Calcinotto

civil and structural engineers

114522
Sussexdowns
Sussexdown House
Washington Road
Pulborough
RH20 4DA

S73 Drainage Condition Discharge Report
For Sussexdowns

May 21st 2025
Revision P02

Produced By
Daniel Bott
Senior Civil Engineer

Checked By
Mark Dewson
Director of Civil Engineering

Rev	Date	Description	By	Approved
P01	14-04-2025	First Issue	DB	MD
P02	21-05-2025	CVs increased to 1 and FEH2022 data used. Clarification added regarding infiltration strategy.	DB	MD

Calcinotto

Content

Drainage Statement for Discharge of Drainage Condition 7 for Sussexdowns.

Section	Title	Page
1	Introduction	1
2	Infiltration Testing	3
3	Drainage Changes	4
4	Summary of Design and Calculations	5
5	Summary	6

Appendix	Title	
A	Proposed Site Layout	8
B	Infiltration Testing Results – June 2022	9
C	Infiltration Testing Results – March 2025	10
D	Current Drainage Layout Plans	11
E	Drainage Hydraulic Calculations	12

1 Introduction

1.1 Site Location

Calcinotto Ltd have been appointed by Care South to prepare a technical note for submission as part of condition 7 of the Section 73 planning approval/decision notice, which relates to the infiltration testing to support the surface water drainage scheme for the development. The site is bounded by residential housing along the north and west boundary, with an existing quarry bordering the south and east boundary line. The latest site layout is presented within Appendix A.

1.1.1 The application site has an area of 1.81 Ha. The nearest postcode is RH20 4DA and national grid reference is TQ 09367 13994. The site location can be seen in Figure 1 below.



Figure 1. Site Location OS Background

1.1.2 Following the updated planning information issued for the development proposals as part of a Section 73 application, Horsham District Council provided a list of conditions applied to the development to enable the commencement of works on site. This technical note seeks to address the pre-commencement condition 7 which relates to the infiltration testing to be carried out to support the surface water drainage design for the proposed development.

1.1.3 This report also acknowledges pre-occupation condition 20, which is a further condition placed against the drainage to be addressed post-construction.

1.2 Drainage Condition 7

1.2.1 Drainage condition 7 received as part of the decision notice (Ref: DC/24/1985) is worded as follows: -

'No development excepts for the construction of the access serving the development, shall be carried out until the relevant revised/additional infiltration testing has been completed, in order to inform a drainage strategy for the proposed means of foul and surface water disposal, which shall then be submitted to and approved in writing by the Local Planning Authority. The development shall be carried out in accordance with the approved scheme.'

Reason: As this matter is fundamental to ensure that the development is properly drained and to comply with Policy 38 of the Horsham District Planning Framework (2015).

1.3 Drainage Planning Condition 20

1.3.1 Further to the above, a drainage-related condition has been placed on the development, which is to be addressed prior to occupation.

1.3.2 The wording of Condition 20 is as follows: -

Prior to the first occupation (or use) of the development hereby permitted, a verification report demonstrating that the SuDS drainage system for that phase has been constructed in accordance with the approved design drawings shall be submitted to and approved by the Local Planning Authority. The development shall be maintained in accordance with the approved report.

Reason: To ensure a SuDS drainage system has been provided to an acceptable standard to reduce the risk of flooding, to improve and protect water quality, improve habitat and amenity, and ensure future maintenance in accordance with Policies 35 and 38 of the Horsham District Planning Framework (2015) and Policies 14 and 15 of Storrington and Sullington and Washington Neighbourhood Plan (2019)

1.4 Further LLFA Comments

1.4.1 Following submission of the first iteration of this note, West Sussex Council provided a response siting issues with the submission, these are summarised as follows:-

- In the calculations, out of date parameters are being used (Cv value 1 and FEH2022 needed)
- It is unclear how the staff parking in the north of the site is connected to the wider network.
- Storage features which are not designed to infiltrate (the attenuation tank) should not have infiltration in the calculations.

1.4.2 Section 6 has been included further into this note to directly address the comments presented above, in addition to updated drainage layout plans and hydraulic calculations in Appendices D and E respectively.

2 Infiltration Testing

2.1 Infiltration testing was conducted in June 2022 which yielded positive results in 2 areas of the site, located both in front of the existing care home building and in the lower western landscape area which is to become the western car park.

2.2 The previous testing concluded worst case results of $7x10^{-6}$m/s in the western landscaping area (TP1) and $2.5x10^{-5}$m/s in the car park in front of the existing Sussexdown House care home building (TP2). Both trial pits had 3 full BRE365 complaint tests undertaken in each, which are sufficient for use within the design of Soakaway 1 and Soakaway 3, presented in the originally submitted foul and surface drainage design (revision P6) for the Section 73 application.

2.3 Testing was not carried out in the rear garden area, which was the location of Soakaway 2 on the previous surface water design. Therefore, additional testing was instructed to confirm the viability and design rate for the design of the soakaway located in the rear courtyard of the proposed development.

2.4 Further testing was conducted in March 2025 by Ground and Water Limited in the location of the rear courtyard (TP3). This testing resulted in a poor rate of $9.55x10^{-7}$m/s being recorded from an incomplete test This poor test rate was found to be the result of the presence of clays within the trial pit, in addition to the more permeable sands found in the Folkstone Formation across the site. This therefore meant that a soakaway situated in the rear courtyard was no longer a viable solution for the surface water drainage design.

2.5 A further additional single test was carried out again in the lower western landscaping area which produced a further good result of $1.97x10^{-5}$m/s (TP4), further supplementing and reinforcing the previous results provided in the same area at TP2. Full BRE365 testing was not carried out in this location due to the previous full testing done in this area, however this additional test provided comfort that the western landscape area is still viable for an infiltration discharge. Despite a higher result produced in the 4th test in this location, the original worst-case result of $7x10^{-6}$m/s is still being adopted as the design rate within the surface water design calculations.

2.6 The previous full BRE365 testing results undertaken in June 2022 are provided in Appendix B which set the design rates for the 2 soakaways proposed within the site, with the latest March 2025 failed test result in the rear courtyard and further 4th test undertaken in the western landscape area provided in Appendix C.

3 Drainage Changes Resulting from Updated Infiltration Testing

3.1 The failed infiltration test result in the rear courtyard resulted in a slight change in strategy presented within the foul and surface water drainage layout drawings submitted for the initial Section 73 application, which originally showed 3 infiltration tanks in the front car park, rear courtyard and western car park.

3.2 Due to the presence of clays in the rear courtyard and failed infiltration test result, Soakaway 2 of the previous design was omitted and instead replaced with an attenuation tank (Attenuation Tank 2), which is now connected into the gravel trench soakaway located within the western car park, where full BRE365 testing revealed a worst-case result of $7x10^{-6}$m/s (out of the 3 tests undertaken). Attenuation Tank 2 is sized at 12m x 12m x 0.8m to ensure all storm events up to the 1 in 100 year + climate change event are captured below ground without flooding.

3.3 The gravel trench soakaway located in the western car park has been increased in width from 1.5m x 40m x 0.8m to 3m x 40m x 0.8m, to cope with the additional flow entering from Attenuation Tank 2. By keeping this soakaway as a gravel filled trench (rather than a geo-cellular soakaway), this ensures minimum half drain times can be achieved, despite the relatively low design infiltration rate adopted. The upstream attenuation tank acts as an overflow storage system to store flows backing up from the gravel soakaway during extreme storm events.

3.4 Another key change from the previously submitted design is the separation of the drainage system at Soakaway 1, which is no longer linked to the drainage system in the rear courtyard, where the omitted Soakaway 2 was situated. The Soakaway 1 drainage system therefore acts independently of the Soakaway 3/Attenuation Tank 2 surface water drainage system, with a greater amount of impermeable area now diverted-to and drained by the lower Soakaway 3 system.

3.5 The latest updated drainage design drawings are presented in Appendix D of this report

4 Summary of Design and Calculations

4.1 The latest hydraulic calculations have been updated to reflect the changes in the design presented in Appendix D and Section 3 above, as a result of the failed infiltration test conducted in the rear courtyard.

4.2 2 sets of hydraulic model results are provided for the Soakaway 1 and Soakaway 3 drainage system respectively. Both drainage systems act independently of one another and are not linked, with Soakaway 1 serving the higher-level central car parking area and upper ground floor level roof areas of the 3 proposed buildings. The Soakaway 3 drainage system serves the lower ground floor roof areas of Block A and Block B and the rear roof line of the Care Home building, in addition to the lower-level western car parking area. All impermeable areas generated from the proposed development are captured within the surface water hydraulic models.

4.3 The surface water drainage systems have been modelled against 5-year, 30-year plus 40% climate change and 100-year plus 45% climate change simulated storm events, for all durations up to 10080-minutes.

4.4 FEH rainfall data has been used within the design, with the MADD factor set to 0 to allow for no additional peripheral storage prior to runoff entering the surface water drainage system.

4.5 All sections of permeable paving are modelled within the design, to ensure that sufficient sub-base storage depths are provided to capture the impermeable areas that they serve. All permeable paving areas have an overflow to the site surface water drainage systems.

4.6 Soakaway 1 has been modelled using a design infiltration rate of $2.5x10^{-5}$m/s, with Soakaway 3 modelled using a rate of $7x10^{-6}$m/s. Both rates used within the design represent the worst result out of the 3 successful tests undertaken in TP1 and TP2. The infiltration rates are applied to the sides of the soakaway only in accordance with BRE365, to account for the accumulation of slit and ultimately reduced performance in the base over time.

4.7 The half drain time for Soakaway 1 and Soakaway 3 are demonstrated within the hydraulic calculations to be complaint with the 24-hour (1440 minute) limit. These are 875 minutes and 1163 minutes for Soakaways 1 and 3 respectively.

4.8 The 100-year + 45% climate change results presented for the Soakaway 1 network does produce very minor amount of flooding at manhole S14, measured at $0.6844m^3$, however this amount of flooding does not constitute a risk to life or infrastructure and will be retained on-site. There is sufficient capacity within the permeable paving during the same storm event to capture additional exceedance and overland flows.

4.9 Hydraulic calculations are situated in Appendix E, which demonstrate the system working for all the necessary storm events, using the adopted worst-case BRE365 infiltration rates presented in Section 2 above.

5 Summary

5.1 This technical note has been written to address the requirements of Condition 7 of the Section 73 decision notice for application DC/24/1985. The proposed site layout plan for the submitted Section 73 condition variation application is presented in Appendix A.

5.2 In summary, the requirements of the condition that this technical note seeks to address are to complete the relevant revised/additional infiltration testing to inform a detailed drainage strategy for the proposed means of foul and surface water disposal

5.3 The infiltration testing produced in Appendix B inform the design rates adopted for Soakaway 1 (TP1) and Soakaway 3 (TP2), which are set at 2.5x10-5m/s and 7x10-6m/s respectively. Both design rates are the worst result out of the 3 full tests undertaken in each trial pit.

5.4 Further additional testing was undertaken in March 2025, presented in Appendix C, to inform the design of Soakaway 2, however testing revealed that infiltration was not viable within the rear courtyard. As a result of this, Soakaway 2 has been replaced with Attenuation Tank 2, which now drains downstream into the Soakaway 3 network, where full BRE365 testing was successfully completed.

5.5 A further 4th test was undertaken in the location of Soakaway 3 to reinforce previous test results in TP2 and confirm that infiltration does work in the western car park area. This 4th test yielded a positive result of 1.97x10^{-5}m/s. Despite this good 4th test result, the design rate of 7x10^{-6}m/s is still adopted within the Soakaway 3 design to ensure worst case rates are applied.

5.6 The result of the failed test in the rear courtyard and subsequent design amendments (i.e. the omission of Soakaway 2), mean that full BRE365 infiltration testing has been carried out in all areas where soakaways are situated within the surface water drainage system.

5.6.1 Section 3 summarises the changes made to the design as a result of the additional testing undertaken in March 2025. This includes the removal of Soakaway 2 in favour of Attenuation Tank 2 and the separation of the Soakaway 1 system to the new Attenuation Tank 2 system, which has now been revised to outfall into Soakaway 3. The updated drainage design plans are provided in Appendix D.

5.7 The detailed hydraulic model output is summarised in Section 4, with results presented in Appendix E. The model output demonstrates that both surface water drainage systems work for all storms and durations up to the 100-year + 45% climate change 10080-minute storm. A very minor amount of flooding is shown on manhole S14 of 0.68m^3 for the 100-year event, however this amount assessed to able to be managed on-site with no risk to life or infrastructure.

5.8 This report also acknowledges the requirements of Condition 20, which outlines that a verification report is required to demonstrate that the drainage design has been constructed in line with the approved scheme. This verification report will be prepared and submitted post-construction of the drainage systems.

5.9 Overall, throughout the report, appendices and summarised above, all the requirements of planning condition 7 have been addressed within the design to enable the commencement of the construction phase of the development.

6 Response to Latest Council Comments

Hydraulic Modelling Changes

6.1 The previous submission of this note had CV values of 0.75/0.84 and using FEH 2013 data as part of the hydraulic modelling parameters, this was consistent with the modelling previously provided as part of the original approved planning application and had not been updated as part of the Section 73 application.

6.2 The hydraulic modelling output provided in Appendix E has now been updated to reflect the increased CV values of 1.0 and a change in rainfall data to FEH2022. The results show no flooding at all modelled storm events with the necessary changes incorporated, with all soakaway half-drain times also below the 24-hour limit.

6.3 Whilst the change in rainfall data from 2013 to 2022 did not make any difference in the results, the increase in CV values did require some changes to the drainage design to accommodate the increase in flow in the surface water drainage system.

6.4 The changes in the surface water drainage design required are summarised as follows:-

- Increase in attenuation tank length from 12m to 20m in the 'Soakaway 3' drainage system.
- Increase in soakaway depth from 0.8m to 1.2m in the 'Soakaway 1' drainage system.
- Increase in pipe size from S18 to S27, 225mm to 300mm diameter.

6.5 The latest drainage layout plans updated with the above are presented in Appendix D.

Staff Parking in North of Site

6.6 The staff parking in the north of the site is connected into the 'Soakaway 1' drainage system. Runoff in this area is collected via the permeable paved parking bays and stored within the sub-base of the permeable paving.

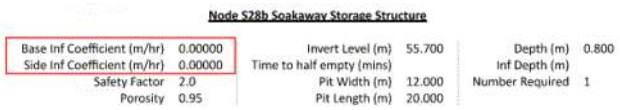
6.7 There is a downstream manhole 'S5' which collects runoff from the permeable parking bays via the perforated collector pipe; this manhole contains an overflow weir, which allows the permeable paving to infiltrate/store water to its full depth, with an overflow into Soakaway 1 (via S7 and S12) if the capacity of the permeable paving becomes exceeded.

6.8 Soakaway 1 is the principle outfall for the higher-level drainage system which infiltrates at source.

Storage Feature in Calculation

6.9 The only storage feature with no infiltration is 'Attenuation Tank 2' which is located in the rear courtyard behind Sussexdown House. This is due to infiltration testing revealing that infiltration in the rear courtyard is not possible due to a localised clay band in this particular location. All other testing locations (in the front car park 'SA1' and in the western car park 'SA3') had a minimum of 3 successful BRE365 infiltration tests undertaken in the prevalent sand strata, therefore infiltration is viable in these areas.

6.10 The previously submitted hydraulic calculations did not have any infiltration rates attributed to 'Attenuation Tank 2' as suggested. This is also reflected in the now updated calculations presented in Appendix E of this note, with a snapshot provided below as further evidence.



Node S28b Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	55.700	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	12.000	Number Required	1
Porosity	0.95	Pit Length (m)	20.000		

6.11 Whilst the modelling software does reference the term 'Soakaway' above, it does not act as a soakaway if there are no infiltration rates input into the parameters, and it will simply act as attenuation storage in the model.

A Proposed Site Layout

General Notes:

This drawing should be read in conjunction with all architectural, structural and M&E engineer's drawings and specifications. For all below ground drainage and structural elements refer to structural engineer's specification.

The information is also intended to assist a competent Building Contractor with a working knowledge of modern and traditional building techniques and practices and familiarity with the latest constructional legislation, to undertake the necessary works to execute the proposed design described on the drawings and in the specification.

- All drawings are subject to Planning and Building Control consent.
- The details shown are for design intent purposes only and are subject to further design development with suppliers and sub-contractors.
- Proposals subject to consultation and approval from Local Authority Building Control or Approved Inspector
- All setting out dimensions should be checked on-site prior to construction and any discrepancies and/or omissions should be reported to the Architect immediately.
- The contractor is responsible for checking all site dimensions, levels, services prior to the commencement of any site works. The contractor and it's sub-contractors are responsible for ensuring all works comply with all relevant statutory requirements and British Standards, whether or not they are noted on this drawing.

This drawing is preliminary, additional subcontractor input and coordination is required.

Supporting Design Information

Fire Strategy: Refer to Solas Realta Fire Safety Strategy Report (Dated November 2024)

Energy Assessment: Refer to Mesh SAP/SBEM and Part O Overheating mitigation

Structural Engineers Drawings: Refer to Calcinotto tender package

Civil Engineers Drawings: Refer to Calcinotto tender package

Landscape Architect Drawings: Refer to JPS Landscape tender package

LEGEND

- Proposed Dual 7kW EV charger
- Proposed Single 75kW rapid EV charger
- Demolished structure & trees
- New planted trees
- New planted shrubs
- Existing trees retained
- 56,250 Proposed ground level
- 56,250 Existing ground level
- Fire hydrant location
- Dropped kerb location
- 900mm high bollard

SURFACE FINISHES KEY

- Dark Grey Tarmac
- Grey Permeable Paving Blocks
- Red Permeable Paving Blocks
- Light Grey Tarmac / Resin Bound Gravel
- Planting, refer to landscape proposals
- Grass, refer to landscape proposals
- 300mm Gravel boundary to edge of buildings
- 1000mm Gravel margin for EV chargers



1 Proposed Site Plan
1:500

NORTH

0 2.0 4.0 6.0 8.0 10.0 20.0m

The copyright of this drawing is vested with Corstorphine & Wright Ltd and must not be copied or reproduced without the consent of the company.

Rev.	Description	Date	Drw.	Chk.
T-04	Sub station and ev charger transformer added to site layout	04.02.2025	CB	PR
T-03	TENDER ISSUE	31.01.2025	CB	TT
T-02	7kW EV charger positions added to residential allocated spaces and 75kW chargers to some visitor spaces	20.01.2025	CB	PR
T-01	Draft tender issue	20.12.2024	CB	PR

This drawing is issued for tender purpose only and is subject to a detailed design review and coordination with the design team prior to construction issue. This may result in changes and/or additions therefore a cost contingency should be allowed for.

