove hydrocarbon and silt contaminants which will improve the water quality of the runoff before discharge to ground.

The underground carrier drains which will discharge all surface water runoff into two underground attenuation storage tanks from where it will infiltrate to ground.

Roofs will be drained to the carrier drains.

Unpaved areas will drain directly by infiltration to ground.

12.5 Simplified Index Approach (SIA) Assessment

The SIA methodology considers the relative potential pollution risk based on land use and assigns a level of risk. Based on the risk it then assigns indices for three pollutants, these being Total Suspended Solids, Metals and Hydrocarbons.

This is shown in Table 26.2, reproduced from the CIRIA SuDs Manual and reproduced below.

12.5.1 CIRIA SuDS Manual Table 26.2

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, **residential car parks, low traffic roads** (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent **change (eg schools, offices) ie < 300 traffic movements/day**	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all **roads except low traffic roads and trunk** roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used **or manufactured; industrial sites; trunk** roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

Notes

1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

2 These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

Where a site land use falls outside the defined categories, the indices should be adapted (and agreed with the drainage approving body) or else the more detailed risk assessment method should be adopted.

Where nutrient or bacteria and pathogen removal is important for a particular receiving water, equivalent indices should be developed for these pollutants (if acceptable to the drainage approving body) or the risk assessment method adopted.

Once the level of risk has been selected, the indices for the pollutants are confirmed. Appropriate pollution control measures are then selected. These are shown in Table 26.4 below.

12.5.2 CIRIA SuDS Manual Table 26.2

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates[1]	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.6[4]	0.5	0.6
A soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.4[4]	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.4[4]	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.8[4]	0.8	0.8
Proprietary treatment systems[5, 6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

Each measure is assigned an indice. If only one measure is used. then the indice for that measure is applied. Providing the Table 26.4 indices for each pollutant are equal or greater than those stated in Table 26.2 then the measure is considered to provide appropriate mitigation. If the value is less, then additional treatment measures are required. However, for each additional measure the mitigation indices values are divided by two.

It should be noted that Indices are not provided for Proprietary Treatment Systems. These have to be obtained from the manufacturer/supplier.

12.6 Application of SIA to FMF

Based on Land Use descriptions it is considered that FMF has a high pollution hazard level. From CIRIA SuDS Manual Table 26.2 the indices shown in Table 1 apply

12.6.1 Table 1 Selected Pollution Hazard Level Indices

Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
High	0.8	0.8	0.9

The proposed drainage infrastructure which removes the surface water runoff and can mitigate pollutants consists in order of use of the following

- Gullies and linear channels

- Catchpit manholes
- Bypass Separators
- Underground Storage Tank

Regulators will often decline to recognise the use of gullies and catchpit manholes on the basis that whilst they will settle out solids and hold back liquids, everything can be remobilised during follow on more intense rainfall events. Therefore, no contribution to mitigation indices has been considered for FMF.

Based on available information and consultation with suppliers, mitigation indices for Bypass Separators, Vortex Separators and Underground Storage Tanks have been obtained as shown in Table 2 below

12.6.2 Table 2 Proposed SuDS Mitigation Indices

Infrastructure	Total Suspended Solids	Metals	Hydrocarbons
Bypass Separator	0.4	0.4	0.8
Underground Storage Tank	0.5	0.2	0.5
Vortex Separator	0.5	0.4	0.8

Applying these values to the DCO design with bypass separator and underground storage tank would give total mitigation indices result as shown in Table 3 below

12.6.3 Table 3 Combined SuDS Mitigation Indices

Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
High	0.8	0.8	0.9
Mitigation	0.4 + 0.5/2 =0.65	0.4 +0.2/2 = 0.5	0.8 +0.5/2 = 0.65

This demonstrates that the DCO design does not provide sufficient mitigation. If in addition vortex separators are added the mitigation indices increase as shown in Table 4 below.

12.6.4 Table 4 Compliant Combined SuDS Mitigation Indices

Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
High	0.8	0.8	0.9
Mitigation	0.4 + 0.5/2 + 0.5/2 = 0.9	0.4 + 0.2/2 + 0.4/2 = 0.7	0.8 + 0.5/2 + 0.8/2 = >0.95

12.7 Conclusion

The SIA calculations demonstrate that a combination of bypass separators and underground storage tanks proposed at DCO submission stage, do not provide adequate pollution mitigation for the protection of groundwater. However, if in addition, vortex separators are added mitigation indices for total suspended solids and hydrocarbons are achieved. The metals mitigation is almost achieved and given the nominal shortfall, it is proposed that this can be addressed at detailed design stage.

