Appendix A.3 – Southern Water Asset Location Data

(c) Crown copyright and database rights 2023 Ordnance Survey 100031673 | Date: 10/08/23 | Scale: 1:1250 | Map Centre: 636389,165493 | Data updated: 05/05/23 | Our Ref: 1246861 - 1 | Wastewater Plan A1

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2023 Ordnance Survey 100031673 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

- Foul Gravity Sewer
- Combined Gravity Sewer
- Culverted Water Course or Treated Effluent
- Surface Water Gravity Sewer
- Rising Main, Vacuum or Syphon
- Combined Outfall
- Foul Outfall
- Surface Water Outfall
- Surface Water Inlet
- ▲ Combined Pumping Station
- ▲ Surface Water Pumping Station
- ▲ Foul Pumping Station
- WWTW Water Treatment Works
- Section 104 Area
- Building Over Agreement Area
- ● Foul Manhole
- ● Combined Manhole
- ● Surface Water Manhole
- ● Side Entry Manhole, Decarcation Chamber, Dummy Manhole or Surface Water Soakaway

flood@herringtonconsulting.co.uk

1077/LS

WATER for LIFE

from Southern Water.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0201	C	42.57	38.28	
0202	C	39.43	35.79	
0203	C	40.86	36.42	
0301	C	44.55	43.16	
0302	C	44.20	41.44	
1101	C	39.64	35.87	
1201	C	43.48	39.70	
1202	C	43.67	41.06	
1301	C	45.15	42.36	
1302	C	45.11	43.43	
1303	C	44.93	42.80	
2201	C	42.94	39.69	
2301	C	44.76	42.96	
2302	C	44.39	42.31	
2303	C	44.70	41.76	
2601	C	44.23	42.78	
2602	C	44.15	42.35	
2603	C	43.98	42.30	
2604	C	43.78	0.00	
2701	C	44.76	43.92	
2702	C	44.41	43.66	
2703	C	44.25	43.45	
3101	C	38.54	34.74	
3201	C	41.32	37.77	
3301	C	43.85	42.15	
3302	C	43.41	0.00	
3303	C	43.54	0.00	
3601	C	42.64	40.79	
3602	C	42.88	40.28	
3603	C	42.08	0.00	
3701	C	43.26	39.46	
4101	C	36.17	33.08	
4201	C	40.96	37.27	
4202	C	37.59	33.73	
4301	C	40.62	37.68	
4401	C	38.11	36.28	
4402	C	39.94	38.30	
4403	C	41.83	39.34	
5101	C	33.24	30.83	
5201	C	34.23	31.94	
5202	C	34.27	0.00	
5203	C	34.17	31.72	
5301	C	36.74	34.51	
5302	C	37.27	35.10	
5401	C	38.52	35.93	
5402	C	39.32	35.65	
6201	C	34.46	30.74	
6301	C	43.80	42.13	
6302	C	39.53	37.83	
6303	C	41.45	39.08	
6401	C	42.84	0.00	
6402	C	46.09	46.09	
6501	C	45.76	0.00	
7101	C	43.56	40.76	
7102	C	40.49	0.00	
7201	C	43.32	41.77	
7301	C	44.27	42.46	
7302	C	44.69	43.13	
7401	C	45.84	44.52	
7402	C	45.80	44.02	
7403	C	45.77	43.70	
7404	C	45.77	43.55	
7501	C	45.56	43.90	
7701	C	47.76	41.66	
7801	C	47.80	41.45	
8201	C	39.19	36.76	
8201	C	45.23	42.39	
8202	C	44.63	41.57	
8301	C	45.13	43.38	
8302	C	44.96	43.25	
8401	C	45.76	21.84	
8402	C	45.68	42.95	
8404	C	0.00	0.00	
8601	C	46.83	0.00	
8602	C	46.90	44.22	
8603	C	46.97	0.00	
8604	C	46.74	44.85	
8701	C	47.34	0.00	
8702	C	47.23	43.41	
8804	C	47.38	0.00	
9101	C	37.98	0.00	
9103	C	0.00	0.00	
9201	C	40.29	37.76	
9202	C	39.46	36.22	
9203	C	39.99	0.00	
9204	C	37.59	0.00	
9301	C	41.86	0.00	
0204	F	0.00	0.00	
0205	F	0.00	0.00	
0501	F	46.02	45.36	
0601	F	46.25	45.65	
0602	F	46.25	45.18	
0603	F	46.15	44.71	
0604	F	46.20	44.02	
0605	F	46.24	45.70	
1601	F	45.05	41.10	
1602	F	45.50	41.50	
1603	F	45.90	42.74	
1604	F	46.20	42.47	
1701	F	45.65	42.08	
2605	F	43.92	40.50	
2704	F	0.00	0.00	
2805	F	0.00	0.00	
3202	F	0.00	0.00	
3203	F	0.00	0.00	
3204	F	0.00	0.00	
3205	F	0.00	0.00	
3206	F	0.00	0.00	
3304	F	0.00	0.00	
3305	F	0.00	0.00	
3306	F	0.00	0.00	
3702	F	0.00	0.00	
3703	F	0.00	0.00	
4203	F	0.00	0.00	
4204	F	0.00	0.65	
4205	F	0.00	0.70	
4206	F	0.00	0.70	
4207	F	0.00	0.70	
4303	F	0.00	0.00	
4304	F	0.00	0.00	
4305	F	0.00	0.00	
5204	F	0.00	0.00	
8101	F	45.23	41.94	
8204	F	45.06	42.63	
8205	F	45.03	42.59	
8303	F	0.00	0.00	
9203	F	45.13	42.75	