Client
Care South

Project
Sussexdown Care South

Drawing Title
Proposed Site Plan

Drawing Status
TENDER

Corstorphine & Wright
Fordingbridge Studio
27 Glasshouse Studios, Fryern Court Road, Burgate, Fordingbridge SP6 1QX
01425 655 806
corstorphine-wright.com

Drawing No. 23068-6000
Revision T-04

Drawn	Checked	Paper Size	Scale	Date
CB	PR	A1	1:500	20/12/2024

B Infiltration Testing Results – June 2022

Ground and Water Limited

Unit 2
The Long Barn, Norton Farm
Selborne Road
Selborne, Alton
Hampshire
GU34 3NB

Tel: 0333 600 1221
E-mail: roger.foord@groundandwater.co.uk

Interim Soakage Testing and Groundwater Monitoring Letter Report

CLIENT	Care South
SITE ADDRESS	Sussexdown Country House Nursing Home, Washington Road, Storrington RH20 4DA
REPORT REFERENCE	GWPR4764
ENGINEER	Roger Foord, Ground and Water Limited

INVESTIGATION LOCATIONS AND SCOPE OF WORKS

Site works were undertaken in two phases.

Phase I was undertaken on the 3rd and 4th May 2022. Two trial pits (TP1 and TP2) were machine excavated to a depth of 0.10m and 1.65m bgl and infiltration tests in accordance with the principles of BRE365 in both trial pits. A trial hole location plan can be seen in Figure 1.

Phase II was undertaken on the 17th May 2022 and comprised the drilling of 6No. Windowless Sampler Borehole (WS1) to a depth of between 1.50m and 5.30m bgl with Standard Penetration Tests at 1.00m intervals. With the exception of WS4, the density of the soils resulted in the boreholes refusing at depth shallower than the proposed 5m bgl.A combined groundwater and ground-gas monitoring standpipe was installed within WS2, WS3 and WS5. The installation and backfill information can be viewed below.

Combined Ground-gas and Groundwater Monitoring Well Construction

Trial Hole	Depth of Installation (m bgl)	Thickness of slotted piping with gravel filter pack (m)	Depth of plain piping with bentonite seal (m bgl)	Piping internal diameter (mm)
WS2	2.00	1.50	0.50	50
WS3	4.00	3.50	0.50	50
WS5	3.50	2.50	0.50	50

GROUND CONDITIONS ENCOUNTERED

Summary of Strata Encountered

Strata	Depth Strata Encountered (m bgl)	Base of Strata (m bgl)	Thickness (m)
TOPSOIL: Dark brown gravelly fine SAND.	GL	0.30 - 1.00m	0.30 – 1.00m
FOLKESTONE FORMATION (WS3 only): Orangish brown gravelly SAND. The gravel was fine to medium, sub-angular sandstone.	1.00 – 4.50m	3.00 – 5.30m	>0.80 – 2.00m
FOLKESTONE FORMATION (WS1 – WS3 and WS6 only): Light orangish brown to light brown fine SAND.	1.00 – 3.00m	>1.50 – >4.00m	>0.50 – >1.30m
FOLKESTONE FORMATION (WS4 only): Orangish brown sandy CLAY. The sand was fine grained.	1.00m	3.00m	2.00m
FOLKESTONE FORMATION (WS4 only): Orangish brown sandy gravelly CLAY. The gravel was fine and medium sandstone.	3.50m	4.50m	1.00m
FOLKESTONE FORMATION (WS6 only): Reddish brown fine SAND.	1.00m	>3.45m	>2.45m

GROUNDWATER

Groundwater was not encountered during the drilling of the boreholes or the excavation of the trial pits.

3No. return groundwater monitoring visits have been undertaken to date. A tabulated summary of the results can be seen tabulated below.

Depth of Groundwater Standing Groundwater Within Borehole and Standpipe

Trial Hole	Date	Depth of Groundwater (m bgl)	Depth of Borehole/Standpipe (m bgl)
WS2	27/05/2022	Dry	2.10
	09/06/2022	Dry	2.10
	14/06/2022	Dry	2.10
WS3	24/05/2022	Dry	3.20
	09/06/2022	Dry	3.20
	14/06/2022	Dry	3.20
WS5	27/05/2022	Dry	3.30
	09/06/2022	Dry	3.30
	14/06/2022	dry	3.30

No groundwater was recorded during the two groundwater monitoring undertaken to date. One further reading is to be taken.

ROOTS

Roots encountered to a depth of between 0.20m and 1.00m bgl in the trial holes.

INFILTRATION TESTING

Soakaway tests, in accordance with the principles of BRE365 were undertaken in the base TP1 at a depth of 1.65m bgl and at a depth of 1.10m bgl in TP2, both within soils of the Folkestone Formation. generally comprising a pale brown and orangish brown fine sand.

The infiltration rates recorded within TP1 can be seen tabulated below.

Infiltration Test Results – Recorded Infiltration Rates m/s

	Test 1	Test 2	Test 3
TP1 @ 1.65m bgl within Folkestone Formation	1.09 x10^{-5} m/s	1.02 x10^{-5} m/s	7.00 x10^{-6} m/s
TP2 @ 1.10m bgl within Folkestone Formation	2.50 x10^{-5} m/s	3.09 x10^{-5} m/s	3.52 x10^{-4} m/s

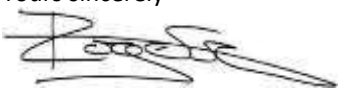
Based upon the results of the infiltration tests, it was considered that the soils of the Folkestone Formation encountered would provide a suitable medium for soakaway installation.

The submission of a Sustainable Urban Drainage Scheme (SUDS) is likely to be required for this site should the proposed development increase the amounts of hardstanding.

Consultation with the Environment Agency must be sought regarding any drainage systems that may have an impact on groundwater resources.

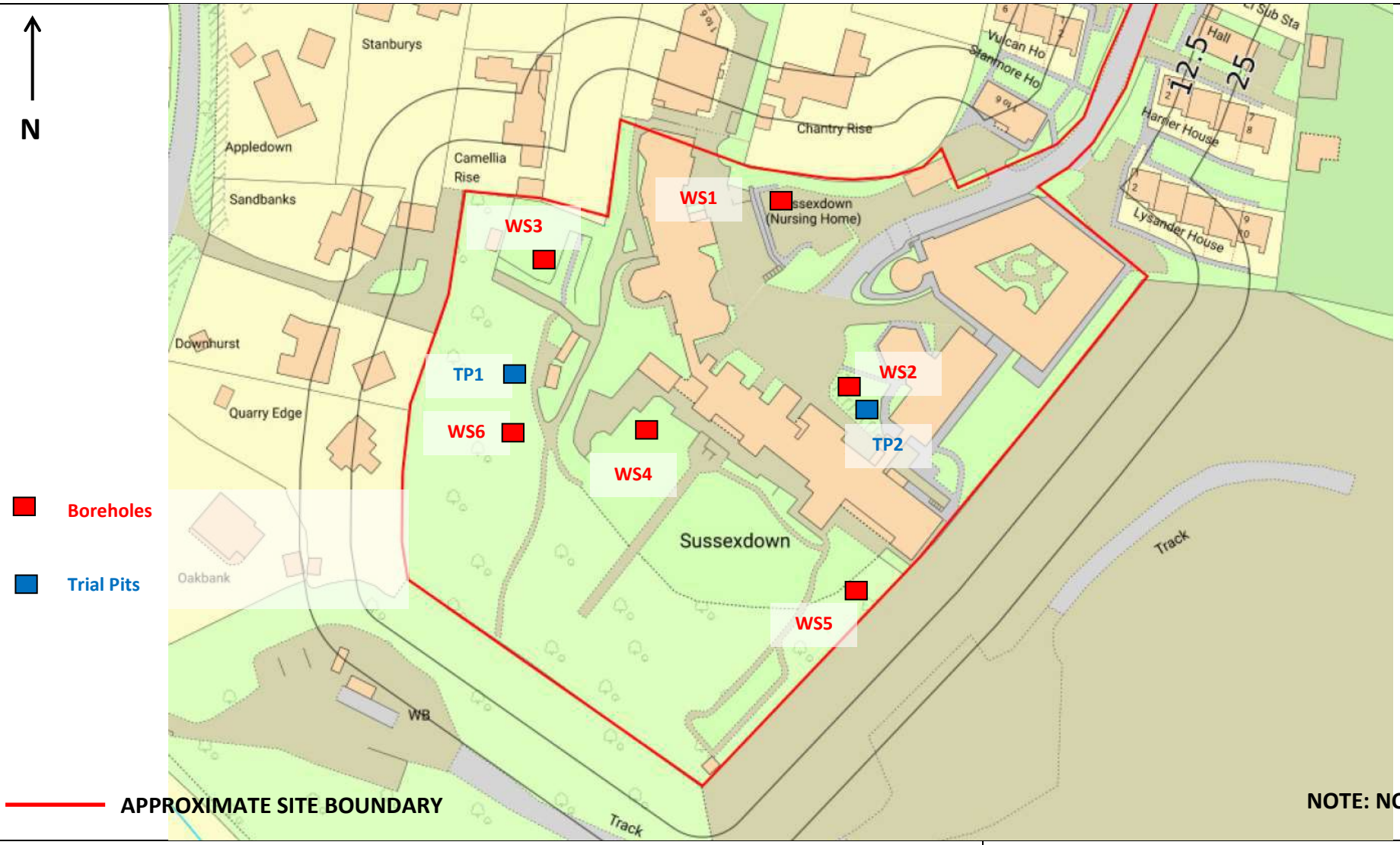
Please feel free to contact us should you have any queries regarding the information enclosed within this letter report. The following figures and appendices complete this report.

Yours sincerely



Roger Foord BA (Hons), MSc, DIC, FGS, CGeol. MIHC
Senior Engineer
For and on behalf of Ground and Water Limited

Figure 1	**Trial Hole Location Plan**
Appendix A	**Terms and Conditions**
Appendix B	**Trial Hole Logs**



Project: Sussexdown Country House Nursing Home, Washington Road, Storrington RH20 4DA	**Figure 1**
Client: Care South	**Date:** June 2022
Trial Hole Location Plan	**Ref:** GWPR4764

APPENDIX A

Term and Conditions

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment/contaminated land considerations.

The conclusions and recommendations relate to Sussexdown Country House Nursing Home, Washington Road, Storrington RH20 4DA.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets,

including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

APPENDIX B
Trial Hole Logs

Percussion Drilling Log

Project Name: Sussexdown Country House,	Client: Care South	Date: 17/05/2022
Location: Washington Rd, Storrington, Pulborough West Sussex RH20 4DA	Contractor: SiteServe	Co-ords: E509363.98 N114019.80
Project No. : GWPR4764	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS1	WLS		JC	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					Dark brown gravelly fine SAND. Gravel is fine and medium sub-angular flint. (TOPSOIL)
		0.50	D					
		1.00	D		1.00			
		1.00	SPT	36 (2,9/36 for 150mm)				Light orangish brown fine SAND. (FOLKESTONE FORMATION)
		1.50	D		1.50			
								End of Borehole at 1.500m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots noted to 0.20m bgl. Groundwater not encountered.

Percussion Drilling Log

Project Name: Sussexdown Country House,	Client: Care South	Date: 17/05/2022
Location: Washington Rd, Storrington, Pulborough West Sussex RH20 4DA	Contractor: SiteServe	Co-ords: E446539.26 N112908.88
Project No. : GWPR4764	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS2	WLS		JC	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					Dark brown gravelly fine SAND. Gravel is fine and medium sub-angular flint. (TOPSOIL)
		0.50	D					
		1.00	D		1.00			
		1.00	SPT	N=23 (2,4/3,3,3,14)				Orangish brown fine SAND. (FOLKESTONE FORMATION)
		1.50	D					
		2.00	D		2.00			
		2.00	SPT	0 (4,1/,,,)				Light brown fine SAND. (FOLKESTONE FORMATION).
		2.30	D		2.30			End of Borehole at 2.300m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots noted to 0.30m bgl. Groundwater not encountered.

Percussion Drilling Log

Project Name: Sussexdown Country House,	Client: Care South	Date: 17/05/2022
Location: Washington Rd, Storrington, Pulborough West Sussex RH20 4DA	Contractor: SiteServe	Co-ords: E446539.26 N112908.88
Project No. : GWPR4764	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS3	WLS		JC	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					Dark brown gravelly fine SAND. Gravel is fine and medium sub-angular flint. (TOPSOIL).
		0.50	D					
		1.00	D		1.00			
		1.00	SPT	N=0 (1,0/0,0,0,0)				Orangish brown gravelly SAND. Gravel is fine and medium sub-angular flint. (FOLKESTONE FORMATION)
		1.50	D					
		2.00	D					
		2.00	SPT	N=10 (0,0/1,2,3,4)				
		2.50	D					
		3.00	D		3.00			
		3.00	SPT	N=26 (1,2/5,7,7,7)				Light brown fine SAND. (FOLKESTONE FORMATION)
		3.50	D					
		4.00	D		4.00			
		4.00	SPT	27 (10,17/27 for 0mm)				
								End of Borehole at 4.250m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots noted to 0.50m bgl. Groundwater not encountered.

Percussion Drilling Log

Project Name: Sussexdown Country House,	Client: Care South	Date: 17/05/2022
Location: Washington Rd, Storrington, Pulborough West Sussex RH20 4DA	Contractor: SiteServe	Co-ords: E446539.26 N112908.88
Project No. : GWPR4764	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS4	WLS		JC	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					Dark brown gravelly fine SAND. Gravel is fine and medium sub-angular flint. (TOPSOIL).
		0.50	D					
		1.00	D		1.00			
		1.00	SPT	N=5 (0,0/1,1,1,2)				Orangish brown sandy CLAY. Sand is fine. (FOLKESTONE FORMATION).
		1.50	D					
		2.00	D					
		2.00	SPT	N=5 (0,0/1,1,1,2)				
		2.50	D					
		3.00	D		3.00			
		3.00	SPT	N=7 (2,2/3,2,1,1)				Orangish brown fine SAND. (FOLKESTONE FORMATION).
		3.50	D		3.50			Orangish brown sandy gravelly CLAY. Gravel is fine and medium sub-angular flint. (FOLKESTONE FORMATION).
		4.00	D					
		4.00	SPT	N=14 (1,3/4,3,3,4)				
		4.50	D		4.50			Light brown gravelly fine SAND. Gravel is fine and medium angular flint. (FOLKESTONE FORMATION).
		5.00	D					
		5.00	SPT	47 (10,18/47 for 150mm)	5.30			End of Borehole at 5.300m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
								0.00	5.30	90	0

Remarks

Roots noted to 1.00. Groundwater not encountered.

Percussion Drilling Log

Project Name: Sussexdown Country House,	Client: Care South	Date: 17/05/2022
Location: Washington Rd, Storrington, Pulborough West Sussex RH20 4DA	Contractor: SiteServe	Co-ords: E446539.26 N112908.88
Project No. : GWPR4764	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS5	WLS		JC	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					Dark brown gravelly fine SAND. Gravel is fine and medium sub-angular flint. (FOLKESTONE FORMATION).
		0.50	D					
		1.00	D		1.00			
		1.00	SPT	N=24 (2,4/5,6,6,7)				Reddish brown fine SAND. (FOLKESTONE FORMATION).
		1.50	D					
		2.00	D					
		2.00	SPT	N=35 (5,7/9,9,8,9)				
		2.50	D					
		3.00	D					
		3.00	SPT	N=59 (4,7/9,11,17,22)				
					3.45			End of Borehole at 3.450m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots noted to 0.45m bgl. Groundwater not encountered.

Percussion Drilling Log

Project Name: Sussexdown Country House,	Client: Care South	Date: 17/05/2022
Location: Washington Rd, Storrington, Pulborough West Sussex RH20 4DA	Contractor: SiteServe	Co-ords: E446539.26 N112908.88
Project No. : GWPR4764	Crew Name:	Drilling Equipment:

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
WS6	WLS		JC	1:50	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					Dark brown gravelly fine SAND. Gravel is fine and medium sub-angular of flint.
		0.50	D					
		1.00	D		1.00			
		1.00	SPT	N=27 (4,5/5,7,7,8)				Light brown gravelly fine SAND. Gravel is fine and medium sub-angular of flint.
		1.50	D					
		2.00	D					
		2.00	SPT	N=24 (3,5/4,6,6,8)				
		2.50	D		2.50			Orangish brown fine SAND.
		3.00	D					
		3.00	SPT	N=61 (6,9/10,13,18,20)				
					3.45			End of Borehole at 3.450m

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Roots noted to 0.60m bgl. Groundwater not encountered.

Trial Pit Log

Project Name: Sussexdown Country House,	Client: Care South	Date: 03/05/2022
Location: Washington Rd, Storrington, Pulborough West Sussex RH20 4DA	Contractor: SiteServe	
Project No. : GWPR4764	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP1	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Dark brown fine to coarse SAND. (TOPSOIL).
					0.30			Pale brown fine SAND. (FOLKESTONE FORMATION).
					1.20			Pale brown and orangish brown fine SAND. (FOLKESTONE FORMATION).
					1.65			End of Borehole at 1.650m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

Roots noted to 0.30m bgl. Groundwater not encountered.

Trial Pit Log

Project Name: Sussexdown Country House,	Client: Care South	Date: 03/05/2022
Location: Washington Rd, Storrington, Pulborough West Sussex RH20 4DA	Contractor: SiteServe	
Project No. : GWPR4764	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP2	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								Pale brown fine to coarse SAND. (TOPSOIL).
					0.40			Pale brown and orangish brown fine SAND. (FOLKESTONE FORMATION).
					1.10			End of Borehole at 1.100m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

Roots noted to 0.25. Groundwater not encountered.

C Infiltration Testing Results – March 2025

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB
0333 600 1221
enquiries@groundandwater.co.uk
groundandwater.co.uk

Soakaway Report	
SITE ADDRESS	Sussexdown Country House, Washington Rd, Pulborough, West Sussex, RH20 4DA.
CLIENT	Care South
REPORT REFERENCE	GWPR6488/SR/March 2025. The conditions and limitations of this infiltration report can be viewed within Appendix A. A technical glossary has also been provided within Appendix B.
SCOPE OF WORKS	The investigation was to be undertaken to provide parameters for the design of drainage by means of in-situ testing BRE365 testing undertaken within trial pits excavated on-site. The techniques adopted for the investigation were chosen considering the requirements of the client, anticipated ground conditions, and bearing in mind the nature of the site, limitations to site access and other logistical limitations. A geotechnical and contamination risk assessment was beyond the scope of this report.
SITE DETAILS	The site was located in Storrington, West Sussex. The site comprised a care home complex with soft landscape.
PROPOSED DEVELOPMENT	At the time of reporting, March 2025, the proposed development was understood to comprise the demolishing of some of the existing buildings on site followed by a redevelopment.
ANTICIPATED GEOLOGY	The BGS Geological Map for the area revealed that the site was underlain by bedrock deposits of the Folkstone Formation with no superficial deposits. Superficial deposits (Drift) are the youngest geological deposits formed during the most recent period of geological time. They rest on older deposits or rocks referred to as bedrock (Solid), which are the main mass forming the Earth. Bedrock is present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water. A BGS borehole (TQ01SE33) located ~375m north revealed a 0.65m capping of light and yellow brown slightly clayey silty fine to medium sand over yellow orange brown mottled red brown, slightly silty, fine to coarse sand, with occasional flint gravels to the end of the borehole at 2.30m bgl.
HYDROGEOLOGY AND HYDROLOGY	A study of the aquifer maps on the DEFRA website revealed the site was underlain by a **Principal Aquifer** within the Folkstone Formation. Examination of the Environment Agency records showed that the site **did not** fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater. No surface water features were present within a 250m radius of the site. The nearest surface water feature was the River Stor ~275m west flowing in a south to north direction. From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at depth within the Folkstone Formation. Some amounts of groundwater however may be present at shallower depths within Topsoil. It was considered that groundwater was flowing in a westerly direction in line with local topography.