12.8 Addition of biochemical treatment

In their review of this document, SCC responded by email dated 12 October 2022 confirming approval of the methodology but not the conclusion. SCC state that reliance on manufactured devices alone is not acceptable. Measures are required to treat dissolved pollution constituents by adsorptive filtration or some type of biochemical process. In discussion SCC have advocated some form of biofiltration trench. It is proposed that bioretention trenches be installed using GreenBlue Hydroplanter trench units. These will be located at the rear of lorry parking bays. The units will collect and provide treatment to runoff. The units will allow treated runoff to be removed through the base into a filter drain which will discharge into the underground storage tanks where the runoff will infiltrate to ground.

12.9 Proposed treatment

In addition to concerns regarding lack of biofiltration, SCC has also suggested that they are sceptical regarding any benefit provided by storage tanks. The indices used for the underground storage tank units the required level of mitigation can be provided using the mitigation measures shown in Table 5 below biomat and a permafilter treatment geotextile. By including the GreenBlue Hydroplanter trench units the required level of mitigation can be provided using the mitigation measures shown in Table 5 below.

12.9.1 Table 5 Lorry Parking Area Mitigation Indices

Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
High	0.8	0.8	0.9
Mitigation – Bioretention Trench	0.8	0.8	0.8
Infiltration Trench	0.4	0.4	0.4
Mitigation	0.8 + 0.4/2 = >0.95	0.8 + 0.4/2 = >0.95	0.8 + 0.4/2 = >0.95

For the entrance and circulatory road, from CIRIA SuDS Manual Table 26.2 the pollution hazard level is Medium rather than High. The required level of mitigation can be provided using the mitigation measures shown in Table 6 below

12.9.2 Table 6 Entrance and circulatory roads

Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Medium	0.7	0.6	0.7
Vortex Separator	0.5	0.4	0.8
Bypass Separator	0.4	0.4	0.8
Mitigation	0.5 + 0.4/2 = 0.7	0.4 + 0.4/2 = 0.6	0.8 + 0.8/2 = >0.95