Appendix A.4 – Site Investigation Report undertaken by EPS

Ground Investigation Report

Flambeau EuroPlast Ltd
Manston Road
Ramsgate
Kent
CT12 6HW

Prepared for:

Flambeau EuroPlast Ltd
Manston Road
Ramsgate
Kent
CT12 6HW

EPS Project Reference:	UK23.6529
Date Issued:	10th August 2023
Report Status:	Issue 1

FLAMBEAU EUROPLAST LTD, RAMSGATE

NON-TECHNICAL CLIENT SUMMARY

This report presents the findings of a Ground Investigation undertaken to determine ground conditions and also provide information for use in infiltration design for the site and its future development. Pertinent findings and conclusions may be summarised as follows:

- The study area is a triangular plot of land located to the south of Manston Road in the north western outskirts of Ramsgate in Kent. The property comprises a large commercial building and a loop access road as well as external areas of storage, parking and soft landscaping. This ground investigation has focussed on assessing the permeability of the soil layers beneath the north of the plot, specifically the feasibility of adopting infiltration drainage as part of future redevelopment works, which are anticipated to comprise an outline residential scheme.

- The investigation involved excavating three trial pits to a maximum depth of 1.7m and one deeper borehole to 8.0m. The ground conditions were slightly variable with made ground found to a maximum of 0.65m with superficial Head Deposits (sandy silty clays) recovered in TP01 and TP02; and are thought to prevail throughout the central third (north to south). Outside of this area and towards the north western corner where TP03 and BH01 were formed, chalk bedrock was recovered, in the form of a weathered material (clay) initially, transitioning into strutureless chalk from roughly 1.0m. Groundwater was not encountered in any of the intrusive locations.

- Soakaway testing was attempted at the three trial pit locations and the initial rates were calculated as $1.68*10^{-6}$m/s for TP01 and $1.27*10^{-6}$m/s for TP02. However, rates for the second tests in both of these locations, and for the first test in TP03 could only be estimated based on extrapolated data or not calculable, as the pits didn't drain sufficiently in the time available.

- During the formation of the deep borehole 'falling head' infiltration tests were completed at approximately 6.0m and 8.0m in the structureless chalk and produced results of $3.24*10^{-6}$m/s and $2.40*10^{-6}$m/s; which are slightly more favourable than the results derived from the trial holes formed in the clay based soils.

- Overall, it is anticipated that the Margate Chalk Member may well provide a more viable infiltration medium, as long as the upper weathered/ finer layers are fully penetrated. It is also anticipated that this material will become closer to surface towards the eastern and western boundaries of the site and therefore the use of traditional soakaways or other similar methods may be more likely in these areas, as oppose to the central third, where cohesive superficial deposits were encountered. The risk of chalk dissolution will have to be considered throughout the design process, and may limit where soakaways or other similar features can be placed in relation to proposed structures for example.

The above points represent a simplified summary of the findings of this assessment and **must not** form the basis for key decisions for the proposed development. A thorough review of the details is contained within the following report, or alternatively get in touch and we'll talk you through it.