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB
0333 600 1221
enquiries@groundandwater.co.uk
groundandwater.co.uk

Soakaway Report

	Examination of the Environment Agency records showed that the site was located within flood zone 1, i.e. an area with a low probability of flooding.
SITE WORKS AND ENCOUNTERED GROUND CONDITIONS	Site works were undertaken on the 12th of March 2025 and comprised the excavation of 2No. trial pits, with soakage testing conducted in accordance with BRE365 within each pit. A summary of the ground conditions and depths of these trial pits has been summarised in the following table. The trial hole logs can be seen within Appendix C. The trial hole location plan can be seen in Figure 1.

Summary of Strata Encountered

Strata	Top Depth (m bgl)	Base Depth (m bgl)	Thickness (m)
Topsoil: TP3 - Dark brown sandy CLAY. Sand is fine to medium. TP4 - Dark brown fine to coarse SAND.	GL	0.30	0.30
Folkstone Formation: TP3 - Light brown clayey gravelly SAND. Sand is fine to medium. Gravel is medium to coarse, angular to sub angular of flint. TP4 – Light brown fine to medium SAND.	0.30	1.50 (TP3) - 2.00 (TP4)	1.20 - >1.70
Folkstone Formation: TP3 - Light brown mottled orange sandy gravelly CLAY. Sand is fine to medium. Gravel is medium to coarse, angular to sub angular of flint.	1.50	2.00	0.50

GROUNDWATER CONDITIONS	No groundwater was encountered in any of the trial pits excavated on site. Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was undertaken in March 2025 when groundwater levels are likely to be approaching their annual maximum (highest elevation). Exact groundwater levels may only be determined through long term measurements from monitoring wells installed on-site.
SURFACE WATER DISPOSAL	The infiltration testing was undertaken within the Folkstone Formation, and in accordance with BRE365. The infiltration test results can be seen in the following table:

Soakage Testing Results

Trial Pit	Test Number	Depth (m bgl)	Start Depth (m bgl)	Finish Depth (m bgl)	Time Taken (mins)	Infiltration Rate (m/sec)
TP3*	1	2.00	1.00	1.10	240	**9.55x10-7**
TP4*	1	2.00	0.99	1.77	120	**1.97x10-5**

*Due to slow infiltration rates BRE365 was not met within these trial pits.

The significantly slower infiltration rates found in TP3 are likely a result of the clay soils encountered within this trial pit.

The principles of sustainable urban drainage system (SUDS) should be applied to reduce the risk of flooding from surface water ponding. The following may wish to be considered:

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB
0333 600 1221
enquiries@groundandwater.co.uk
groundandwater.co.uk

- Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
- Rainwater infiltration to ground at or close to source
- Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
- Rainwater discharge direct to a watercourse (unless not appropriate)
- Controlled rainwater discharge to a surface water sewer or drain
- Controlled rainwater discharge to a combined sewer.

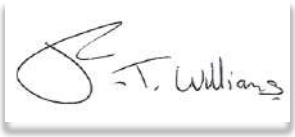
Consultation with the Environment Agency must be sought regarding any use that may have an impact on groundwater resources, abstractions and surface water features/watercourses.

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB

0333 600 1221
enquiries@groundandwater.co.uk

groundandwater.co.uk

Please feel free to contact us should you have any queries regarding the information enclosed within this report.

Summary of Authors		
Prepared By	**Checked By**	**Approved By**
Adam Wright BSc (Hons) Graduate Engineer		
	Miltiadis Mellios MSc(Eng) CGeol FGS MIEnvSc GMICE Principal Engineer	Francis Williams MGeol (Hons) FGS CEnv CGeol Director

For and on behalf of Ground and Water Limited

FIGURES **5**

APPENDIX A: Conditions and Limitations **6**

APPENDIX B: Technical Glossary **9**

APPENDIX C: Trial Hole Logs **10**

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB

0333 600 1221
enquiries@groundandwater.co.uk

groundandwater.co.uk

FIGURES



Machine Excavated Trial Pit

Sussexdown Country House Washington Rd Pulborough West Sussex RH20 4DA

Care South	**March 2025**
Figure 1 – Trial Hole Location Plan	**GWPR6488**

ground&water

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB

0333 600 1221
enquiries@groundandwater.co.uk

groundandwater.co.uk

APPENDIX A: Conditions and Limitations

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB
0333 600 1221
enquiries@groundandwater.co.uk
groundandwater.co.uk

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment/contaminated land considerations.

The conclusions and recommendations relate to Sussexdown Country House, Washington Rd, Pulborough, West Sussex, RH20 4DA.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB

0333 600 1221
enquiries@groundandwater.co.uk

groundandwater.co.uk

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

The aim of the investigation was understood to be to supply the client and their designers with information regarding the ground conditions underlying the site to assist them in preparing an appropriate scheme for development.

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB

0333 600 1221
enquiries@groundandwater.co.uk

groundandwater.co.uk

APPENDIX B: Technical Glossary

TECHNICAL GLOSSARY

The list of possible definitions within the report may be seen below. Please note that some definitions may not be relevant to this report.

HYDROGEOLOGY:

A **Principal Aquifer** is a layer of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary (A) Aquifers consist of deposits with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Minor Aquifers.

Secondary (B) Aquifers consist of deposits with predominantly lower permeability layers with may stoke and yield limited amounts of groundwater due to localised features such as fissures, think permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary Aquifers (Undifferentiated) are assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both a minor aquifer and non-aquifer in different locations due to the variable characteristics of the rock type.

Unproductive Strata are rock layers with low permeability that have negligible significance for water supply or river base flow. These were formerly classified as non-aquifers.

FLOOD ZONES:

Environment Agency Flood Zone 2, defined as; land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.

Environment Agency Flood Zone 3 shows the extent of a river flood with a 1 in 100 (1%0 or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

Environment Agency Flood Zone 3 area that benefits from flood defences, defined as; land and property in this flood zone would have a high probability of flooding without the local flood defences. These protect the area against a river flood with a 1% chance of happening each year, or a flood from the sea with a 0.5% chance of happening each year.

GROUNDWATER SOURCE PROTECTION ZONES (SPZS):

Inner Zone (SPZ1): This zone is 50 day travel time of pollutant to source with a 50 metres default minimum radius.

Outer Zone (SPZ2): This zone is 400 day travel time of pollutant to source. This has a 250 or 500 metres minimum radius around the source depending on the amount of water taken.

Total Catchment (SPZ3): This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.

Zone of Special Interest (SPZ4): This zone is where local conditions require additional protection.

IN-SITU STRENGTH GEOTECHNICAL TESTING:

Windowless Sample and/or Cable Percussion and/or Rotary Boreholes provide samples of the ground for assessment but they do not give any engineering data. The standard penetration test (SPT) is an in-situ dynamic penetration test designed to provide information on the geotechnical engineering properties of soil. The test uses a thick-walled sample tube, with an outside diameter of 50mm and an inside diameter of 35mm, and a length of around 650mm. This is driven into the ground at the bottom of a borehole by blows from a slide hammer with a weight of 63.5kg falling through a distance of 760mm. The sample tube is driven 150mm into the ground and then the number of blows needed for the tube to penetrate each 75mm up to a depth of 450mm is recorded. The sum of the number of blows is termed the "standard penetration resistance" or the "N-value".

Dynamic Probing involves the driving of a metal cone into the ground via a series of steel rods. These rods are driven from the surface by a hammer system that lifts and drops a 63.5kg (SHDP) hammer onto the top of the rods through a set height, thus ensuring a consistent energy input. The number of hammer blows that are required to drive the cone down by each 100mm increment are recorded. These blow counts then provide a comparative assessment from which correlations have been published, based on dynamic energy, which permits engineering parameters to be generated. (The Dynamic Probe 'Super Heavy' (SHDP) Tests were conducted in accordance with BS 1377; 1990; Part 9, Clause 3.2).

2 The Long Barn,
Norton Farm, Selborne Road,
Alton, Hampshire GU34 3NB

0333 600 1221
enquiries@groundandwater.co.uk

groundandwater.co.uk

APPENDIX C: Trial Hole Logs

Trial Pit Log

Project Name: Sussexdown Country House	Client: Care South	Date:
Location: Washington Rd, Pulborough, West Sussex, RH20 4DA	Contractor:	
Project No. : GWPR6488	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP3	TP			1:25	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D					TOPSOIL: Dark brown sandy CLAY. Sand is fine to medium.
					0.30			
		0.50	D					Light brown slightly clayey fine to medium SAND. (FOLKSTONE FORMATION).
		0.80	D					
		1.00	D		1.00			
								Light brown clayey gravelly fine to medium SAND. Gravel is medium to coarse, angular to sub angular of flint. (FOLKSTONE FORMATION).
		1.50	D		1.50			
								Light brown mottled orange sandy gravelly CLAY. Sand is fine to medium. Gravel is medium to coarse, angular to sub angular of flint. (FOLKSTONE FORMATION).
		2.00	D		2.00			
								End of Borehole at 2.000m

1 2 3 4 5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

No roots noted.
No groundwater encountered.

AGS

Trial Pit Log

Project Name: Sussexdown Country House	Client: Care South	Date:
Location: Washington Rd, Pulborough, West Sussex, RH20 4DA	Contractor:	
Project No. : GWPR6488	Crew Name:	Equipment:

Location Number	Location Type	Level	Logged By	Scale	Page Number
TP4	TP			1:25	Sheet 1 of 1

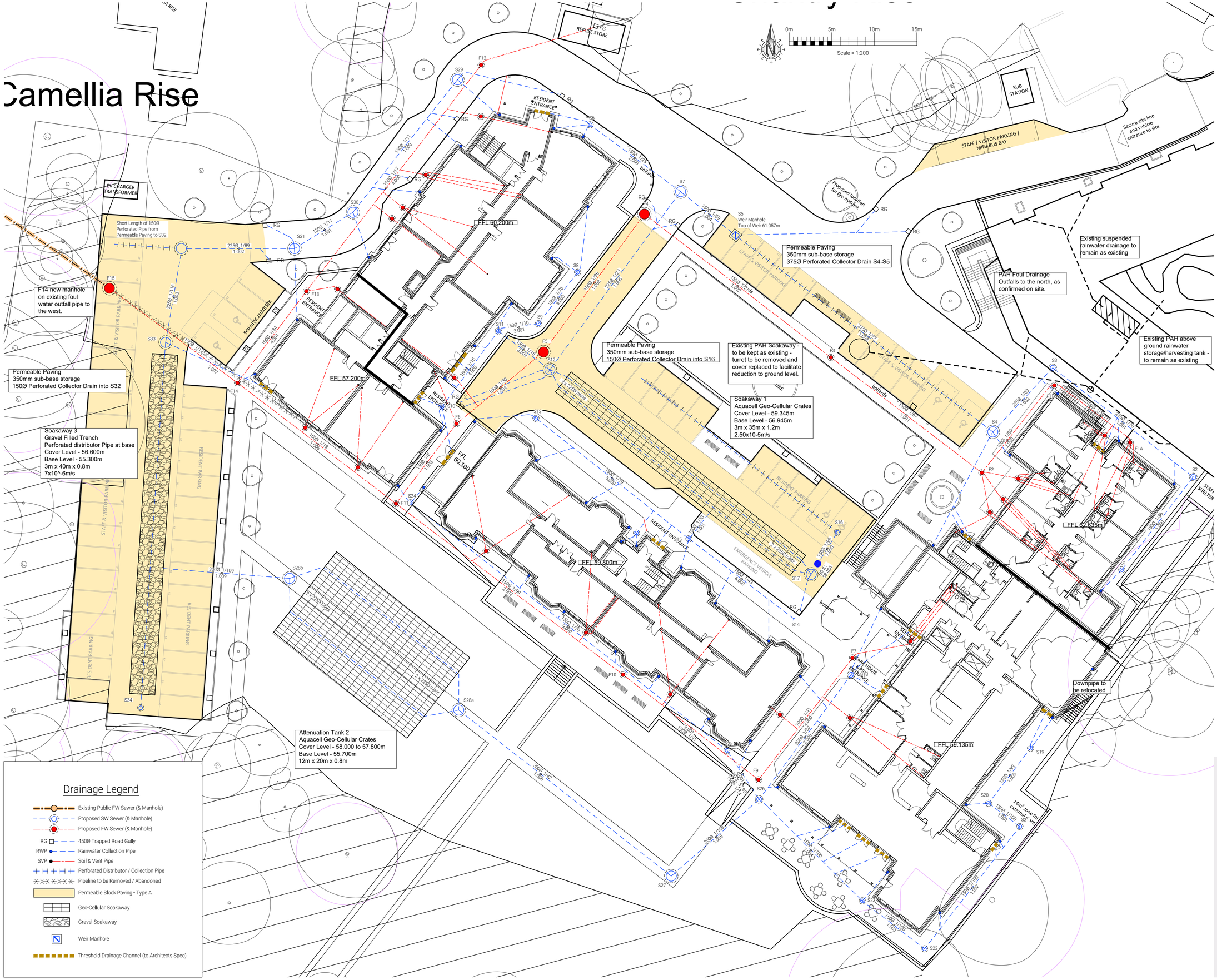
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20	D		0.30			TOPSOIL: Dark brown fine to coarse SAND.
		0.50	D					Light brown fine to medium SAND. (FOLKSTONE FORMATION).
		0.80	D					
		1.00	D					
		1.50	D					
		2.00	D		2.00			End of Borehole at 2.000m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

Roots noted to 1.50m bgl.
No groundwater encountered.

D Current Drainage Layout Plans and Construction Details



Drainage Legend

- Existing Public FW Sewer (& Manhole)
- Proposed SW Sewer (& Manhole)
- Proposed FW Sewer (& Manhole)
- RG — 450Ø Trapped Road Gully
- RWP — Rainwater Collection Pipe
- SVP — Soil & Vent Pipe
- Perforated Distributor / Collection Pipe
- Pipeline to be Removed / Abandoned
- Permeable Block Paving - Type A
- Geo-Cellular Soakaway
- Gravel Soakaway
- Weir Manhole
- Threshold Drainage Channel (to Architects Spec)

Notes:

1. This drawing is to be read in conjunction with all relevant architects, engineers and specialist sub-contractors drawings and the specification.

2. All setting out to be in accordance with the schedules. any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Dimensions must not be scaled.

3. All private drainage is to be in accordance with BS EN 752-1-2-3-4, BS EN 1295-1, BS EN 1610 and all relevant sections of approved document H of the building regulations (2015 Edition).

4. Where drainage pipework is to be flexibly jointed extra strength vitrified clay it should be to BS EN 295-1, Hepworth 'Supersleve' or equivalent.

5. Where drainage pipework is plastic i.e. PVC-U it shall be to BS EN 1401-1 Osma or equivalent. Private pipework to be type SN4 and all adoptable pipework to be type SN8.

6. Where drainage pipework is cast iron it shall be to BS EN 877 and for ductile iron it shall be to BS EN 598.

7. All concrete pipework, shall be to BS EN 1916 and BS 5911-1. Manholes and fittings shall be to BS 5911 parts 3 and 4 and BS EN 1917.

8. Where drains pass through foundations or connect to manholes, flexible pipe joints are to be provided within 150mm of the face of the structure and within a further 600mm to form a rocker pipe.

9. Where pipes pass through screen walls, footings or retaining walls, lintels are to be provided.

10. Where pipelines pass within 1.0m of buildings or walls the foundations are to be taken down below the bottom of the trench. Where pipelines are more than 1.0m away from foundations the trench shall be backfilled with concrete up to a point that meets a 45° angle line taken from the bottom corner of the nearest foundation.

11. Where depth to invert does not exceed 600mm and the pipe size does not exceed 100mm diameter, 300mm dia. polypropylene access chambers may be used. Elsewhere, proprietary polypropylene or precast concrete manholes are to be used.

12. Where connections are to be made to existing manholes / sewers, invert levels, pipe sizes and orientation should be checked prior to the commencement of the works and any variance reported to the engineer immediately. Where connections are to be made on or off site the contractor is to check the line and level of any services / mains, to ensure that no clashes exist prior to works commencing.

13. Where pipelines cross, each is to be surrounded with grade ST4 mass concrete for a distance not less than 1.0m centred on the crossing point. Length of surround to be extended as necessary to within 150mm of the next nearest flexible joints.

14. For private drainage, concrete protection is to be provided where the effective cover to the crown of the pipe(s) is less than 1.2m in trafficked areas and 0.6m in soft landscaped or pedestrianised areas.

15. The contractor is to ensure that protective measures are taken to ensure that drainage pipework and fittings are not damaged by site traffic prior to oversite filling operations being completed around buildings.

16. The top run of each private foul drainage network is to be laid to falls no slacker than 1:40. the head of each run is to be vented to atmosphere in accordance with approved document H.

17. All surface water drainage to be min 100mm dia, laid at a gradient no slacker than 1/80. And all foul water drainage to be min 100mm dia. unless stated otherwise.

18. The contractor is to ensure that all pipework connections are arranged to direct flows down or into the main channel in the direction of the main flow. Where necessary 3/4 bends are to be used on oblique connections inside the manhole benching where sufficient room exists or the pipelines on oblique connections are arranged outside the chamber to be able to divert flows down the main channel. Connections brought in perpendicular to the main channel are not acceptable. Where possible the main channel flow shall be from any connections with WC's to ensure a flush through the main channel is achieved.

19. The contractor is to ensure that when preformed polypropylene manhole bases are used that they are orientated such that the main flow is through the main channel of the base. this should be achieved by incorporating long radius bends outside of the manhole.

20. The contractors attention is drawn to the need to ensure that any trenches excavated through previously compacted filled areas, in particular under the building footprint and immediately around the outside, are re-compacted to ensure localised differential settlement does not occur.

21. Where new connections are to be made into existing manholes or sewers, all invert levels, pipe orientation and sizes should be checked on-site prior to the commencement of the works, with any variance reported to the engineer once identified. Where new connections are to be made either on or off-site, the contractor is to check the line and level of any existing services / mains, to ensure that no clashes exist prior to the works commencing.

22. Any and all new connections into a public sewer are to be inspected by the local water authority and carried out fully in accordance with their requirements. The contractor is to allow for obtaining the appropriate 'Section Agreements' as well as paying all necessary fees.

23. Permeable paving surface finish 'to the architects spec'. Any alteration to the extents of the permeable paving may have an adverse affect upon the Surface water drainage design and must therefore be discussed with the engineer.

24. Modular crate soakaway system(s) to be 'Wavin Aquacell' or 'Polypipe Polystorm'. Any other system offered will need to be provided with a separate warranty for design and installation.