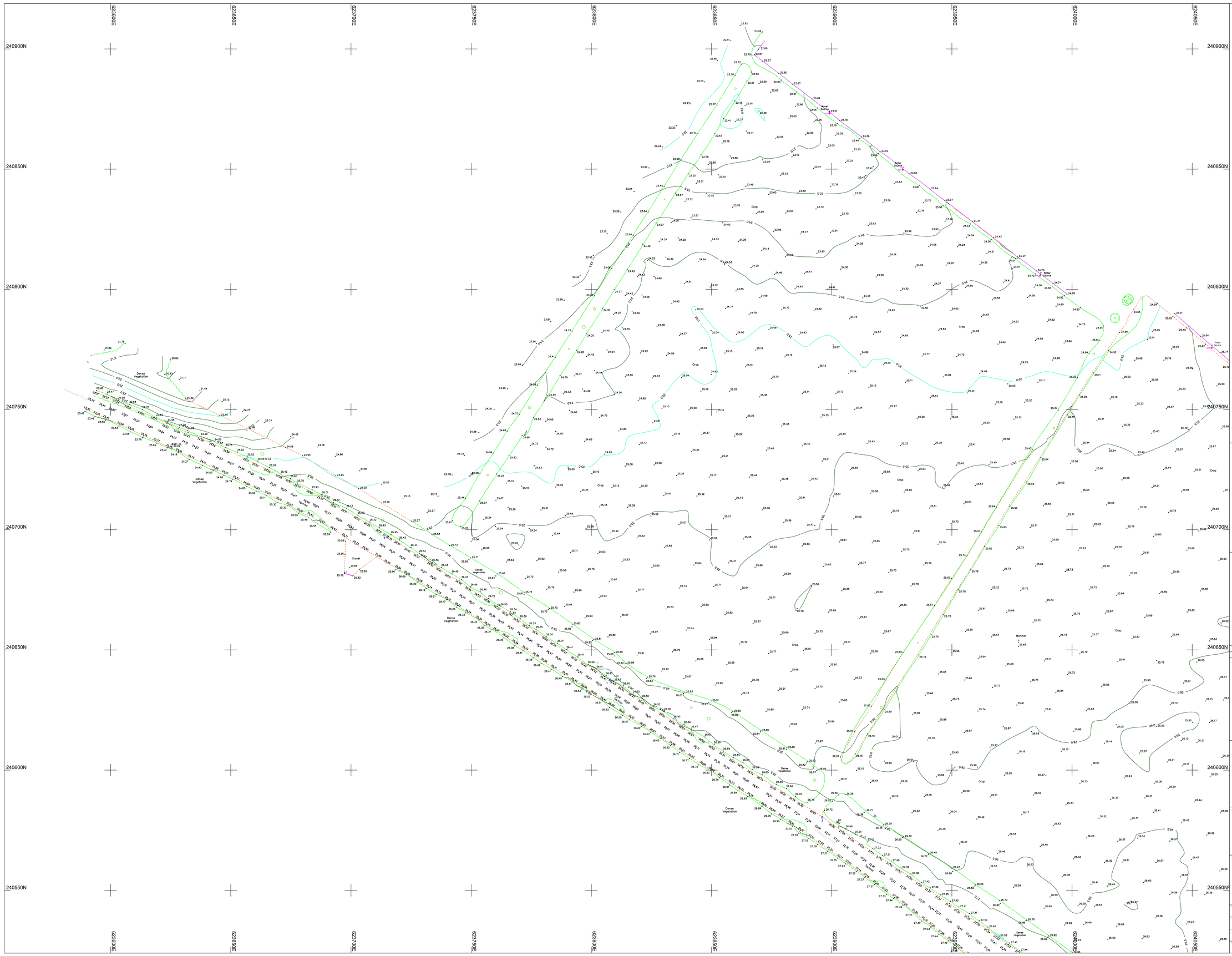
12.10 Final Conclusion

As proposed at DCO submission stage the site access entrance will be drained via swales. The swales shown in the DCO submission layout drawing will be provided. Runoff collected in the swales will be disposed by infiltration to ground.

The roofs and circulatory roads will be drained via gullies and carrier drains via bypass and vortex separators to underground storage tanks where runoff will be disposed by infiltration to ground.

As requested by SCC, for the lorry parking area, which presents a higher level of pollution risk, runoff will pass through GreenBlue Hydroplanter bioretention trenches into an infiltration trench with runoff which does not infiltrate directly to ground discharging into underground storage tanks where runoff will be disposed by infiltration to ground.

APPENDIX F: EXISTING TOPOGRAPHY



Link Feature Legend

- Bottom of bank
- Building
- Building Overhang
- Ditch
- Fence
- Foliage
- Hedge
- Kerb
- Low Kerb
- Pipeline
- Stream
- Top of bank
- Verge
- Wall
- Water Line

Point Feature Legend

- Air Valve (AV)
- O.S. Benchmark (BM)
- Bollard (BO)
- Borehole (BH)
- Bus Stop (BUS)
- British Telecom (BTI)
- Cable T.V. (CTV)
- Culvert (CUL)
- Drain (DR)
- Electricity Pole (EPO)
- Earth Rod (ERod)
- Fire Hydrant (FH)
- Gas Valve (GV)
- Gully (GU)
- Inspection Cover (IC)
- Invert Level (IL)
- Kerb Outlet (KO)
- Lamp Post (LP)
- Manhole (MH)
- Meter (MET)
- Marker Post (MP)
- Post (P)
- Rodding Eye (RE)
- Road Sign (RS)
- Spot level (+)
- Stop Cock (SC)
- Stop Valve (SV)
- Telegraph Pole (TP)
- Threshold Level (T)
- Traffic Signal (TS)
- Trial Pit (TP)
- Ridge Level (Ridge HT)
- Eaves Level (Eaves HT)

Tree (To scale)

SURVEY IS ROTATED TO GRID NORTH.

Notes:

Horizontal Control points are relative to the NATIONAL GRID.

All levels are relative to ORDNANCE DATUM.

RTK corrections were obtained using the Trimble VRS Active Network.