Project Reference:	UK23.6529	
Title:	Ground Investigation Report – Flambeau EuroPlast Ltd, Ramsgate	
Client:	Flambeau EuroPlast Ltd	
Date:	10th August 2023	
EPS Contact Details:	7B Caxton House Broad Street Cambourne Cambridge CB23 6JN	T: 01954 710666 F: 01954 710677 E: info@epstrategies.co.uk W: www.epstrategies.co.uk
Status:	Issue 1	

Author:	**Reviewed:**	**Authorised:**
		Steve Bullock
James Bowley	Ben Virtue	Steve Bullock
Senior Consultant	Principal Consultant	Director

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The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' in house quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.

The National Planning Policy Framework requires a competent person to prepare site investigation information, which is defined as a person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation. EPS considers that it fulfils these criteria and would welcome any request for staff CVs or case studies to demonstrate it.

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1 INTRODUCTION

In June 2023, Environmental Protection Strategies Ltd (EPS) was commissioned by Flambeau EuroPlast Ltd to complete a Ground Investigation Report at Flambeau EuroPlast Ltd, Manston Road, Ramsgate, Kent, CT12 6HW ('the site'); see Figure 1.

The work was commissioned in order to provide ground conditions information and infiltration data to support drainage design for a proposed redevelopment, understood to comprise a residential scheme, which has not yet been finalised at the time of writing. Selected site photographs are presented as Appendix A.

This report presents the findings, conclusions, and recommendations of the ground investigation undertaken as instructed. It should be appreciated that the assessment of any soil contamination including a Phase I Desk Study did not form part of the brief for the works undertaken.

1.1 Objectives

The objectives of this investigation were as follows:

a) Collect information on the nature of the ground conditions beneath the site in areas considered potentially suitable for the use of infiltration drainage systems.
b) Conduct infiltration testing to assess the permeability of sub-surface soils and the suitability of sustainable drainage systems (such as soakaways), in support of the proposed scheme.

1.2 Scope of Works

To perform an exploratory assessment of the site in accordance with the principles and requirements of BS 5930:2015+A1:2020 '*Code of practice for ground investigations*', the following tasks were undertaken.

Intrusive Investigation:

- Site walkover, inspection and obtaining photographic records.
- Health and safety briefing / site supervision.
- Excavation of three trial pits using a track-mounted mechanical excavator, to a maximum depth of 1.7m below ground level (bgl); with infiltration testing subsequently attempted at all three locations.
- Drilling of one cable percussive (shell & auger) borehole to 8.0m bgl, with the completion of 'falling head' infiltration testing at predetermined depths.
- Continual logging of ground conditions including inspection of soils for visual and olfactory contamination (on a purely precautionary basis).

Reporting:

- Data collection and interpretation.
- Reporting.

The findings of these investigations and their conclusions are presented in the following sections.

1.3 Limitations and Constraints

The purpose of this report is to present the findings of a ground investigation conducted at the location(s) specified. When examining the data collected from the investigations made during the assessment, Environmental Protection Strategies Ltd (EPS) makes the following statements:

No investigation method is capable of completely identifying all the ground conditions that might be present beneath a site. Where outlined in our report, we have examined the ground beneath a site by constructing a number of boreholes / trial pits to recover soil samples. The locations of these excavations and sampling points are considered to be representative of the condition of the whole site subsurface. However, it should be appreciated that ground conditions are naturally variable. For this reason, it is possible that samples collected during the investigation may not represent the conditions across the entire site.

This report does not include specific investigation for the presence of either Potential Asbestos Containing Material (PACM) or Japanese Knotweed at the subject site. However, if obvious evidence of either is observed during EPS site walkover, details will be provided in this report. Specialist contractors should be commissioned to make detailed assessments and recommendations if these materials are suspected.

2 GEO-ENVIRONMENTAL SETTING

The following section provides a summary of pertinent background information in relation to the site location and geo-environmental context.