25. Contractor to allow for threshold channel drainage to building access points where required.

Rev.	Date	Description
P9	21.05.25	Soakaway 1 and Attenuation Tank 2 increased in size due to change in CV values
P8	02.04.25	Drainage amended following poor infiltration test results in rear courtyard
P7	17.01.25	Infiltration rates corrected on plan to match calcs.
P6	10.01.25	Notes updated following contractor RFI.
P5	05.12.24	Updated to latest site plan and issued for pricing
P4	25.10.24	Drainage updated to latest site plan and levels
P3	12.09.24	Updated following request to site CV values
P2	20.08.24	Updated for Section 73 application
P1	04.08.22	First Issue for Planning

Calcinotto
First Floor South
Waterloo House
Fleets Corner
Poole BH17 0HL
01202 237237
info@calcinotto.co.uk
www.calcinotto.co.uk

Client
Care South

Project Title
Sussexdown House

Drawing Title
Foul and Surface Water Drainage Layout
Sheet 1 of 2

Drawing Status
Planning

Originator No.	Rev by	Chk by	Scale
114522	DB	MR	1:200 @A1

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO.
114522-CAL-XX-XX-DR-D-0100 | Revision P9

SURFACE WATER MANHOLE SCHEDULE

MH No.	MANHOLE DIMENSION (mm)	MANHOLE TYPE	COVER TYPE	COVER LEVEL (m)	INVERT LEVEL (m)	DEPTH TO SOFFIT (m)	EASTING (m)	NORTHING (m)
S1	450Ø	Type D	B125	62.553	61.953	0.450	509407.909	113974.773
S2	600Ø	Type D	B125	62.596	61.500	0.871	509416.309	113985.669
S3	600Ø	Type D	B125	62.663	61.200	1.238	509399.800	113998.490
S4	1200Ø	CATCHPIT	B125	62.457	60.900	1.182	509392.766	113990.964
S5	600x600	CATCHPIT	D400	61.272	59.500	1.622	509362.790	114013.821
S6	450Ø	Type D	B125	60.600	59.900	0.550	509345.454	114027.026
S7	1200Ø	CATCHPIT	D400	61.012	59.300	1.412	509356.067	114019.182
S8	450Ø	Type D	B125	60.050	59.300	0.600	509343.968	114009.704
S9	450Ø	Type D	B125	60.050	59.200	0.700	509339.368	114003.670
S10	450Ø	Type D	B125	60.110	59.460	0.500	509328.044	113993.922
S11	450Ø	Type D	B125	60.070	58.720	1.200	509334.655	114002.806
S12	1200Ø	CATCHPIT	D400	60.270	56.945	3.100	509340.714	113998.264
S13	450Ø	Type D	B125	60.260	59.100	1.010	509339.077	113992.552
S14	450Ø	Type D	B125	59.259	58.659	0.450	509369.412	113968.994
S15	450Ø	Type D	B125	59.650	58.300	1.200	509357.052	113978.413
S16	450Ø	CATCHPIT	D400	59.180	58.550	0.480	509374.489	113979.168
S17	1200Ø	CATCHPIT	D400	59.345	56.945	2.400	509373.650	113972.665
S18	600Ø	Type D	D400	59.096	58.000	0.871	509376.110	113962.431
S19	450Ø	Type D	B125	58.992	58.123	0.719	509397.192	113953.814
S20	450Ø	Type D	B125	58.988	58.041	0.797	509392.261	113947.346
S21	450Ø	Type D	B125	58.997	57.995	0.852	509395.939	113944.616
S22	450Ø	Type D	B125	58.993	57.813	1.030	509384.739	113930.256
S23	450Ø	Type D	B125	58.991	57.721	1.120	509377.418	113935.893
S24	450Ø	Type D	B125	60.050	59.100	0.800	509324.334	113982.637
S25	450Ø	Type D	B125	59.162	58.430	0.582	509361.533	113953.561
S26	600Ø	Type D	B125	59.047	57.401	1.346	509365.299	113947.805
S27	1200Ø	CATCHPIT	D400	59.030	57.201	1.529	509357.114	113936.928
S29	1200Ø	CATCHPIT	D400	59.417	58.200	1.067	509329.851	114032.323
S30	1200Ø	CATCHPIT	D400	57.914	56.400	1.364	509317.575	114016.751
S31	1200Ø	CATCHPIT	D400	57.362	55.575	1.562	509310.823	114011.453
S32	1200Ø	CATCHPIT	D400	56.609	55.425	0.959	509297.442	114012.477
S33	1200Ø	CATCHPIT	D400	56.651	55.300	1.126	509295.563	114001.482
S28a	1200Ø	CATCHPIT	D400	58.348	56.143	1.980	509330.007	113958.301
S28b	1200Ø	CATCHPIT	D400	57.995	55.700	1.995	509310.130	113973.759

FOUL WATER MANHOLE SCHEDULE

MH No.	MANHOLE DIMENSION (mm)	MANHOLE TYPE	COVER TYPE	COVER LEVEL (m)	INVERT LEVEL (m)	DEPTH TO SOFFIT (m)	EASTING (m)	NORTHING (m)
F1	450Ø	Type D	B125	62.499	61.550	0.849	509397.381	113993.753
F2	450Ø	Type D	B125	62.301	61.137	1.014	509391.472	113986.153
F3	450Ø	Type D	B125	61.702	60.803	0.749	509373.738	113999.709
F4	1200Ø	Type C	D400	60.842	59.492	1.200	509351.812	114016.540
F5	1350Ø	Type C	D400	60.292	58.942	1.200	509339.967	114000.345
F6	450Ø	Type D	B125	60.080	58.500	1.430	509329.735	113991.923
F7	450Ø	Type D	B125	59.129	58.250	0.779	509376.270	113964.412
F9	450Ø	Type D	B125	59.075	57.764	1.161	509365.217	113950.103
F10	450Ø	Type D	B125	59.600	57.544	1.906	509349.313	113962.442
F11	450Ø	Type D	B125	60.050	57.050	2.850	509322.631	113982.540
F12	450Ø	Type D	B125	59.630	57.700	1.830	509332.628	114034.047
F13	450Ø	Type D	B125	57.332	55.700	1.532	509312.095	114007.480
F14	450Ø	Type D	B125	56.971	55.250	1.571	509304.006	113996.715
F15	1200Ø	Type C	D400	56.221	55.100	0.971	509288.958	114007.834

Notes:

1. This drawing is to be read in conjunction with all relevant architects, engineers and specialist sub-contractors drawings and the specification.

2. All setting out to be in accordance with the schedules. any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Dimensions must not be scaled.

3. All private drainage is to be in accordance with BS EN 752-1-2-3-4, BS EN 1295-1, BS EN 1610 and all relevant sections of approved document H of the building regulations (2015 Edition).

4. Where drainage pipework is to be flexibly jointed extra strength vitrified clay it should be to BS EN 295-1, Hepworth 'Supersleve' or equivalent.

5. Where drainage pipework is plastic i.e. PVC-U it shall be to BS EN 1401-1 Osma or equivalent. Private pipework to be type SN4 and all adoptable pipework to be type SN8.

6. Where drainage pipework is cast iron it shall be to BS EN 877 and for ductile iron it shall be to BS EN 598.

7. All concrete pipework, shall be to BS EN 1916 and BS 5911-1. Manholes and fittings shall be to BS 5911 parts 3 and 4 and BS EN 1917.

8. Where drains pass through foundations or connect to manholes, flexible pipe joints are to be provided within 150mm of the face of the structure and within a further 600mm to form a rocker pipe.

9. Where pipes pass through screen walls, footings or retaining walls, lintels are to be provided.

10. Where pipelines pass within 1.0m of buildings or walls the foundations are to be taken down below the bottom of the trench. Where pipelines are more than 1.0m away from foundations the trench shall be backfilled with concrete up to a point that meets a 45° angle line taken from the bottom corner of the nearest foundation.

11. Where depth to invert does not exceed 600mm and the pipe size does not exceed 100mm diameter, 300mm dia. polypropylene access chambers may be used. Elsewhere, proprietary polypropylene or precast concrete manholes are to be used.

12. Where connections are to be made to existing manholes / sewers, invert levels, pipe sizes and orientation should be checked prior to the commencement of the works and any variance reported to the engineer immediately. Where connections are to be made on or off site the contractor is to check the line and level of any services / mains, to ensure that no clashes exist prior to works commencing.

13. Where pipelines cross, each is to be surrounded with grade ST4 mass concrete for a distance not less than 1.0m centred on the crossing point. Length of surround to be extended as necessary to within 150mm of the next nearest flexible joints.

14. For private drainage, concrete protection is to be provided where the effective cover to the crown of the pipe(s) is less than 1.2m in trafficked areas and 0.6m in soft landscaped or pedestrianised areas.

15. The contractor is to ensure that protective measures are taken to ensure that drainage pipework and fittings are not damaged by site traffic prior to oversite filling operations being completed around buildings.

16. The top run of each private foul drainage network is to be laid to falls no slacker than 1:40. the head of each run is to be vented to atmosphere in accordance with approved document H.

17. All surface water drainage to be min 100mm dia, laid at a gradient no slacker than 1/80. And all foul water drainage to be min 100mm dia. unless stated otherwise.

18. The contractor is to ensure that all pipework connections are arranged to direct flows down or into the main channel in the direction of the main flow. Where necessary 3/4 bends are to be used on oblique connections inside the manhole benching where sufficient room exists or the pipelines on oblique connections are arranged outside the chamber to be able to divert flows down the main channel. Connections brought in perpendicular to the main channel are not acceptable. Where possible the main channel flow shall be from any connections with WC's to ensure a flush through the main channel is achieved.

19. The contractor is to ensure that when preformed polypropylene manhole bases are used that they are orientated such that the main flow is through the main channel of the base. this should be achieved by incorporating long radius bends outside of the manhole.

20. Where new connections are to be made into existing manholes or sewers, all invert levels, pipe orientation and sizes should be checked on-site prior to the commencement of the works, with any variance reported to the engineer once identified. Where new connections are to be made either on or off-site, the contractor is to check the line and level of any existing services / mains, to ensure that no clashes exist prior to the works commencing.

21. Any and all new connections into a public sewer are to be inspected by the local water authority and carried out fully in accordance with their requirements. The contractor is to allow for obtaining the appropriate 'Section Agreements' as well as paying all necessary fees.

22. The contractor is to allow for obtaining the appropriate road opening licence's from the local highway authority and paying all necessary fees. All reinstatement works within the public highway are to be carried out in accordance with the requirements of the local highway authority.

23. Permeable paving surface finish 'to the architects spec'. Any alteration to the extents of the permeable paving may have an adverse affect upon the Surface water drainage design and must therefore be discussed with the engineer.

24. Modular crate soakaway system(s) to be 'Wavin Aquacell' or 'Polypipe Polystorm'. Any other system offered will need to be provided with a separate warranty for design and installation.

25. Contractor to allow for threshold channel drainage to building access points where required.

Rev.	Date	Description
P8	21.05.25	S28a, S12 and S17 amended following tank/soakaway changes
P7	02.04.25	Drainage amended following poor infiltration test results in rear courtyard
P6	10.01.25	Manhole S34 added following contractor RFI.
P5	05.12.24	Updated to latest site levels and issued for pricing
P4	25.10.24	Drainage updated to latest site plan and levels
P3	12.09.24	Updated following request to site CV values
P2	20.08.24	Updated for Section 73 application
P1	04.08.22	First Issue for Planning

Calcinotto
First Floor South
Waterloo House
Fleets Corner
Poole BH17 0HL

01202 237237
info@calcinotto.co.uk
www.calcinotto.co.uk

Client
Care South

Project Title
Sussexdown House

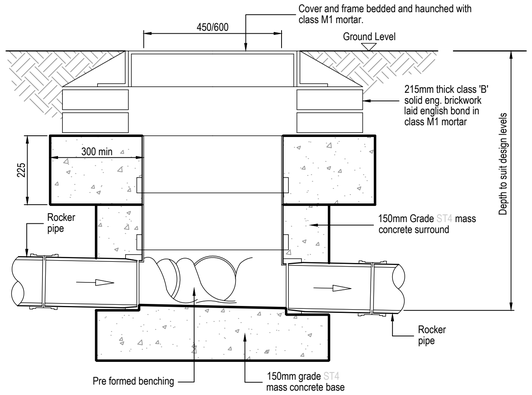
Drawing Title
Foul and Surface Water Drainage Layout
Sheet 2 of 2

Drawing Status
Planning

Originator No.	Rev by	Chk by	Scale
114522	DB	MR	1:NTS @A1

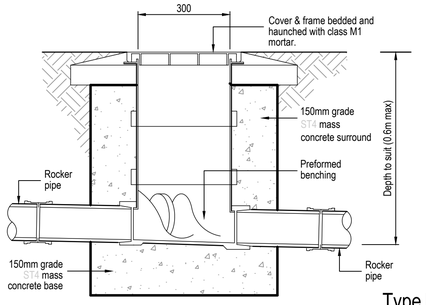
PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO.
114522-CAL-XX-XX-DR-D-0101

Revision
P8

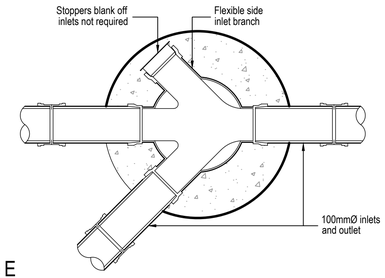


Type D
Plastic Inspection Chamber Section Detail

SCALE = 1:10



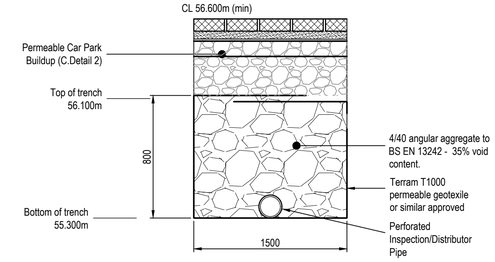
Plastic A.C. Section Detail



Plastic A.C. Base Detail

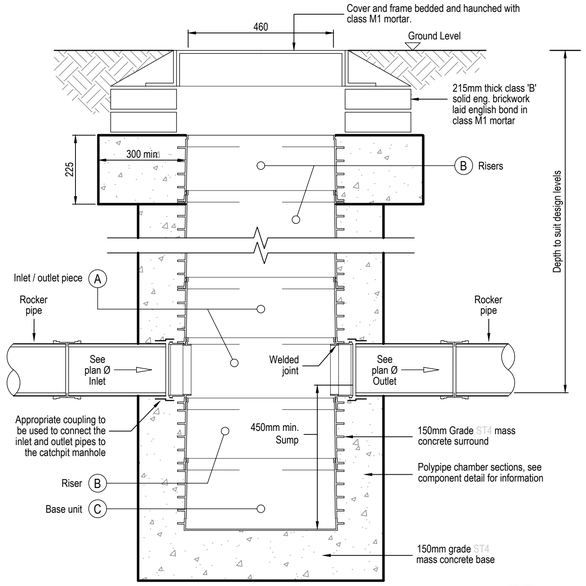
Type E
Plastic Access Chamber Detail

SCALE = 1:10

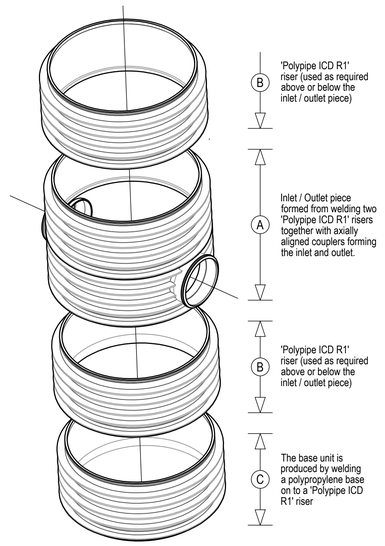


Trench Soakaway Detail

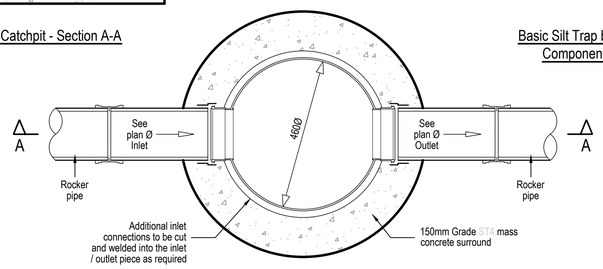
SCALE = 1:20



Plastic Catchpit - Section A-A



Basic Silt Trap by Polypipe Component Detail

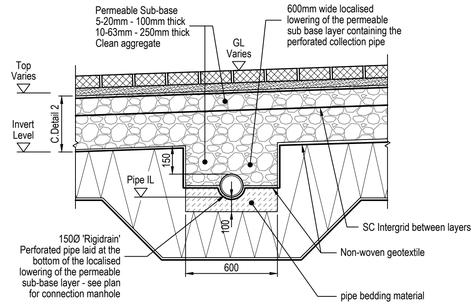


Plastic Catchpit Chamber - Plan Detail

Plastic Catchpit Construction Detail

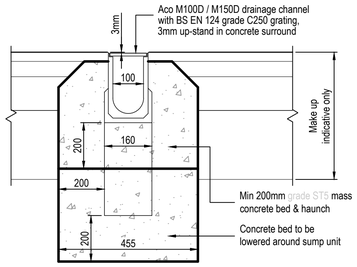
SCALE = 1:10

Note:
This detail is for a basic silt trap produced by 'Polypipe' however an alternative product can be used providing that it meets the needs for the site. The engineer to be consulted for comment should any alternative products be requested.



Section Through the Perforated Collection Pipe Within the Permeable Sub-base Layer

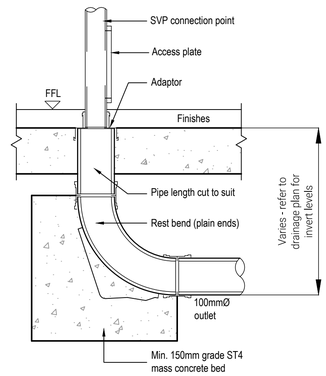
SCALE = 1:20



Aco M100D / M150D Drainage Channel Construction Detail

SCALE = 1:10

Notes:
1. Drainage channels to be laid at a constant depth.
2. Sump unit to be provided at discharge point with a 100mm outlet.
3. Expansion joint to be provided @ 5m c/c's along length of channel across whole width of concrete as per manufacturer's recommendations.
4. The channel must not be trafficked until after the wearing course has been laid and compacted.



Roddable Internal SVP Detail

SCALE = 1:10

Notes:

1. This drawing is to be read in conjunction with all relevant architects, engineers and specialist sub-contractors drawings and the specification.

2. All setting out to be in accordance with the schedules. any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Dimensions must not be scaled.

3. All private drainage is to be in accordance with BS EN 752-1-2-3-4, BS EN 1295-1, BS EN 1610 and all relevant sections of approved document H of the building regulations (2015 Edition).

4. Where drainage pipework is to be flexibly jointed extra strength vitrified clay it should be to BS EN 295-1, Hepworth 'Supersleve' or equivalent.

5. Where drainage pipework is plastic i.e. PVC-U it shall be to BS EN 1401-1 Osma or equivalent. Private pipework to be type SN4 and all adoptable pipework to be type SN8.