CONTROL STATION COORDINATES

STN	EASTING	NORTHING	LEVEL
1	623807.753	240637.480	26.471
2	623896.047	240580.545	26.915
3	623713.843	240697.971	26.297

Aspect
Land + Hydrographic Surveys
CHARTERED SURVEYORS
Thornhouse Business Centre
Ballot Road
Irvine
KA12 0HW
Tel : 01294 313399
Fax : 01294 313389
E-mail: mail@aspectsurveys.com
Web: www.aspectsurveys.com

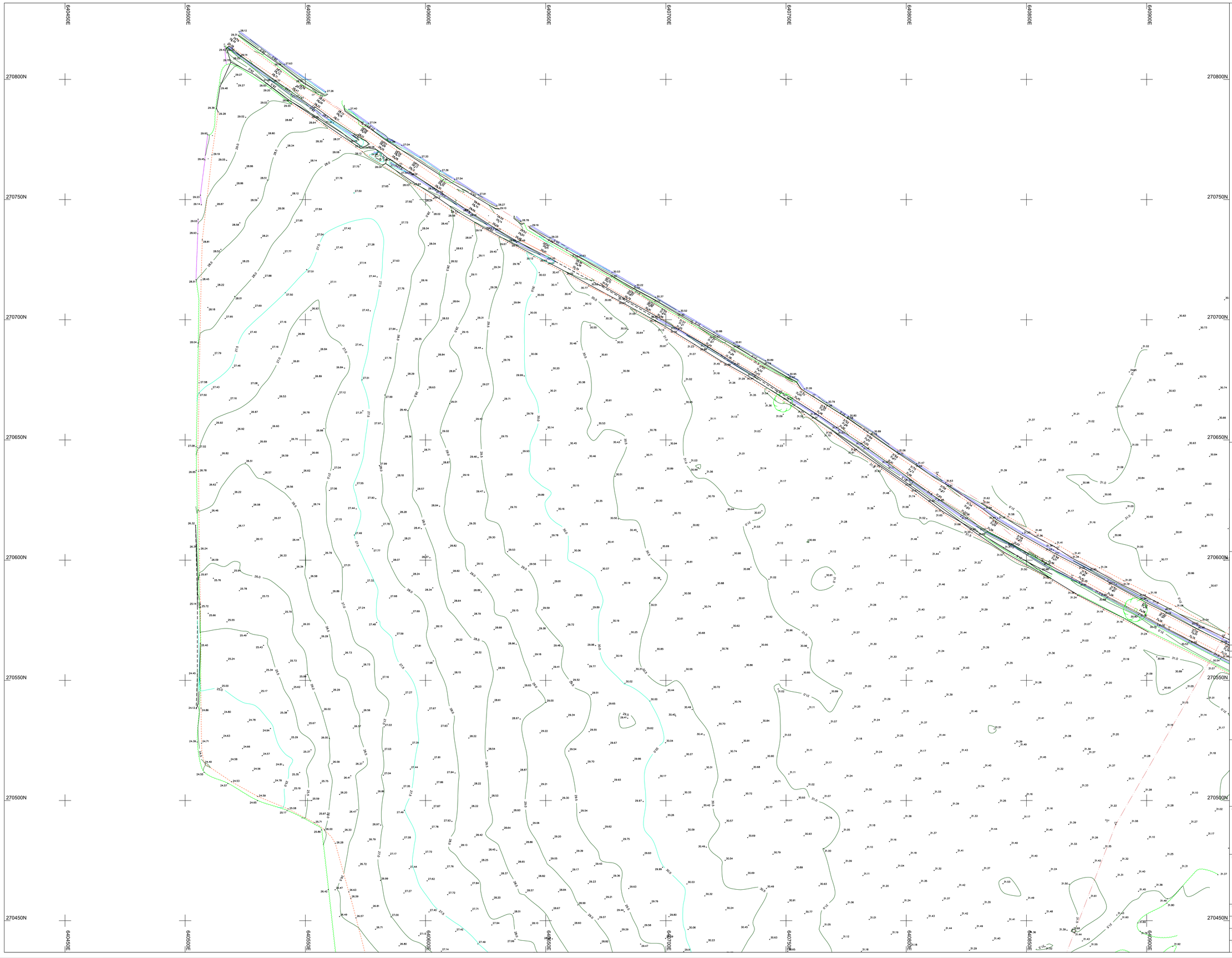
Client :

FUGRO GEOSERVICES LTD
ARMSTRONG HOUSE
UNIT 43, NUMBER ONE INDUSTRIAL ESTATE
MEDOMSLEY ROAD
CONSETT
DH8 6TW

Project Title :

TOPOGRAPHIC SURVEY
FREIGHT MANAGEMENT FACILITY
SIZEWELL C POWER STATION
SUFFOLK

Project No: A7769	Scale : 1:500
Surveyed date : 15th July 2021	Issued date : 27th July 2021
Surveyed by : AJS	Checked by: SJS
Sheet No. : 1 of 2	Plot Scale: 1:1 @ A0