2.1 Site Location and Description

Detail	Description
Location	The site is located to the south of Manston Road in the north western outskirts of Ramsgate in Kent.
National Grid Reference	636341, 165571
Topography	The intrusive works were focused in the north/ north western area of the site and levels were largely flat, lying between 46m and 47m above ordnance datum (AOD). The wider site did slope down from the northwest to the south east, with levels at the lowest point between 42m and 43m AOD.
Description of Site	The site was accessed from Manston Road in the northwest corner and was a roughly triangular plot of land, thinning from west to east. The majority of the property was covered by the Flambeau factory building, which is understood to be a plastics manufacturing firm. The main structure was largely of brick construction with two-storey office space and more open warehouse style sections and the footprint mirrored the shape of the land itself. A one way (clockwise) concrete surfaced access road ran around the perimeter of the building, leading to employee car park along the western boundary. The southeast corner and southern area off of the same route was used for storing materials and a couple of water tanks were also situated adjacent to the south of the building used for the sprinkler system. The site was surrounded with a combination of metal fencing and well established shrubs/ hedges. Areas of soft landscaping were present adjacent to the building on the northern side where the building's shape was stepped as well as in the northwest next to the building and was surfaced with grass and a mature tree was also present. Overall, the vegetation was quite overgrown at the time of the EPS visit. Evidence of underground utilities was also recorded during the site walkover including a number of manholes present in the access road thought to be surface/ foul drainage. Approximately halfway down the northern side of the building, a secured gas junction box was noted that then entered the factory.
Surrounding Land Use	Residential properties and a primary school are located to the north with the schools field and Manston Road situated to the east. A railway line (trending east-west) is located to the south with a supermarket and petrol station west of the site.

Detail	Description
Geology	Geological maps provided by the British Geological Survey (BGS) indicate that superficial Head Deposits (clay and silt) are intermittently present in the local area. The bedrock geology is mapped as chalk of the Margate Chalk Member.

A plan showing the site location is provided as Figure 1, selected site photographs are included as Appendix A and a proposed development plan is included as Appendix B

3 SUMMARY OF INVESTIGATIONS

The intrusive ground investigation was undertaken on the 4th and 5th of July 2023, in accordance with EPS standard operating procedures, copies of which will be made available on request. A summary of the site activities is presented in the following sections:

3.1 Trial Pit Locations

The borehole and trial pit locations were selected following the requirements of the Clients drainage engineers with consideration also given to the locations of below ground utilities and infrastructure, as well as operational/ health and safety considerations associated with working at an active commercial site.

Additionally, due to the presence of a potential water supply and storage facility somewhere beneath the southern area of the property, no intrusive locations were formed in this area.

The main objective in terms of trial pit and borehole locations was to assess the permeability of the underlying soils beneath the northern sections of the site, and ultimately the feasibility in incorporating infiltration drainage systems for the management of surface water disposal as part of any future development. The trial pits (TP01-TP03) were utilised to provide lateral coverage of the shallow ground conditions and capture any variability in the soil profile, with the deeper borehole (BH01) targeting the deeper lying conditions and the presence/ nature of any chalk bedrock; which may be a more suitable infiltration medium.

The trial pits and borehole were formed in accordance with standard EPS methodologies, and all sub-contractors were supervised by an EPS engineer throughout the works.

Upon completion all positions were backfilled with compacted soil arising's and levelled at the surface. The location of the intrusive works are shown on the location plan included as Figure 2.

3.2 Infiltration Testing & Soil Sampling

Each position was logged for ground conditions encountered and inspected for any physical evidence of contamination, such as soil staining, odour and the presence of separate phase liquids (on a purely precautionary basis).

Furthermore, soakaway infiltration testing was attempted at all three trial pit locations (TP01-TP03) to provide an assessment of shallow soil permeability, and the feasibility of the use of soakaways or other similar methods of surface water disposal.

Within the deep borehole (BH01) 'falling head' infiltration tests were undertaken at depths of 6.0m and 8.0m. These tests were undertaken exclusively within the chalk bedrock to offer a direct comparison of the permeability of the soil layers.

4 FINDINGS OF THE INVESTIGATION

This section of the report provides a summary of the findings of the intrusive investigations undertaken.

4.1 Ground Conditions

Four intrusive positions were formed in the northern and north western area of the site and the ground conditions encountered, from surface level, have been interpreted to comprise:

- Made Ground
- Head Deposits
- Margate Chalk Member

Site specific trial pit and borehole logs are included as Appendix C and give full descriptions and depths of strata encountered. A summary of the general ground profile is provided in the table below, with more detailed description given in the following sub-sections.

Geological Strata	Maximum Depth to Base of Strata (m bgl)	Strata Thickness (m)
Made Ground	0.65	0.3-0.65
Head Deposits	>1.7	>0.9->1.05 (where encountered)
Margate Chalk Member	>8.0	>0.16->7.7 (where encountered)

4.1.1 Made Ground

Made ground was encountered from the surface at all four locations and was recovered as initially greyish brown sandy clayey silt with common rootlets and rare brick fragments in TP01-TP03. From around 0.1m to 0.25m this then transitioned to a brownish grey slightly sandy gravelly silty clay with asphalt, brick, concrete and rubble in the trial pits; and this material was also present from surface in BH01. A couple of small suspected fragments of asbestos were also encountered in TP02 in the clay based infilled soils and this layer extended to a maximum of 0.65m at the same location.