6. Where drainage pipework is cast iron it shall be to BS EN 877 and for ductile iron it shall be to BS EN 598.

7. All concrete pipework, shall be to BS EN 1916 and BS 5911-1. Manholes and fittings shall be to BS 5911 parts 3 and 4 and BS EN 1917.

8. All materials for adoptable drainage are to be Kitemarked as appropriate.

9. Where drains pass through foundations or connect to manholes, flexible pipe joints are to be provided within 150mm of the face of the structure and within a further 600mm to form a rocker pipe.

10. Where pipes pass through screen walls, footings or retaining walls, lintels are to be provided.

11. Where pipelines pass within 1.0m of buildings or walls the foundations are to be taken down below the bottom of the trench. Where pipelines are more than 1.0m away from foundations the trench shall be backfilled with concrete up to a point that meets a 45° angle line taken from the bottom corner of the nearest foundation.

12. Where depth to invert does not exceed 600mm and the pipe size does not exceed 100mm diameter, 300mm dia. polypropylene access chambers may be used. Elsewhere, proprietary polypropylene or precast concrete manholes are to be used.

13. Where connections are to be made to existing manholes / sewers, invert levels, pipe sizes and orientation should be checked prior to the commencement of the works and any variance reported to the engineer immediately. Where connections are to be made on or off site the contractor is to check the line and level of any services / mains, to ensure that no clashes exist prior to works commencing.

14. Where pipelines cross, each is to be surrounded with grade ST4 mass concrete for a distance not less than 1.0m centred on the crossing point. Length of surround to be extended as necessary to within 150mm of the next nearest flexible joints.

15. For private drainage, concrete protection is to be provided where the effective cover to the crown of the pipe(s) is less than 1.2m in trafficked areas and 0.6m in soft landscaped or pedestrianised areas.

16. The contractor is to ensure that protective measures are taken to ensure that drainage pipework and fittings are not damaged by site traffic prior to oversite filling operations being completed around buildings.

17. The top run of each private foul drainage network is to be laid to falls no slacker than 1:40. the head of each run is to be vented to atmosphere in accordance with approved document H.

18. All surface water drainage to be min 100mm dia, laid at a gradient no slacker than 1/80. And all foul water drainage to be min 100mm dia. unless stated otherwise.

19. The contractor is to ensure that all pipework connections are arranged to direct flows down or into the main channel in the direction of the main flow. Where necessary 3/4 bends are to be used on oblique connections inside the manhole benching where sufficient room exists or the pipelines on oblique connections are arranged outside the chamber to be able to divert flows down the main channel. Connections brought in perpendicular to the main channel are not acceptable. Where possible the main channel flow shall be from any connections with WC's to ensure a flush through the main channel is achieved.

20. The contractor is to ensure that when preformed polypropylene manhole bases are used that they are orientated such that the main flow is through the main channel of the base. this should be achieved by incorporating long radius bends outside of the manhole.

21. The contractors attention is drawn to the need to ensure that any trenches excavated through previously compacted filled areas, in particular under the building footprint and immediately around the outside, are re-compacted to ensure localised differential settlement does not occur.

22. Where new connections are to be made into existing manholes or sewers, all invert levels, pipe orientation and sizes should be checked on-site prior to the commencement of the works, with any variance reported to the engineer once identified. Where new connections are to be made either on or off-site, the contractor is to check the line and level of any existing services / mains, to ensure that no clashes exist prior to the works commencing.

Rev.	Date	Description
P2	10.01.25	Perforated pipe cross section added.
P1	09.12.24	Issued for Pricing

Calcinotto
Jansen House
43 Commercial Rd
Poole BH14 0HU
01202 237237
info@calcinotto.co.uk
www.calcinotto.co.uk

Client
Care South

Project Title
Sussexdown Care Home

Drawing Title
Drainage Construction Details

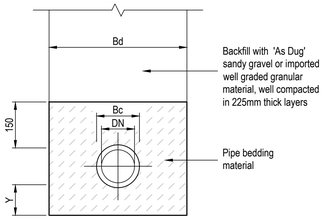
Sheet 1 of 3

Drawing Status
For Information

Originator No.	Rev by	Chk by	Scale
114522	DB	MD	As Shown

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO.
114522-CAL-XX-XX-D-C-0410

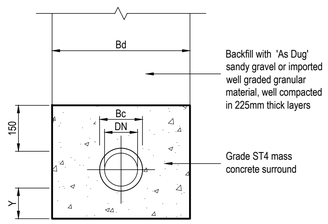
Revision
P2



Class 'S' Bedding Detail (Granular Bed & Surround)

SCALE = 1:10

Note - For use on all pipework with:
More than 0.6m of cover in all landscaped and pedestrianised areas.
More than 1.2m of cover in all trafficked areas.



25mm expansion joint material to full area of concrete bed & surround at all pipe joints

Final formation to be dished to give full depth of concrete bed around pipe collar

Class 'Z' Bedding Detail (Concrete Bed & Surround)

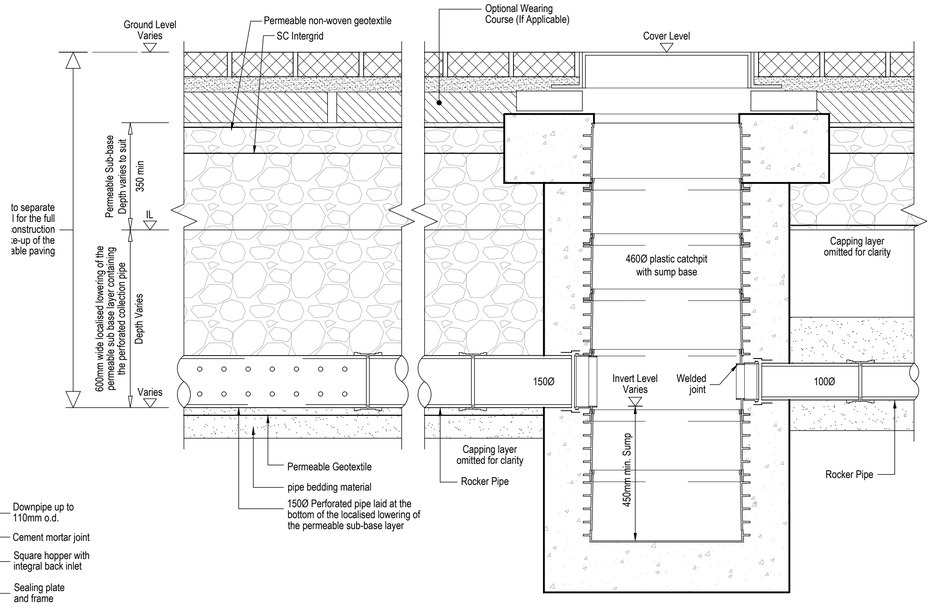
SCALE = 1:10

Note - For use on all pipework with:
Less than 0.6m of cover in all landscaped and pedestrianised areas.
Less than 1.2m of cover in all trafficked areas.

Nominal maximum aggregate size (mm) B.S. 882 Grading		
Pipe bore (mm)	Aggregate	Bedding class S … B
100	Single size graded	10 --
150	Single size graded	10 or 14 14 to 5
225	Single size graded	10, 14 or 20 14 to 5 or 20 to 5
300	Single size graded	10, 14 or 20 14 to 5 or 20 to 5
375	Single size graded	14 or 20 14 to 5 or 20 to 5

Nominal internal Ø DN (mm)	Assumed external Ø Bc (mm)	Assumed max. permissible trench width Bd (mm)	Dimension 'Y' for uniform soils
100	130	550	100
150	190	600	100
225	280	700	100
300	388	750	125
375	500	1050	125

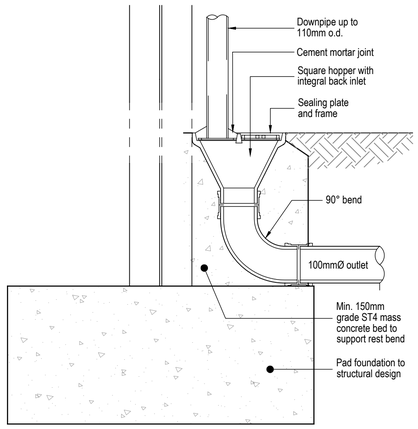
Pipe Bedding Tables



Catchpit Chamber Serving the Permeable Paving Construction Detail

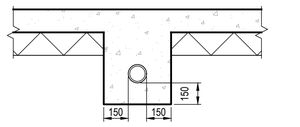
SCALE = 1:10

Notes:
1. The Permeable blocks should not be laid until the building construction is finished to avoid damage by construction vehicles and activity.
2. The contractor should ensure that there is a level base course for the Permeable blocks and clean stone bedding before the surfacing is laid to correct line and level.
3. A suitable permeable geotextile is to be laid at the base of the permeable sub-base layer to protect the sub-base from any migrating silts permeating from the layers below
4. Perforated pipe upstream ends to be capped.

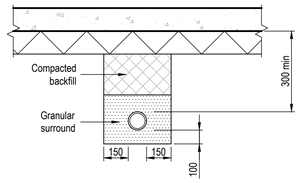


Roddable RWP Connection Detail

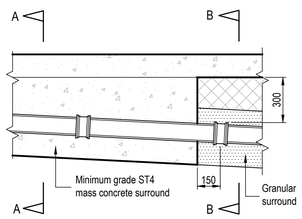
SCALE = 1:10



Section A-A

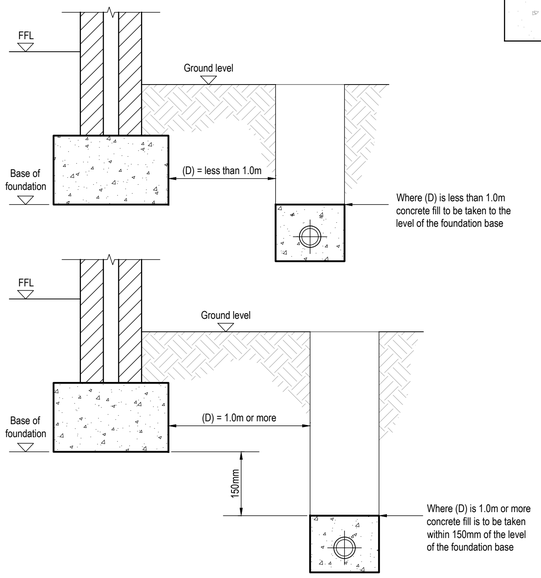


Section B-B



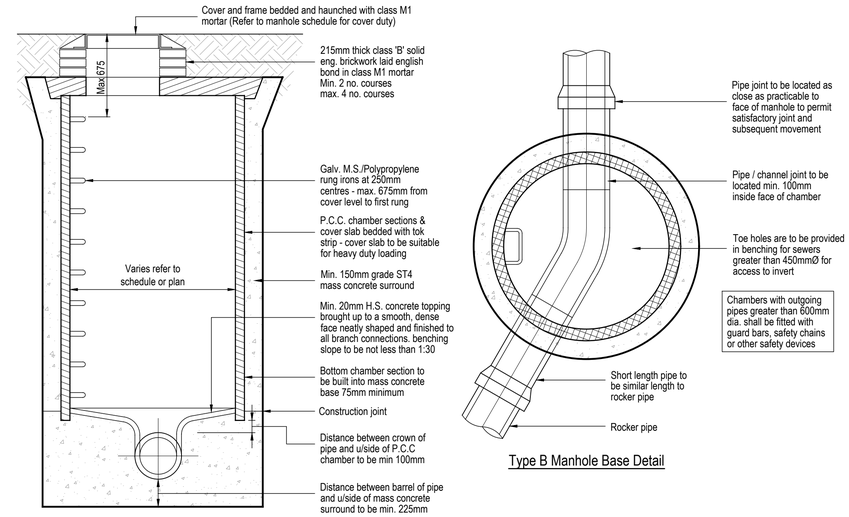
Pipework Under Slabs

SCALE = 1:20



Protection of Pipes Adjacent to Building Detail

SCALE = 1:20



Type B Manhole Section Detail

Type B Manhole Base Detail

Type B - P.C.C Ring Manhole Detail (Depth to Soffit = 3.0m Max.)

SCALE = 1:25

Notes:

1. This drawing is to be read in conjunction with all relevant architects, engineers and specialist sub-contractors drawings and the specification.

2. All setting out to be in accordance with the schedules. any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Dimensions must not be scaled.

3. All private drainage is to be in accordance with BS EN 752-1-2-3-4, BS EN 1295-1, BS EN 1610 and all relevant sections of approved document H of the building regulations (2015 Edition).

4. Where drainage pipework is to be flexibly jointed extra strength vitrified clay it should be to BS EN 295-1, Hepworth 'Supersleve' or equivalent.

5. Where drainage pipework is plastic i.e. PVC-U it shall be to BS EN 1401-1 Osma or equivalent. Private pipework to be type SN4 and all adoptable pipework to be type SN8.

6. Where drainage pipework is cast iron it shall be to BS EN 877 and for ductile iron it shall be to BS EN 598.

7. All concrete pipework, shall be to BS EN 1916 and BS 5911-1. Manholes and fittings shall be to BS 5911 parts 3 and 4 and BS EN 1917.

8. All materials for adoptable drainage are to be Kitemarked as appropriate.

9. Where drains pass through foundations or connect to manholes, flexible pipe joints are to be provided within 150mm of the face of the structure and within a further 600mm to form a rocker pipe.

10. Where pipes pass through screen walls, footings or retaining walls, lintels are to be provided.

11. Where pipelines pass within 1.0m of buildings or walls the foundations are to be taken down below the bottom of the trench. Where pipelines are more than 1.0m away from foundations the trench shall be backfilled with concrete up to a point that meets a 45° angle line taken from the bottom corner of the nearest foundation.

12. Where depth to invert does not exceed 600mm and the pipe size does not exceed 100mm diameter, 300mm dia. polypropylene access chambers may be used. Elsewhere, proprietary polypropylene or precast concrete manholes are to be used.

13. Where connections are to be made to existing manholes / sewers, invert levels, pipe sizes and orientation should be checked prior to the commencement of the works and any variance reported to the engineer immediately. Where connections are to be made on or off site the contractor is to check the line and level of any services / mains, to ensure that no clashes exist prior to works commencing.

14. Where pipelines cross, each is to be surrounded with grade ST4 mass concrete for a distance not less than 1.0m centred on the crossing point. Length of surround to be extended as necessary to within 150mm of the next nearest flexible joints.

15. For private drainage, concrete protection is to be provided where the effective cover to the crown of the pipe(s) is less than 1.2m in trafficked areas and 0.6m in soft landscaped or pedestrianised areas.

16. The contractor is to ensure that protective measures are taken to ensure that drainage pipework and fittings are not damaged by site traffic prior to oversite filling operations being completed around buildings.

17. The top run of each private foul drainage network is to be laid to falls no slacker than 1:40. the head of each run is to be vented to atmosphere in accordance with approved document H.

18. All surface water drainage to be min 100mm dia, laid at a gradient no slacker than 1/80. And all foul water drainage to be min 100mm dia. unless stated otherwise.

19. The contractor is to ensure that all pipework connections are arranged to direct flows down or into the main channel in the direction of the main flow. Where necessary 3/4 bends are to be used on oblique connections inside the manhole benching where sufficient room exists or the pipelines on oblique connections are arranged outside the chamber to be able to divert flows down the main channel. Connections brought in perpendicular to the main channel are not acceptable. Where possible the main channel flow shall be from any connections with WC's to ensure a flush through the main channel is achieved.

20. The contractor is to ensure that when preformed polypropylene manhole bases are used that they are orientated such that the main flow is through the main channel of the base. this should be achieved by incorporating long radius bends outside of the manhole.

21. The contractors attention is drawn to the need to ensure that any trenches excavated through previously compacted filled areas, in particular under the building footprint and immediately around the outside, are re-compacted to ensure localised differential settlement does not occur.

22. Where new connections are to be made into existing manholes or sewers, all invert levels, pipe orientation and sizes should be checked on-site prior to the commencement of the works, with any variance reported to the engineer once identified. Where new connections are to be made either on or off-site, the contractor is to check the line and level of any existing services / mains, to ensure that no clashes exist prior to the works commencing.

Rev.	Date	Description
P1	09.12.24	Issued for Pricing

Calcinotto
Jonsieri House
43 Commercial Rd
Poole BH14 0HU
01202 237237
info@calkinotto.co.uk
www.calcinotto.co.uk

Client
Care South

Project Title
Sussexdown Care Home

Drawing Title
Drainage Construction Details

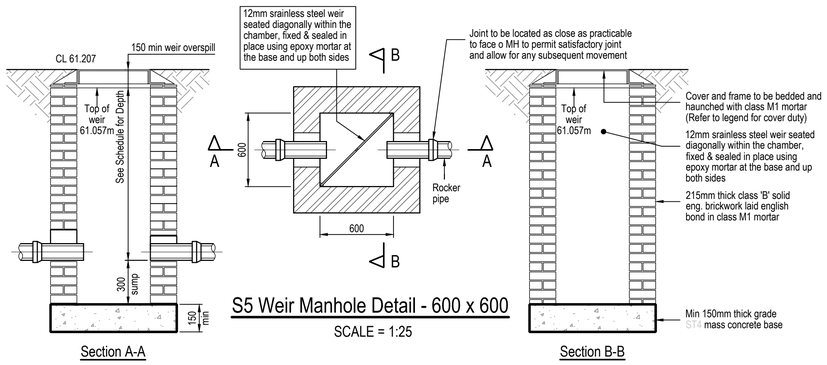
Sheet 2 of 3

Drawing Status
For Information

Originator No.	Rev by	Chk by	Scale
114522	DB	MD	As Shown

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO.
114522-CAL-XX-XX-D-C-0411