Link Feature Legend

- Bottom of bank
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- Building Overhang
- Ditch
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- Top of bank
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- Air Valve (AV)
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- Cable T.V. (CTV)
- Culvert (Culv)
- Drain (D)
- Electricity Pole (EP)
- Earth Rod (Erod)
- Fire Hydrant (FH)
- Gas Valve (GV)
- Gully (G)
- Inspection Cover (IC)
- Invert Level (IL)
- Kerb Outlet (KO)
- Lamp Post (LP)
- Manhole (MH)
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- Marker Post (MP)
- Post (P)
- Rodding Eye (RE)
- Road Sign (RS)
- Spot level (+)
- Stop Cock (SC)
- Stop Valve (SV)
- Telegraph Pole (TP)
- Threshold Level (T)
- Traffic Signal (TS)
- Trial Pit (TP)
- Ridge Level (Ridge HT)
- Eaves Level (Eaves HT)

Tree (To scale)

SURVEY IS ROTATED TO GRID NORTH.

Notes:

Horizontal Control points are relative to the NATIONAL GRID.

All levels are relative to ORDNANCE DATUM.

RTK corrections were obtained using the Trimble VRS Active Network.

CONTROL STATION COORDINATES

STN	EASTING	NORTHING	LEVEL
1	641125.267	270660.322	29.056
2	641045.690	270517.585	31.223
3	641189.808	270796.113	27.835
4	640578.741	269811.108	24.330
5	640645.135	269872.747	26.274
6	640710.303	269963.040	28.712

Aspect
Land + Hydrographic Surveys
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Tel : 01294 313399 Fax : 01294 313389
E-mail: mail@aspectsurveys.com
Web: www.aspectsurveys.com

Client :

FUGRO GEOSERVICES LTD
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UNIT 43, NUMBER ONE INDUSTRIAL ESTATE
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CONSETT
DH8 6TW

Project Title :

TOPOGRAPHIC SURVEY
NORTHERN PARK AND RIDE SITE
SIZEWELL C POWER STATION
SUFFOLK

Project No: A7769	Scale : 1:500
Surveyed date : 13th July 2021	Issued date : 28th July 2021
Surveyed by : AJS	Checked by: RM
Sheet No. : 2 of 4	Print Scale: 1:1 @ A0

APPENDIX G: RECORD OF SCC COMMENTS AND SZC ACTIONS

SCC Comment	SZC Action
I don't entirely support the methodologies used for calculating adequate storage. The use of average infiltration rates in particular will not draw support from SCC. However, I also note the additional infiltration testing that was undertaken in 2021 which demonstrates good infiltration across the site, often in exceedance of the design rate you have used based on the results of 2019 testing. Whilst the 2021 testing is slightly deeper than we would like, it is not of a depth to cause significant concern	It is agreed that there is now sufficient data to demonstrate the viability of removal of runoff and its disposal by infiltration at locations to be confirmed at detailed design.
The main outstanding concern SCC have for FMF is in relation to treatment. The document makes multiple references to the use of bioremediation areas in order to supplement proposed treatment and to provide a natural form of treatment, as opposed to the 'mechanical heavy' treatment train previously proposed. Appendix B does not make any acknowledgement of the space requirements of bioretention features and Appendix E does not include these features in a pollution assessment. This approach does not have SCC support. The current pollution assessment in Appendix E uses indices for 3 pieces of infrastructure without supporting evidence of the values used. The indices for the underground storage tank are particularly questionable as I have never seen anyone claim that such a feature delivers any form of treatment. There is a brief reference to bioretention in the conclusion, but again, this is insufficient.	Full detail is provided in new Section 11 and includes a plate showing proposed location for the hydroplanter bioremediation areas and confirms no adverse impact on site layout. Appendix B is not relevant since the hydroplanters are at the surface. Appendix E has been updated to include the hydroplanters. Since the result show no requirement for the underground storage tanks to contribute to the treatment train these have been removed from the calculation.
7.1.2 document acknowledges SCC's position, subject to the inclusion of bioretention in the treatment train, this position remains unchanged	It is understood that as noted in 7.1.12 SCC accept the necessity for underground storage subject to the provision of bioremediation as part of the infrastructure.
Calculations for Option 2 have a water depth of 1.142m but the crates are only 0.6m	Revised calculations provided in Appendix C
Water depths stated on drawing in Appendix B do not match calculations in Appendix C	Water depths updated to align with calculations