4.1.2 Head Deposits

The natural soils underlying the made ground in TP01 and TP02 were interpreted to be representative of the superficial Head Deposits and were described as an orangish brown sandy silty clay. These soils extended beyond the full completion depth of both locations (1.5m in TP01 and to 1.7m at TP02), but were not identified in TP03 or BH01, which were positioned closer to the north western corner of the site. These findings broadly align with the local geological maps where the superficial units are anticipated to thin and ultimately pinch out towards the eastern and western boundaries respectively.

4.1.3 *Margate Chalk Member*

Bedrock of the Margate Chalk Member was encountered at BH01 and TP03, directly beneath the made ground, with no superficial soils recorded. Initially this was a light brown weathered chalk recovered as a silty clay with chalk gravel, and was clearly distinguishable for the Head Deposits based on colour and composition. This layer was proven to 1.0m in BH01, and then transitioned to a white structureless chalk in a silt dominated matrix with chalk gravel and occasional flints which extended to the base of the borehole (>8.0m).

4.2 Groundwater

No evidence of groundwater was recorded at any of the intrusive locations as part of this investigation.

4.3 Physical Evidence of Contamination

Despite the presence of a notable thickness of made ground materials which contained construction debris throughout, no physical evidence of contamination such as separate phase liquids, hydrocarbon odours or putrefiable material was recorded in the any of the soils recovered from any of the locations formed as part of the EPS investigation.

However, a couple of small suspected asbestos fragments were noted within the made ground recovered at TP02.

4.4 Infiltration Testing Results

4.4.1 *Head Deposits and Weathered Chalk (clay)*

Infiltration testing was completed at all three trial pit locations (TP01 – TP03) focussed to the north and northwest of the factory building, in general accordance with *BRE Digest 365 'Soakaway Design'*, although it should be appreciated that full testing could not be completed due to the geology encountered. The ground profile in these locations was found to comprise clay soils, either the Superficial Head Deposits in TP01 and TP02 or the weathered chalk in TP03.

The results of the soakaway infiltration testing as applicable to the trial holes are summarised in the table below and discussed in the subsequent paragraphs.

Location	**Trial Hole Depth (m bgl)**	**Infiltration Rate (m/s)**	**Comments**
TP01 (*Test 1*)	1.5	$1.68*10^{-6}$	Test left running overnight and reached full completion. Some sediments collecting at the base of the excavation, with the total depth recorded as ~1.4m at the end of the testing period.
TP01 (*Test 2*)	1.4	$\sim 1.59*10^{-6}$	Test failed to reach completion, but did progress beyond 50% in time allowed. Calculated rate has been extrapolated and therefore is approximate.
TP02 (*Test 1*)	1.7	$1.27*10^{-6}$	Test left running overnight and reached full completion. Some sediments collecting at the base of the excavation, with the total depth recorded as ~1.6m at the end of the testing period.
TP02 (*Test 2*)	1.6	Not calculable	Test failed to reach 50% completion.
TP03 (*Test 1*)	0.6	Not calculable	Test failed to reach 50% completion (extended overnight).

4.4.2 *Margate Chalk Member*

During the formation of the deep borehole (BH01), 'falling head' infiltration tests were undertaken at specified depths in order to assess the permeability of the chalk bedrock (beneath the upper weathered layer). The results of the tests are summarised in the below table and discussed in the subsequent paragraphs.

Location	**Uncased Profile Response Zone (m bgl)**	**Infiltration Rate (m/s)**	**Comments**
BH01 (*Test 1*)	2.7m to 6.0m	$3.24*10^{-6}$	Approximately 100 litres of water added to the borehole and drained to a final depth of 4.6m within an hour. Testing completed entirely within the chalk response zone.
BH02 (*Test 2*)	3.8m to 8.0m	$2.40*10^{-6}$	Approximately 100 litres of water added to the borehole and drained to a final depth of 5.65m within an hour. Testing completed entirely within the chalk response zone.

4.5 Conclusions

The calculated infiltration rates in both the boreholes and trial pits confirm ‘very low’ to ‘low’ permeability conditions; however these results were calculated using different methods of testing and within separate strata as the targeted infiltration medium.