Revision
P1

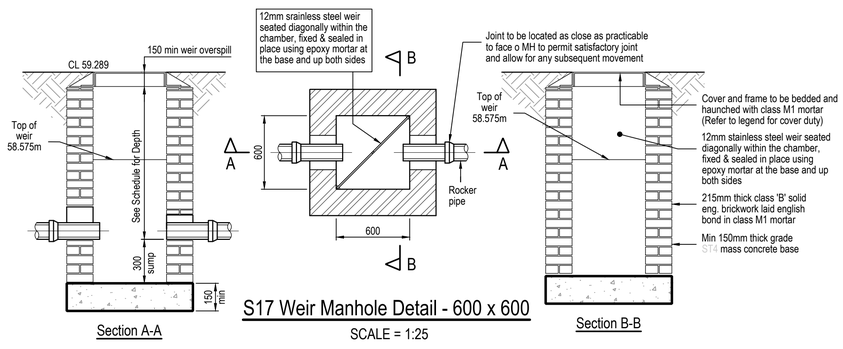


Section A-A

Section B-B

S5 Weir Manhole Detail - 600 x 600

SCALE = 1:25

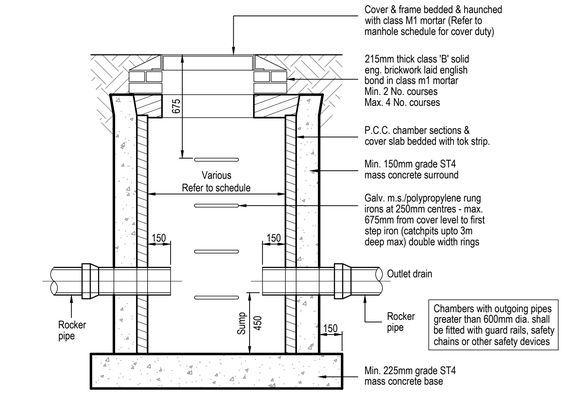


Section A-A

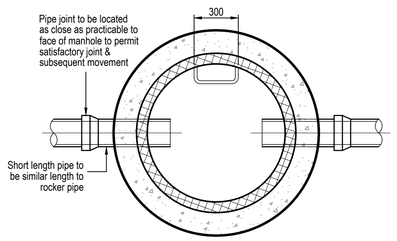
Section B-B

S17 Weir Manhole Detail - 600 x 600

SCALE = 1:25



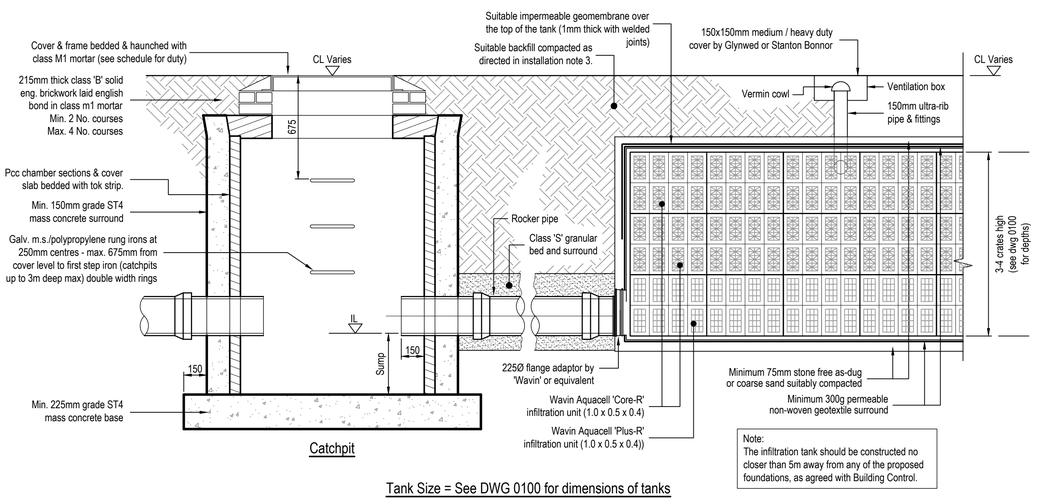
P.C.C. Catchpit Section Detail



P.C.C. Catchpit Base Detail

P.C.C. Ring Catchpit Manhole Detail

SCALE = 1:20

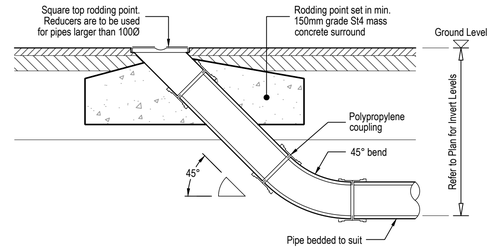


Catchpit

Tank Size = See DWG 0100 for dimensions of tanks

Typical Wavin Aquacell 'Core-R / Plus-R' Infiltration Tank Detail

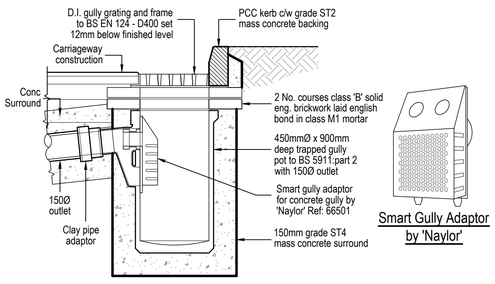
SCALE = 1:20



Hard Paved Areas

External Rodding Point Detail

SCALE = 1:10



Smart Gully Adaptor by 'Naylor'

Road Gully Detail (P.C.C) Adjacent Kerb (With Smart Sponge Filter)

SCALE = 1:20

Note:
1. Tail to have a minimum 150mm ST4 Concrete Surround for the first 750mm below Road level.
2. The smart gully adaptor is to be installed in accordance with the manufacturers recommendations.

Notes:

1. This drawing is to be read in conjunction with all relevant architects, engineers and specialist sub-contractors drawings and the specification.

2. All setting out to be in accordance with the schedules, any discrepancies between the engineers and the architects drawings to be referred to the architect before proceeding. Dimensions must not be scaled.

3. All private drainage is to be in accordance with BS EN 752-1-2-3-4, BS EN 1295-1, BS EN 1610 and all relevant sections of approved document H of the building regulations (2015 Edition).

4. Where drainage pipework is to be flexibly jointed extra strength vitrified clay it should be to BS EN 295-1, Hepworth 'Supersleve' or equivalent.

5. Where drainage pipework is plastic i.e. PVC-U it shall be to BS EN 1401-1 Osma or equivalent. Private pipework to be type SN4 and all adoptable pipework to be type SN8.

6. Where drainage pipework is cast iron it shall be to BS EN 877 and for ductile iron it shall be to BS EN 598.

7. All concrete pipework, shall be to BS EN 1916 and BS 5911-1. Manholes and fittings shall be to BS 5911 parts 3 and 4 and BS EN 1917.

8. All materials for adoptable drainage are to be Kitemarked as appropriate.

9. Where drains pass through foundations or connect to manholes, flexible pipe joints are to be provided within 150mm of the face of the structure and within a further 600mm to form a rocker pipe.

10. Where pipes pass through screen walls, footings or retaining walls, lintels are to be provided.

11. Where pipelines pass within 1.0m of buildings or walls the foundations are to be taken down below the bottom of the trench. Where pipelines are more than 1.0m away from foundations the trench shall be backfilled with concrete up to a point that meets a 45° angle line taken from the bottom corner of the nearest foundation.

12. Where depth to invert does not exceed 600mm and the pipe size does not exceed 100mm diameter, 300mm dia. polypropylene access chambers may be used. Elsewhere, proprietary polypropylene or precast concrete manholes are to be used.

13. Where connections are to be made to existing manholes / sewers, invert levels, pipe sizes and orientation should be checked prior to the commencement of the works and any variance reported to the engineer immediately. Where connections are to be made on or off site the contractor is to check the line and level of any services / mains, to ensure that no clashes exist prior to works commencing.

14. Where pipelines cross, each is to be surrounded with grade ST4 mass concrete for a distance not less than 1.0m centred on the crossing point. Length of surround to be extended as necessary to within 150mm of the next nearest flexible joints.

15. For private drainage, concrete protection is to be provided where the effective cover to the crown of the pipe(s) is less than 1.2m in trafficked areas and 0.6m in soft landscaped or pedestrianised areas.

16. The contractor is to ensure that protective measures are taken to ensure that drainage pipework and fittings are not damaged by site traffic prior to oversite filling operations being completed around buildings.

17. The top run of each private foul drainage network is to be laid to falls no slacker than 1:40. the head of each run is to be vented to atmosphere in accordance with approved document H.

18. All surface water drainage to be min 100mm dia, laid at a gradient no slacker than 1/80. And all foul water drainage to be min 100mm dia. unless stated otherwise.

19. The contractor is to ensure that all pipework connections are arranged to direct flows down or into the main channel in the direction of the main flow. Where necessary 3/4 bends are to be used on oblique connections inside the manhole benching where sufficient room exists or the pipelines on oblique connections are arranged outside the chamber to be able to divert flows down the main channel. Connections brought in perpendicular to the main channel are not acceptable. Where possible the main channel flow shall be from any connections with WC's to ensure a flush through the main channel is achieved.

20. The contractor is to ensure that when preformed polypropylene manhole bases are used that they are orientated such that the main flow is through the main channel of the base. this should be achieved by incorporating long radius bends outside of the manhole.

21. The contractors attention is drawn to the need to ensure that any trenches excavated through previously compacted filled areas, in particular under the building footprint and immediately around the outside, are re-compacted to ensure localised differential settlement does not occur.

22. Where new connections are to be made into existing manholes or sewers, all invert levels, pipe orientation and sizes should be checked on-site prior to the commencement of the works, with any variance reported to the engineer once identified. Where new connections are to be made either on or off-site, the contractor is to check the line and level of any existing services / mains, to ensure that no clashes exist prior to the works commencing.

Rev.	Date	Description
P1	09.12.24	Issued for Pricing

Calcinotto
Jansen House
43 Commercial Rd
Poole BH14 0HU
01202 237237
info@calcinotto.co.uk
www.calcinotto.co.uk

Client: Care South

Project Title: Sussexdown Care Home

Drawing Title: Drainage Construction Details

Sheet 3 of 3

Drawing Status: For Information

Originator No.	Rev by	Chk by	Scale
114522	DB	MD	AS SHOWN @A1

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | NO. 114522-CAL-XX-XX-D-C-0412

Revision P1

E Drainage Hydraulic Calculations

SOAKAWAY 1 OUTFALL - HYDRAULIC CALCULATIONS

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1		5.00	62.553	450	509407.909	113974.773	0.600
S2	0.033	5.00	62.596	600	509416.309	113985.669	1.096
S3			62.663	600	509399.800	113998.490	1.463
S4	0.118	5.00	62.457	1200	509392.766	113990.964	1.557
S5			61.272	1350	509362.790	114013.821	1.772
S6		5.00	60.600	450	509345.454	114027.026	0.700
S7	0.018	5.00	61.012	1200	509356.067	114019.182	1.712
S8		5.00	60.050	450	509343.968	114009.704	0.750
S9			60.050	450	509339.368	114003.670	0.850
S10		5.00	60.110	450	509328.044	113993.922	0.650
S11			60.070	450	509334.655	114002.806	1.350
S12	0.076	5.00	60.270	1200	509340.714	113998.264	2.195
S13	0.015	5.00	60.260	450	509339.077	113992.552	1.160
S14		5.00	59.259	450	509369.412	113968.994	0.600
S15	0.011	5.00	59.650	450	509357.052	113978.413	1.350
S16	0.062	5.00	59.180	1200	509374.489	113979.168	0.630
S17			59.345	1350	509373.650	113972.665	2.400

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	13.758	0.600	61.953	61.575	0.378	36.4	150	5.14	50.0
1.001	S2	S3	20.903	0.600	61.500	61.200	0.300	69.7	225	5.36	50.0
1.002	S3	S4	10.302	0.600	61.200	61.050	0.150	68.7	225	5.47	50.0
1.003	S4	S5	37.696	0.600	60.900	59.500	1.400	26.9	375	5.65	50.0
1.004	S5	S7	8.599	0.600	59.500	59.375	0.125	68.8	150	5.77	50.0
2.000	S6	S7	13.197	0.600	59.900	59.375	0.525	25.1	150	5.11	50.0
1.005	S7	S12	25.947	0.600	59.300	58.075	1.225	21.2	300	5.89	50.0
5.000	S8	S9	7.587	0.600	59.300	59.200	0.100	75.9	150	5.11	50.0
5.001	S9	S11	4.792	0.600	59.200	58.720	0.480	10.0	150	5.13	50.0
6.000	S10	S11	11.073	0.600	59.460	58.720	0.740	15.0	150	5.07	50.0
5.002	S11	S12	7.573	0.600	58.720	58.225	0.495	15.3	150	5.18	50.0
1.006	S12	S17	41.714	0.600	58.075	56.945	1.130	36.9	300	6.16	50.0
3.000	S13	S15	22.869	0.600	59.100	58.300	0.800	28.6	150	5.20	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.673	29.6	0.0	0.450	0.871	0.000	0.0
1.001	1.568	62.4	4.5	0.871	1.238	0.033	0.0
1.002	1.580	62.8	4.5	1.238	1.182	0.033	0.0
1.003	3.503	386.9	20.4	1.182	1.397	0.151	0.0
1.004	1.214	21.4	20.4	1.622	1.487	0.151	0.0
2.000	2.016	35.6	0.0	0.550	1.487	0.000	0.0
1.005	3.431	242.5	22.8	1.412	1.895	0.169	0.0
5.000	1.155	20.4	0.0	0.600	0.700	0.000	0.0
5.001	3.207	56.7	0.0	0.700	1.200	0.000	0.0
6.000	2.617	46.2	0.0	0.500	1.200	0.000	0.0
5.002	2.588	45.7	0.0	1.200	1.895	0.000	0.0
1.006	2.596	183.5	45.0	1.895	2.100	0.332	0.0
3.000	1.890	33.4	2.0	1.010	1.200	0.015	0.0

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
4.000	S14	S15	15.540	0.600	58.659	58.300	0.359	43.3	150	5.17	50.0
3.001	S15	S12	17.565	0.600	58.300	58.075	0.225	78.1	150	5.46	50.0
7.000	S16	S12	6.557	0.600	58.550	58.075	0.475	13.8	150	5.04	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
4.000	1.533	27.1	0.0	0.450	1.200	0.000	0.0
3.001	1.139	20.1	3.5	1.200	2.045	0.026	0.0
7.000	2.725	48.2	8.4	0.480	2.045	0.062	0.0

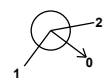
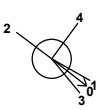
Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	13.758	36.4	150	Circular	62.553	61.953	0.450	62.596	61.575	0.871
1.001	20.903	69.7	225	Circular	62.596	61.500	0.871	62.663	61.200	1.238
1.002	10.302	68.7	225	Circular	62.663	61.200	1.238	62.457	61.050	1.182
1.003	37.696	26.9	375	Circular	62.457	60.900	1.182	61.272	59.500	1.397
1.004	8.599	68.8	150	Circular	61.272	59.500	1.622	61.012	59.375	1.487
2.000	13.197	25.1	150	Circular	60.600	59.900	0.550	61.012	59.375	1.487
1.005	25.947	21.2	300	Circular	61.012	59.300	1.412	60.270	58.075	1.895
5.000	7.587	75.9	150	Circular	60.050	59.300	0.600	60.050	59.200	0.700
5.001	4.792	10.0	150	Circular	60.050	59.200	0.700	60.070	58.720	1.200
6.000	11.073	15.0	150	Circular	60.110	59.460	0.500	60.070	58.720	1.200
5.002	7.573	15.3	150	Circular	60.070	58.720	1.200	60.270	58.225	1.895
1.006	41.714	36.9	300	Circular	60.270	58.075	1.895	59.345	56.945	2.100
3.000	22.869	28.6	150	Circular	60.260	59.100	1.010	59.650	58.300	1.200
4.000	15.540	43.3	150	Circular	59.259	58.659	0.450	59.650	58.300	1.200
3.001	17.565	78.1	150	Circular	59.650	58.300	1.200	60.270	58.075	2.045
7.000	6.557	13.8	150	Circular	59.180	58.550	0.480	60.270	58.075	2.045

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	450	Manhole	Adoptable	S2	600	Manhole	Adoptable
1.001	S2	600	Manhole	Adoptable	S3	600	Manhole	Adoptable
1.002	S3	600	Manhole	Adoptable	S4	1200	Manhole	Adoptable
1.003	S4	1200	Manhole	Adoptable	S5	1350	Manhole	Adoptable
1.004	S5	1350	Manhole	Adoptable	S7	1200	Manhole	Adoptable
2.000	S6	450	Manhole	Adoptable	S7	1200	Manhole	Adoptable
1.005	S7	1200	Manhole	Adoptable	S12	1200	Manhole	Adoptable
5.000	S8	450	Manhole	Adoptable	S9	450	Manhole	Adoptable
5.001	S9	450	Manhole	Adoptable	S11	450	Manhole	Adoptable
6.000	S10	450	Manhole	Adoptable	S11	450	Manhole	Adoptable
5.002	S11	450	Manhole	Adoptable	S12	1200	Manhole	Adoptable
1.006	S12	1200	Manhole	Adoptable	S17	1350	Manhole	Adoptable
3.000	S13	450	Manhole	Adoptable	S15	450	Manhole	Adoptable
4.000	S14	450	Manhole	Adoptable	S15	450	Manhole	Adoptable
3.001	S15	450	Manhole	Adoptable	S12	1200	Manhole	Adoptable
7.000	S16	1200	Manhole	Adoptable	S12	1200	Manhole	Adoptable

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	509407.909	113974.773	62.553	0.600	450				
						0	1.000	61.953	150
S2	509416.309	113985.669	62.596	1.096	600		1	1.000	61.575	150
							0	1.001	61.500	225
S3	509399.800	113998.490	62.663	1.463	600		1	1.001	61.200	225
							0	1.002	61.200	225
S4	509392.766	113990.964	62.457	1.557	1200		1	1.002	61.050	225
							0	1.003	60.900	375
S5	509362.790	114013.821	61.272	1.772	1350		1	1.003	59.500	375
							0	1.004	59.500	150
S6	509345.454	114027.026	60.600	0.700	450				
						0	2.000	59.900	150
S7	509356.067	114019.182	61.012	1.712	1200		1	2.000	59.375	150
							2	1.004	59.375	150
							0	1.005	59.300	300
S8	509343.968	114009.704	60.050	0.750	450				
						0	5.000	59.300	150
S9	509339.368	114003.670	60.050	0.850	450		1	5.000	59.200	150
							0	5.001	59.200	150
S10	509328.044	113993.922	60.110	0.650	450				
						0	6.000	59.460	150
S11	509334.655	114002.806	60.070	1.350	450		1	6.000	58.720	150
							2	5.001	58.720	150
							0	5.002	58.720	150
S12	509340.714	113998.264	60.270	2.195	1200		1	7.000	58.075	150
							2	5.002	58.225	150
							3	3.001	58.075	150
							4	1.005	58.075	300
							0	1.006	58.075	300
S13	509339.077	113992.552	60.260	1.160	450				
						0	3.000	59.100	150

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S14	509369.412	113968.994	59.259	0.600	450				
						0	4.000	58.659	150
S15	509357.052	113978.413	59.650	1.350	450				
						1	4.000	58.300	150
						2	3.000	58.300	150
						0	3.001	58.300	150
S16	509374.489	113979.168	59.180	0.630	1200				
						0	7.000	58.550	150
S17	509373.650	113972.665	59.345	2.400	1350				
						1	1.006	56.945	300

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
5	0	0	0
30	40	0	0
100	45	0	0

Node S5 Online Weir Control

Flap Valve	x	Invert Level (m)	61.120	Discharge Coefficient	0.590
Replaces Downstream Link	✓	Width (m)	1.200		

Node S5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.09000	Invert Level (m)	60.470	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.09000	Time to half empty (mins)	100	Depth (m)	0.350
Safety Factor	1.5	Width (m)	17.000	Inf Depth (m)	
Porosity	0.35	Length (m)	5.000		

Node S16 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.09000	Invert Level (m)	58.550	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.09000	Time to half empty (mins)	68	Depth (m)	0.350
Safety Factor	1.5	Width (m)	64.000	Inf Depth (m)	
Porosity	0.35	Length (m)	10.000		

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Node S17 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	56.945	Depth (m)	1.200
Side Inf Coefficient (m/hr)	0.09000	Time to half empty (mins)	875	Inf Depth (m)	
Safety Factor	1.0	Pit Width (m)	3.000	Number Required	1
Porosity	0.95	Pit Length (m)	35.000		

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
5 year 15 minute summer	182.098	51.528
5 year 15 minute winter	127.788	51.528
5 year 30 minute summer	118.977	33.666
5 year 30 minute winter	83.492	33.666
5 year 60 minute summer	80.570	21.292
5 year 60 minute winter	53.529	21.292
5 year 120 minute summer	51.268	13.549
5 year 120 minute winter	34.061	13.549
5 year 180 minute summer	40.036	10.303
5 year 180 minute winter	26.024	10.303
5 year 240 minute summer	31.983	8.452
5 year 240 minute winter	21.249	8.452
5 year 360 minute summer	24.727	6.363
5 year 360 minute winter	16.073	6.363
5 year 480 minute summer	19.634	5.189
5 year 480 minute winter	13.044	5.189
5 year 600 minute summer	16.167	4.422
5 year 600 minute winter	11.046	4.422
5 year 720 minute summer	14.465	3.877
5 year 720 minute winter	9.722	3.877
5 year 960 minute summer	11.936	3.143
5 year 960 minute winter	7.907	3.143
5 year 1440 minute summer	8.708	2.334
5 year 1440 minute winter	5.853	2.334
5 year 2160 minute summer	6.287	1.737
5 year 2160 minute winter	4.332	1.737
5 year 2880 minute summer	5.285	1.416
5 year 2880 minute winter	3.552	1.416
5 year 4320 minute summer	4.111	1.075
5 year 4320 minute winter	2.707	1.075
5 year 5760 minute summer	3.494	0.895
5 year 5760 minute winter	2.262	0.895
5 year 7200 minute summer	3.079	0.786
5 year 7200 minute winter	1.987	0.786
5 year 8640 minute summer	2.790	0.712
5 year 8640 minute winter	1.801	0.712
5 year 10080 minute summer	2.583	0.659
5 year 10080 minute winter	1.667	0.659
30 year +40% CC 15 minute summer	410.971	116.291
30 year +40% CC 15 minute winter	288.401	116.291

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +40% CC 30 minute summer	273.863	77.494
30 year +40% CC 30 minute winter	192.184	77.494
30 year +40% CC 60 minute summer	186.041	49.165
30 year +40% CC 60 minute winter	123.601	49.165
30 year +40% CC 120 minute summer	110.855	29.296
30 year +40% CC 120 minute winter	73.649	29.296
30 year +40% CC 180 minute summer	84.068	21.633
30 year +40% CC 180 minute winter	54.646	21.633
30 year +40% CC 240 minute summer	65.987	17.438
30 year +40% CC 240 minute winter	43.840	17.438
30 year +40% CC 360 minute summer	49.946	12.853
30 year +40% CC 360 minute winter	32.466	12.853
30 year +40% CC 480 minute summer	39.162	10.349
30 year +40% CC 480 minute winter	26.018	10.349
30 year +40% CC 600 minute summer	31.983	8.748
30 year +40% CC 600 minute winter	21.853	8.748
30 year +40% CC 720 minute summer	28.452	7.625
30 year +40% CC 720 minute winter	19.121	7.625
30 year +40% CC 960 minute summer	23.313	6.139
30 year +40% CC 960 minute winter	15.443	6.139
30 year +40% CC 1440 minute summer	16.892	4.527
30 year +40% CC 1440 minute winter	11.353	4.527
30 year +40% CC 2160 minute summer	12.110	3.347
30 year +40% CC 2160 minute winter	8.344	3.347
30 year +40% CC 2880 minute summer	10.120	2.712
30 year +40% CC 2880 minute winter	6.801	2.712
30 year +40% CC 4320 minute summer	7.781	2.034
30 year +40% CC 4320 minute winter	5.124	2.034
30 year +40% CC 5760 minute summer	6.548	1.676
30 year +40% CC 5760 minute winter	4.238	1.676
30 year +40% CC 7200 minute summer	5.715	1.458
30 year +40% CC 7200 minute winter	3.688	1.458
30 year +40% CC 8640 minute summer	5.135	1.310
30 year +40% CC 8640 minute winter	3.314	1.310
30 year +40% CC 10080 minute summer	4.718	1.203
30 year +40% CC 10080 minute winter	3.045	1.203
100 year +45% CC 15 minute summer	540.136	152.840
100 year +45% CC 15 minute winter	379.043	152.840
100 year +45% CC 30 minute summer	361.409	102.266
100 year +45% CC 30 minute winter	253.620	102.266
100 year +45% CC 60 minute summer	246.710	65.198
100 year +45% CC 60 minute winter	163.908	65.198
100 year +45% CC 120 minute summer	144.029	38.062
100 year +45% CC 120 minute winter	95.689	38.063
100 year +45% CC 180 minute summer	108.159	27.833
100 year +45% CC 180 minute winter	70.306	27.833
100 year +45% CC 240 minute summer	84.443	22.316
100 year +45% CC 240 minute winter	56.102	22.316
100 year +45% CC 360 minute summer	63.649	16.379
100 year +45% CC 360 minute winter	41.374	16.379
100 year +45% CC 480 minute summer	49.801	13.161
100 year +45% CC 480 minute winter	33.087	13.161

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +45% CC 600 minute summer	40.629	11.113
100 year +45% CC 600 minute winter	27.760	11.113
100 year +45% CC 720 minute summer	36.127	9.683
100 year +45% CC 720 minute winter	24.280	9.683
100 year +45% CC 960 minute summer	29.612	7.797
100 year +45% CC 960 minute winter	19.615	7.797
100 year +45% CC 1440 minute summer	21.492	5.760
100 year +45% CC 1440 minute winter	14.444	5.760
100 year +45% CC 2160 minute summer	15.413	4.260
100 year +45% CC 2160 minute winter	10.620	4.260
100 year +45% CC 2880 minute summer	12.849	3.444
100 year +45% CC 2880 minute winter	8.635	3.444
100 year +45% CC 4320 minute summer	9.770	2.554
100 year +45% CC 4320 minute winter	6.434	2.554
100 year +45% CC 5760 minute summer	8.128	2.081
100 year +45% CC 5760 minute winter	5.261	2.081
100 year +45% CC 7200 minute summer	7.015	1.790
100 year +45% CC 7200 minute winter	4.528	1.790
100 year +45% CC 8640 minute summer	6.241	1.592
100 year +45% CC 8640 minute winter	4.028	1.592
100 year +45% CC 10080 minute summer	5.685	1.450
100 year +45% CC 10080 minute winter	3.669	1.450

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 5 year Critical Storm Duration. Lowest mass balance: 95.41%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	1	61.953	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S2	10	61.561	0.061	9.8	0.0174	0.0000	OK
15 minute summer	S3	10	61.263	0.063	9.7	0.0178	0.0000	OK
60 minute summer	S4	37	61.167	0.267	28.9	0.3015	0.0000	OK
60 minute summer	S5	37	61.164	1.664	28.9	11.5574	0.0000	FLOOD RISK
15 minute summer	S6	1	59.900	0.000	0.0	0.0000	0.0000	OK
60 minute summer	S7	37	59.361	0.061	22.6	0.0689	0.0000	OK
15 minute summer	S8	1	59.300	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S9	1	59.200	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S10	1	59.460	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S11	1	58.720	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S12	10	58.186	0.111	45.9	0.1258	0.0000	OK
15 minute summer	S13	10	59.137	0.037	4.4	0.0058	0.0000	OK
15 minute summer	S14	1	58.659	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S15	11	58.363	0.063	7.6	0.0100	0.0000	OK
15 minute summer	S16	12	58.601	0.051	18.5	1.8374	0.0000	OK
480 minute summer	S17	352	57.512	0.567	14.7	57.3951	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S1	1.000	S2	0.0	0.000	0.000	0.0000
15 minute summer	S2	1.001	S3	9.7	1.093	0.156	0.1859
15 minute summer	S3	1.002	S4	9.6	1.107	0.152	0.0893
60 minute summer	S4	1.003	S5	28.9	0.906	0.075	3.6581
60 minute summer	S5	Weir	S7	20.4			
60 minute summer	S5	Infiltration		1.6			
15 minute summer	S6	2.000	S7	0.0	0.000	0.000	0.0000
60 minute summer	S7	1.005	S12	21.9	1.558	0.091	0.3689
15 minute summer	S8	5.000	S9	0.0	0.000	0.000	0.0000
15 minute summer	S9	5.001	S11	0.0	0.000	0.000	0.0000
15 minute summer	S10	6.000	S11	0.0	0.000	0.000	0.0000
15 minute summer	S11	5.002	S12	0.0	0.000	0.000	0.0000
15 minute summer	S12	1.006	S17	47.1	2.655	0.257	1.0956
15 minute summer	S13	3.000	S15	4.4	0.856	0.131	0.1181
15 minute summer	S14	4.000	S15	0.0	0.000	0.000	0.0544
15 minute summer	S15	3.001	S12	7.4	0.722	0.369	0.1844
15 minute summer	S16	7.000	S12	12.2	1.450	0.253	0.0617
15 minute summer	S16	Infiltration		3.4			
480 minute summer	S17	Infiltration		1.1			

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 95.41%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	1	61.953	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S2	10	61.596	0.096	22.1	0.0271	0.0000	OK
15 minute summer	S3	11	61.394	0.194	21.9	0.0550	0.0000	OK
30 minute summer	S4	17	61.397	0.497	94.5	0.5617	0.0000	SURCHARGED
15 minute summer	S5	11	61.247	1.747	101.5	11.6760	0.0000	FLOOD RISK
15 minute summer	S6	1	59.900	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S7	11	59.441	0.141	111.7	0.1589	0.0000	OK
15 minute summer	S8	1	59.300	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S9	1	59.200	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S10	1	59.460	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S11	1	58.720	0.000	0.0	0.0000	0.0000	OK
240 minute winter	S12	164	58.692	0.617	35.7	0.6982	0.0000	SURCHARGED
15 minute summer	S13	10	59.156	0.056	9.9	0.0089	0.0000	OK
240 minute winter	S14	164	58.696	0.037	0.0	0.0059	0.0000	OK
240 minute winter	S15	164	58.693	0.393	3.1	0.0625	0.0000	SURCHARGED
360 minute winter	S16	256	58.660	0.110	13.6	8.2350	0.0000	OK
240 minute winter	S17	164	58.693	1.748	35.6	122.2516	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S1	1.000	S2	0.0	0.000	0.000	0.0101
15 minute summer	S2	1.001	S3	21.9	1.328	0.352	0.5361
15 minute summer	S3	1.002	S4	22.7	1.361	0.361	0.3928
30 minute summer	S4	1.003	S5	89.0	1.108	0.230	4.1578
15 minute summer	S5	Weir	S7	100.3			
15 minute summer	S5	Infiltration		1.6			
15 minute summer	S6	2.000	S7	0.0	0.000	0.000	0.0488
15 minute summer	S7	1.005	S12	108.6	2.101	0.448	1.2921
15 minute summer	S8	5.000	S9	0.0	0.000	0.000	0.0000
15 minute summer	S9	5.001	S11	0.0	0.000	0.000	0.0000
15 minute summer	S10	6.000	S11	0.0	0.000	0.000	0.0000
15 minute summer	S11	5.002	S12	0.0	0.000	0.000	0.0667
240 minute winter	S12	1.006	S17	35.6	1.384	0.194	2.9375
15 minute summer	S13	3.000	S15	9.8	1.045	0.295	0.2601
240 minute winter	S14	4.000	S15	0.1	0.007	0.003	0.1629
240 minute winter	S15	3.001	S12	3.1	0.488	0.154	0.3092
360 minute winter	S16	7.000	S12	-10.3	-0.716	-0.213	0.1031
360 minute winter	S16	Infiltration		7.2			
240 minute winter	S17	Infiltration		2.3			

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 95.41%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	1	61.953	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S2	9	61.609	0.109	29.1	0.0309	0.0000	OK
15 minute summer	S3	10	61.537	0.337	28.9	0.0955	0.0000	SURCHARGED
15 minute summer	S4	10	61.505	0.605	122.1	0.6841	0.0000	SURCHARGED
15 minute summer	S5	10	61.271	1.771	131.8	11.7109	0.0000	FLOOD RISK
15 minute summer	S6	1	59.900	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S7	11	59.485	0.185	145.3	0.2094	0.0000	OK
15 minute summer	S8	1	59.300	0.000	0.0	0.0000	0.0000	OK
120 minute summer	S9	76	59.205	0.005	0.0	0.0008	0.0000	OK
15 minute summer	S10	1	59.460	0.000	0.0	0.0000	0.0000	OK
120 minute summer	S11	76	59.196	0.476	2.4	0.0757	0.0000	SURCHARGED
120 minute summer	S12	76	59.197	1.122	116.5	1.2693	0.0000	SURCHARGED
120 minute summer	S13	76	59.216	0.116	5.7	0.0185	0.0000	OK
120 minute summer	S14	76	59.215	0.556	1.7	0.0884	0.0000	FLOOD RISK
120 minute summer	S15	76	59.214	0.914	22.2	0.1454	0.0000	SURCHARGED
240 minute summer	S16	168	58.816	0.266	46.9	41.2755	0.0000	SURCHARGED
120 minute summer	S17	76	59.200	2.255	114.2	122.9772	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S1	1.000	S2	0.0	0.000	0.000	0.0207
15 minute summer	S2	1.001	S3	28.9	1.393	0.464	0.6103
15 minute summer	S3	1.002	S4	28.9	1.411	0.460	0.4097
15 minute summer	S4	1.003	S5	131.8	1.196	0.341	4.1578
15 minute summer	S5	Weir	S7	129.6			
15 minute summer	S5	Infiltration		1.6			
15 minute summer	S6	2.000	S7	0.0	0.000	0.000	0.0915
15 minute summer	S7	1.005	S12	136.5	2.120	0.563	1.5057
15 minute summer	S8	5.000	S9	0.0	0.000	0.000	0.0000
120 minute summer	S9	5.001	S11	0.1	0.010	0.002	0.0426
15 minute summer	S10	6.000	S11	0.0	0.000	0.000	0.0188
120 minute summer	S11	5.002	S12	-2.4	-0.165	-0.052	0.1333
120 minute summer	S12	1.006	S17	114.2	1.823	0.623	2.9375
120 minute summer	S13	3.000	S15	5.7	0.915	0.171	0.3687
120 minute summer	S14	4.000	S15	-1.7	-0.097	-0.063	0.2736
120 minute summer	S15	3.001	S12	-15.5	-0.883	-0.772	0.3092
240 minute summer	S16	7.000	S12	-36.8	-2.118	-0.765	0.1154
240 minute summer	S16	Infiltration		11.1			
120 minute summer	S17	Infiltration		2.3			

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

SOAKAWAY 3 OUTFALL - HYDRAULIC CALCULATIONS

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S19		5.00	58.992	450	509397.192	113953.814	0.869
S20			58.988	450	509392.261	113947.346	0.947
S21			58.997	450	509395.939	113944.616	1.002
S22			58.993	450	509384.739	113930.256	1.180
S23			58.991	450	509377.418	113935.893	1.270
S24	0.031	5.00	60.050	450	509324.334	113982.637	0.950
S25	0.021	5.00	59.162	450	509361.533	113953.561	0.732
S18	0.133	5.00	59.096	600	509376.110	113962.431	1.096
S26			59.047	600	509365.299	113947.805	1.646
S27			59.030	1200	509357.114	113936.928	1.829
S28b			57.995	1200	509310.130	113973.759	2.295
S29	0.025	5.00	59.417	1200	509329.851	114032.323	1.217
S30	0.004	5.00	57.914	1200	509317.575	114016.751	1.514
S31	0.037	5.00	57.362	1200	509310.823	114011.453	1.787
S32	0.114	5.00	56.609	1200	509297.442	114012.477	1.184
S33			56.638	1200	509294.619	113998.228	1.338

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S19	S20	8.133	0.600	58.123	58.041	0.082	99.2	150	5.13	50.0
1.001	S20	S21	4.580	0.600	58.041	57.995	0.046	99.6	150	5.21	50.0
1.002	S21	S22	18.211	0.600	57.995	57.813	0.182	100.1	150	5.51	50.0
1.003	S22	S23	9.240	0.600	57.813	57.721	0.092	100.4	150	5.67	50.0
1.004	S23	S26	16.993	0.600	57.721	57.551	0.170	100.0	150	5.95	50.0
2.000	S24	S25	47.214	0.600	59.100	58.430	0.670	70.5	150	5.66	50.0
2.001	S25	S26	6.879	0.600	58.430	57.951	0.479	14.4	150	5.70	50.0
3.000	S18	S26	18.188	0.600	58.000	57.401	0.599	30.4	300	5.11	50.0
1.005	S26	S27	13.613	0.600	57.401	57.276	0.125	108.9	300	6.10	50.0
1.006	S27	S28b	62.699	0.600	57.201	55.700	1.501	41.8	300	6.53	50.0
1.007	S28b	S32	38.293	0.600	55.700	55.500	0.200	191.5	300	7.09	50.0
4.000	S29	S30	19.829	0.600	58.200	56.400	1.800	11.0	150	5.11	50.0
4.001	S30	S31	8.582	0.600	56.400	55.650	0.750	11.4	150	5.16	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.009	17.8	0.0	0.719	0.797	0.000	0.0
1.001	1.007	17.8	0.0	0.797	0.852	0.000	0.0
1.002	1.004	17.7	0.0	0.852	1.030	0.000	0.0
1.003	1.002	17.7	0.0	1.030	1.120	0.000	0.0
1.004	1.005	17.8	0.0	1.120	1.346	0.000	0.0
2.000	1.199	21.2	4.2	0.800	0.582	0.031	0.0
2.001	2.672	47.2	7.0	0.582	0.946	0.052	0.0
3.000	2.863	202.4	18.0	0.796	1.346	0.133	0.0
1.005	1.506	106.4	25.0	1.346	1.454	0.185	0.0
1.006	2.439	172.4	25.0	1.529	1.995	0.185	0.0
1.007	1.133	80.1	25.0	1.995	0.809	0.185	0.0
4.000	3.052	53.9	3.4	1.067	1.364	0.025	0.0
4.001	2.995	52.9	3.9	1.364	1.562	0.029	0.0

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
4.002	S31	S32	13.420	0.600	55.575	55.425	0.150	89.5	225	5.32	50.0
1.008	S32	S33	14.526	0.600	55.425	55.300	0.125	116.2	225	7.29	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
4.002	1.383	55.0	8.9	1.562	0.959	0.065	0.0
1.008	1.212	48.2	49.4	0.959	1.113	0.365	0.0

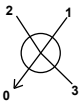
Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	8.133	99.2	150	Circular	58.992	58.123	0.719	58.988	58.041	0.797
1.001	4.580	99.6	150	Circular	58.988	58.041	0.797	58.997	57.995	0.852
1.002	18.211	100.1	150	Circular	58.997	57.995	0.852	58.993	57.813	1.030
1.003	9.240	100.4	150	Circular	58.993	57.813	1.030	58.991	57.721	1.120
1.004	16.993	100.0	150	Circular	58.991	57.721	1.120	59.047	57.551	1.346
2.000	47.214	70.5	150	Circular	60.050	59.100	0.800	59.162	58.430	0.582
2.001	6.879	14.4	150	Circular	59.162	58.430	0.582	59.047	57.951	0.946
3.000	18.188	30.4	300	Circular	59.096	58.000	0.796	59.047	57.401	1.346
1.005	13.613	108.9	300	Circular	59.047	57.401	1.346	59.030	57.276	1.454
1.006	62.699	41.8	300	Circular	59.030	57.201	1.529	57.995	55.700	1.995
1.007	38.293	191.5	300	Circular	57.995	55.700	1.995	56.609	55.500	0.809
4.000	19.829	11.0	150	Circular	59.417	58.200	1.067	57.914	56.400	1.364
4.001	8.582	11.4	150	Circular	57.914	56.400	1.364	57.362	55.650	1.562
4.002	13.420	89.5	225	Circular	57.362	55.575	1.562	56.609	55.425	0.959
1.008	14.526	116.2	225	Circular	56.609	55.425	0.959	56.638	55.300	1.113

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S19	450	Manhole	Adoptable	S20	450	Manhole	Adoptable
1.001	S20	450	Manhole	Adoptable	S21	450	Manhole	Adoptable
1.002	S21	450	Manhole	Adoptable	S22	450	Manhole	Adoptable
1.003	S22	450	Manhole	Adoptable	S23	450	Manhole	Adoptable
1.004	S23	450	Manhole	Adoptable	S26	600	Manhole	Adoptable
2.000	S24	450	Manhole	Adoptable	S25	450	Manhole	Adoptable
2.001	S25	450	Manhole	Adoptable	S26	600	Manhole	Adoptable
3.000	S18	600	Manhole	Adoptable	S26	600	Manhole	Adoptable
1.005	S26	600	Manhole	Adoptable	S27	1200	Manhole	Adoptable
1.006	S27	1200	Manhole	Adoptable	S28b	1200	Manhole	Adoptable
1.007	S28b	1200	Manhole	Adoptable	S32	1200	Manhole	Adoptable
4.000	S29	1200	Manhole	Adoptable	S30	1200	Manhole	Adoptable
4.001	S30	1200	Manhole	Adoptable	S31	1200	Manhole	Adoptable
4.002	S31	1200	Manhole	Adoptable	S32	1200	Manhole	Adoptable
1.008	S32	1200	Manhole	Adoptable	S33	1200	Manhole	Adoptable

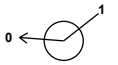
Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S19	509397.192	113953.814	58.992	0.869	450		0 1.000	58.123	150
S20	509392.261	113947.346	58.988	0.947	450		1 1.000 0 1.001	58.041 58.041	150 150
S21	509395.939	113944.616	58.997	1.002	450		1 1.001 0 1.002	57.995 57.995	150 150
S22	509384.739	113930.256	58.993	1.180	450		1 1.002 0 1.003	57.813 57.813	150 150
S23	509377.418	113935.893	58.991	1.270	450		1 1.003 0 1.004	57.721 57.721	150 150
S24	509324.334	113982.637	60.050	0.950	450		0 2.000	59.100	150
S25	509361.533	113953.561	59.162	0.732	450		1 2.000 0 2.001	58.430 58.430	150 150
S18	509376.110	113962.431	59.096	1.096	600		0 3.000	58.000	300
S26	509365.299	113947.805	59.047	1.646	600		1 3.000 2 2.001 3 1.004 0 1.005	57.401 57.951 57.551 57.401	300 150 150 300
S27	509357.114	113936.928	59.030	1.829	1200		1 1.005 0 1.006	57.276 57.201	300 300
S28b	509310.130	113973.759	57.995	2.295	1200		1 1.006 0 1.007	55.700 55.700	300 300
S29	509329.851	114032.323	59.417	1.217	1200		0 4.000	58.200	150
S30	509317.575	114016.751	57.914	1.514	1200		1 4.000 0 4.001	56.400 56.400	150 150

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S31	509310.823	114011.453	57.362	1.787	1200	 1	4.001	55.650	150
						0	4.002	55.575	225
S32	509297.442	114012.477	56.609	1.184	1200	1	4.002	55.425	225
						 2	1.007	55.500	300
						0	1.008	55.425	225
S33	509294.619	113998.228	56.638	1.338	1200	 1	1.008	55.300	225

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
5	0	0	0
30	40	0	0
100	45	0	0

Node S33 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	55.300	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.02520	Time to half empty (mins)	1163	Inf Depth (m)	
Safety Factor	1.0	Pit Width (m)	3.000	Number Required	1
Porosity	0.35	Pit Length (m)	40.000		

Node S32 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.02520	Invert Level (m)	56.000	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.02520	Time to half empty (mins)	450	Depth (m)	0.350
Safety Factor	1.5	Width (m)	71.000	Inf Depth (m)	
Porosity	0.35	Length (m)	16.000		

Node S28b Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	55.700	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	12.000	Number Required	1
Porosity	0.95	Pit Length (m)	20.000		

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
5 year 15 minute summer	182.098	51.528
5 year 15 minute winter	127.788	51.528
5 year 30 minute summer	118.977	33.666
5 year 30 minute winter	83.492	33.666
5 year 60 minute summer	80.570	21.292
5 year 60 minute winter	53.529	21.292
5 year 120 minute summer	51.268	13.549
5 year 120 minute winter	34.061	13.549
5 year 180 minute summer	40.036	10.303
5 year 180 minute winter	26.024	10.303
5 year 240 minute summer	31.983	8.452
5 year 240 minute winter	21.249	8.452
5 year 360 minute summer	24.727	6.363
5 year 360 minute winter	16.073	6.363
5 year 480 minute summer	19.634	5.189
5 year 480 minute winter	13.044	5.189
5 year 600 minute summer	16.167	4.422
5 year 600 minute winter	11.046	4.422
5 year 720 minute summer	14.465	3.877
5 year 720 minute winter	9.722	3.877
5 year 960 minute summer	11.936	3.143
5 year 960 minute winter	7.907	3.143
5 year 1440 minute summer	8.708	2.334
5 year 1440 minute winter	5.853	2.334
5 year 2160 minute summer	6.287	1.737
5 year 2160 minute winter	4.332	1.737
5 year 2880 minute summer	5.285	1.416
5 year 2880 minute winter	3.552	1.416
5 year 4320 minute summer	4.111	1.075
5 year 4320 minute winter	2.707	1.075
5 year 5760 minute summer	3.494	0.895
5 year 5760 minute winter	2.262	0.895
5 year 7200 minute summer	3.079	0.786
5 year 7200 minute winter	1.987	0.786
5 year 8640 minute summer	2.790	0.712
5 year 8640 minute winter	1.801	0.712
5 year 10080 minute summer	2.583	0.659
5 year 10080 minute winter	1.667	0.659
30 year +40% CC 15 minute summer	410.971	116.291
30 year +40% CC 15 minute winter	288.401	116.291
30 year +40% CC 30 minute summer	273.863	77.494
30 year +40% CC 30 minute winter	192.184	77.494
30 year +40% CC 60 minute summer	186.041	49.165
30 year +40% CC 60 minute winter	123.601	49.165
30 year +40% CC 120 minute summer	110.855	29.296
30 year +40% CC 120 minute winter	73.649	29.296
30 year +40% CC 180 minute summer	84.068	21.633

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +40% CC 180 minute winter	54.646	21.633
30 year +40% CC 240 minute summer	65.987	17.438
30 year +40% CC 240 minute winter	43.840	17.438
30 year +40% CC 360 minute summer	49.946	12.853
30 year +40% CC 360 minute winter	32.466	12.853
30 year +40% CC 480 minute summer	39.162	10.349
30 year +40% CC 480 minute winter	26.018	10.349
30 year +40% CC 600 minute summer	31.983	8.748
30 year +40% CC 600 minute winter	21.853	8.748
30 year +40% CC 720 minute summer	28.452	7.625
30 year +40% CC 720 minute winter	19.121	7.625
30 year +40% CC 960 minute summer	23.313	6.139
30 year +40% CC 960 minute winter	15.443	6.139
30 year +40% CC 1440 minute summer	16.892	4.527
30 year +40% CC 1440 minute winter	11.353	4.527
30 year +40% CC 2160 minute summer	12.110	3.347
30 year +40% CC 2160 minute winter	8.344	3.347
30 year +40% CC 2880 minute summer	10.120	2.712
30 year +40% CC 2880 minute winter	6.801	2.712
30 year +40% CC 4320 minute summer	7.781	2.034
30 year +40% CC 4320 minute winter	5.124	2.034
30 year +40% CC 5760 minute summer	6.548	1.676
30 year +40% CC 5760 minute winter	4.238	1.676
30 year +40% CC 7200 minute summer	5.715	1.458
30 year +40% CC 7200 minute winter	3.688	1.458
30 year +40% CC 8640 minute summer	5.135	1.310
30 year +40% CC 8640 minute winter	3.314	1.310
30 year +40% CC 10080 minute summer	4.718	1.203
30 year +40% CC 10080 minute winter	3.045	1.203
100 year +45% CC 15 minute summer	540.136	152.840
100 year +45% CC 15 minute winter	379.043	152.840
100 year +45% CC 30 minute summer	361.409	102.266
100 year +45% CC 30 minute winter	253.620	102.266
100 year +45% CC 60 minute summer	246.710	65.198
100 year +45% CC 60 minute winter	163.908	65.198
100 year +45% CC 120 minute summer	144.029	38.062
100 year +45% CC 120 minute winter	95.689	38.063
100 year +45% CC 180 minute summer	108.159	27.833
100 year +45% CC 180 minute winter	70.306	27.833
100 year +45% CC 240 minute summer	84.443	22.316
100 year +45% CC 240 minute winter	56.102	22.316
100 year +45% CC 360 minute summer	63.649	16.379
100 year +45% CC 360 minute winter	41.374	16.379
100 year +45% CC 480 minute summer	49.801	13.161
100 year +45% CC 480 minute winter	33.087	13.161
100 year +45% CC 600 minute summer	40.629	11.113
100 year +45% CC 600 minute winter	27.760	11.113
100 year +45% CC 720 minute summer	36.127	9.683
100 year +45% CC 720 minute winter	24.280	9.683
100 year +45% CC 960 minute summer	29.612	7.797
100 year +45% CC 960 minute winter	19.615	7.797
100 year +45% CC 1440 minute summer	21.492	5.760

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +45% CC 1440 minute winter	14.444	5.760
100 year +45% CC 2160 minute summer	15.413	4.260
100 year +45% CC 2160 minute winter	10.620	4.260
100 year +45% CC 2880 minute summer	12.849	3.444
100 year +45% CC 2880 minute winter	8.635	3.444
100 year +45% CC 4320 minute summer	9.770	2.554
100 year +45% CC 4320 minute winter	6.434	2.554
100 year +45% CC 5760 minute summer	8.128	2.081
100 year +45% CC 5760 minute winter	5.261	2.081
100 year +45% CC 7200 minute summer	7.015	1.790
100 year +45% CC 7200 minute winter	4.528	1.790
100 year +45% CC 8640 minute summer	6.241	1.592
100 year +45% CC 8640 minute winter	4.028	1.592
100 year +45% CC 10080 minute summer	5.685	1.450
100 year +45% CC 10080 minute winter	3.669	1.450

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 5 year Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S19	1	58.123	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S20	1	58.041	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S21	1	57.995	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S22	1	57.813	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S23	1	57.721	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S24	10	59.171	0.071	9.2	0.0112	0.0000	OK
15 minute summer	S25	10	58.494	0.064	15.3	0.0102	0.0000	OK
15 minute summer	S18	10	58.089	0.089	39.5	0.0252	0.0000	OK
15 minute summer	S26	10	57.568	0.167	54.5	0.0472	0.0000	OK
15 minute summer	S27	10	57.342	0.141	53.7	0.1589	0.0000	OK
2880 minute summer	S28b	1800	56.140	0.440	4.3	100.8210	0.0000	SURCHARGED
15 minute summer	S29	10	58.238	0.038	7.5	0.0427	0.0000	OK
15 minute summer	S30	10	56.443	0.043	8.6	0.0484	0.0000	OK
2880 minute summer	S31	1800	56.140	0.565	1.0	0.6390	0.0000	SURCHARGED
2880 minute summer	S32	1800	56.140	0.715	2.7	5.6135	0.0000	SURCHARGED
2880 minute summer	S33	1800	56.140	0.840	1.2	34.5710	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S19	1.000	S20	0.0	0.000	0.000	0.0000
15 minute summer	S20	1.001	S21	0.0	0.000	0.000	0.0000
15 minute summer	S21	1.002	S22	0.0	0.000	0.000	0.0000
15 minute summer	S22	1.003	S23	0.0	0.000	0.000	0.0000
15 minute summer	S23	1.004	S26	0.0	0.000	0.000	0.0091
15 minute summer	S24	2.000	S25	9.1	1.184	0.428	0.3616
15 minute summer	S25	2.001	S26	15.1	2.235	0.319	0.0464
15 minute summer	S18	3.000	S26	39.4	1.387	0.195	0.5248
15 minute summer	S26	1.005	S27	53.7	1.434	0.505	0.5114
15 minute summer	S27	1.006	S28b	54.8	3.102	0.318	1.2083
2880 minute summer	S28b	1.007	S32	-1.5	0.283	-0.018	2.6966
15 minute summer	S29	4.000	S30	7.5	1.996	0.138	0.0754
15 minute summer	S30	4.001	S31	8.5	2.125	0.161	0.0881
2880 minute summer	S31	4.002	S32	1.0	0.146	0.018	0.5337
2880 minute summer	S32	1.008	S33	1.2	0.278	0.024	0.5777
2880 minute summer	S32	Infiltration		1.4			
2880 minute summer	S33	Infiltration		0.5			

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S19	1	58.123	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S20	1	58.041	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S21	1	57.995	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S22	1	57.813	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S23	11	57.789	0.068	3.0	0.0108	0.0000	OK
15 minute summer	S24	10	59.225	0.125	20.8	0.0198	0.0000	OK
15 minute summer	S25	10	58.542	0.112	34.4	0.0178	0.0000	OK
15 minute summer	S18	10	58.144	0.144	89.2	0.0407	0.0000	OK
15 minute summer	S26	11	57.781	0.380	122.7	0.1076	0.0000	SURCHARGED
15 minute summer	S27	10	57.414	0.213	120.6	0.2411	0.0000	OK
1440 minute summer	S28b	930	56.422	0.722	10.3	165.3858	0.0000	SURCHARGED
15 minute summer	S29	10	58.258	0.058	16.9	0.0652	0.0000	OK
15 minute summer	S30	10	56.472	0.072	19.3	0.0819	0.0000	OK
1440 minute summer	S31	930	56.422	0.847	3.1	0.9575	0.0000	SURCHARGED
1440 minute summer	S32	930	56.422	0.997	8.4	44.6272	0.0000	FLOOD RISK
1440 minute summer	S33	930	56.422	1.122	2.0	34.8895	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S19	1.000	S20	0.0	0.000	0.000	0.0000
15 minute summer	S20	1.001	S21	0.0	0.000	0.000	0.0000
15 minute summer	S21	1.002	S22	0.0	0.000	0.000	0.0000
15 minute summer	S22	1.003	S23	0.0	0.000	0.000	0.0357
15 minute summer	S23	1.004	S26	-3.0	0.269	-0.167	0.2153
15 minute summer	S24	2.000	S25	20.4	1.376	0.963	0.7023
15 minute summer	S25	2.001	S26	34.0	2.637	0.720	0.0886
15 minute summer	S18	3.000	S26	88.7	1.602	0.438	0.9436
15 minute summer	S26	1.005	S27	120.6	1.715	1.133	0.9274
15 minute summer	S27	1.006	S28b	122.5	3.364	0.711	2.8736
1440 minute summer	S28b	1.007	S32	-2.9	0.354	-0.036	2.6966
15 minute summer	S29	4.000	S30	16.8	2.437	0.312	0.1451
15 minute summer	S30	4.001	S31	19.0	2.118	0.358	0.1116
1440 minute summer	S31	4.002	S32	3.0	0.237	0.055	0.5337
1440 minute summer	S32	1.008	S33	2.0	0.351	0.041	0.5777
1440 minute summer	S32	Infiltration		4.4			
1440 minute summer	S33	Infiltration		0.5			

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S19	1	58.123	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S20	1	58.041	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S21	1	57.995	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S22	11	57.957	0.144	5.1	0.0229	0.0000	OK
15 minute summer	S23	11	57.954	0.233	8.1	0.0370	0.0000	SURCHARGED
15 minute summer	S24	11	59.643	0.543	27.4	0.0864	0.0000	SURCHARGED
15 minute summer	S25	11	58.634	0.204	42.1	0.0325	0.0000	SURCHARGED
15 minute summer	S18	10	58.214	0.214	117.2	0.0606	0.0000	OK
15 minute summer	S26	11	57.943	0.542	157.6	0.1534	0.0000	SURCHARGED
15 minute summer	S27	10	57.453	0.252	152.6	0.2847	0.0000	OK
1440 minute summer	S28b	930	56.598	0.898	11.0	183.5299	0.0000	SURCHARGED
15 minute summer	S29	10	58.267	0.067	22.2	0.0757	0.0000	OK
1440 minute summer	S30	930	56.598	0.198	1.7	0.2240	0.0000	SURCHARGED
1440 minute summer	S31	930	56.598	1.023	3.9	1.1570	0.0000	SURCHARGED
1440 minute summer	S32	930	56.598	1.173	12.3	87.7691	0.0000	FLOOD RISK
1440 minute summer	S33	930	56.598	1.298	2.0	35.0889	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S19	1.000	S20	0.0	0.000	0.000	0.0000
15 minute summer	S20	1.001	S21	0.0	0.000	0.000	0.0000
15 minute summer	S21	1.002	S22	0.0	0.000	0.000	0.1582
15 minute summer	S22	1.003	S23	-5.1	-0.328	-0.287	0.1616
15 minute summer	S23	1.004	S26	8.8	0.588	0.495	0.2992
15 minute summer	S24	2.000	S25	24.4	1.385	1.150	0.8312
15 minute summer	S25	2.001	S26	41.2	2.658	0.872	0.1074
15 minute summer	S18	3.000	S26	116.5	1.735	0.575	1.1295
15 minute summer	S26	1.005	S27	152.6	2.167	1.433	0.9468
15 minute summer	S27	1.006	S28b	154.0	3.345	0.893	3.6786
1440 minute summer	S28b	1.007	S32	6.2	0.378	0.078	2.6966
15 minute summer	S29	4.000	S30	22.1	2.496	0.410	0.2207
1440 minute summer	S30	4.001	S31	1.7	0.713	0.032	0.1511
1440 minute summer	S31	4.002	S32	3.8	0.223	0.070	0.5337
1440 minute summer	S32	1.008	S33	2.0	0.326	0.041	0.5777
1440 minute summer	S32	Infiltration		5.5			
1440 minute summer	S33	Infiltration		0.5			

Flow+ v10.6.234 Copyright © 1988-2025 Causeway Technologies Ltd