The first tests for TP01 and TP02 were left to run overnight within the superficial Head Deposits and reached full completion, with calculated rates of $1.68*10^{-6}$m/s and $1.59*10^{-6}$m/s respectively. However, both of the second tests in these locations were slower, and failed to reach the same stage during the allotted time period. Therefore, the rate for the repeat test in TP01 was extrapolated based on at least 50% being achieved, but the second test in TP02 failed to reach this marker and therefore calculating a rate to a reasonable degree of accuracy was not possible. This was similar in TP03, which despite technically being formed within the chalk bedrock, the trial hole was formed in the upper weathered section of this strata (recovered as clay), and no rate was calculable based on data recorded from this location either.

In the deep borehole, BH01, formed in the north western area, the initial weathered chalk (clay layer) was fully penetrated and the position progressed into the white structureless chalk in a silt dominated matrix with chalk gravel. Whilst this material was still relatively fine, with limited granular content, the ‘falling head’ tests completed at 6.0m and 8.0m produced results of $3.24*10^{-6}$ and $2.40*10^{-6}$, which are slightly more favourable than the results derived from the trial holes.

Borehole tests can often produce slightly favourable results when compared to more conventional trial holes and whilst this may marginally impact the rates recovered, this in broadly in line with expectations of the anticipated permeability of the materials based on composition. Furthermore, it is recognised that the superficial Head Deposits were slightly variable and small pockets of coarser granular material did exist any may have resulted in more favourable conditions during the first test which then became saturated and resulted in the significantly poorer drainage observed during the second tests.

Overall, based on the results of the testing in the different strata, as well as EPS’s experience of the geological units encountered, it is anticipated that the Margate Chalk Member may well provide a more viable infiltration medium, providing the upper weathered/ finer layers are fully penetrated. It is also anticipated that this material will become closer to surface towards the eastern and western boundaries of the site and therefore the use of traditional soakaways or other similar methods may be more likely in these areas, as oppose to the central third, where cohesive superficial deposits were encountered. Groundwater was not identified within 8.0m of existing surface level and therefore isn’t likely to constrain the design of shallow infiltration features.

Additionally, consideration should be given to the potential for dissolution features to be created from any infiltration drainage infrastructure that are to be adopted as part of the proposed scheme. It would be prudent to consider the risk of creating such features by discharging surface waters into the ground at a focussed point. It is recommended to consult local building control to confirm any mitigation measures that would typically be expected.

FIGURES

N

Rev	Date	Drawn	Description	Ch'k'd

eps

The Geotechnical and Environmental Engineers
www.epstrategies.co.uk

Site

Flambeau EuroPlast Ltd, Manston Road,
Ramsgate, CT12 6HW

Client

Flambeau EuroPlast Ltd

Title

Figure 1 - Site Location Plan

Surveyed:		Drawn by:	JB
Checked by:	BV	Date:	July 2023

Scale [A4 Sheet]	Drawing Reference
1:50,000	UK23.6529_01

Job No	Rev
UK23.6529	01

N

KEY:

— SITE BOUNDARY

◐ EPS TRIAL PIT LOCATIONS

◐ EPS CABLE PERCUSSION BOREHOLE

Rev	Date	Drawn	Description	Chk'd

eps

The Geotechnical and Environmental Engineers
www.epstrategies.co.uk

Site
Flambeau EuroPlast Ltd, Manston Road,
Ramsgate, CT12 6HW

Client
Flambeau EuroPlast Ltd

Title
Figure 2 - Intrusive Investigation Location Plan

Surveyed:
Drawn by: JB
Checked by: BV
Date: July 2023
Scale [A4 Sheet] Not to Scale
Drawing Reference UK23.6529_02
Job No UK23.6529
Rev 01

APPENDICES

APPENDIX A

Selected Site Photographs

Photo 1: Image showing the material encountered at TP01.	Photo 2: Image showing the location of BH01.
	
Photo 3: Image showing TP01 after running the infiltration test overnight.	Photo 4: Image showing TP02 after running the infiltration test overnight.
	

APPENDIX B

Site Specific Borehole & Trial Pit Logs

Borehole Log

Borehole No.	**BH01**	Sheet 1 of 1		
Project Name:	Flambeau EuroPlast Ltd	Project No. UK23.6529	Co-ords: 154818E - 6681739N	Hole Type CP
Location:	Flambeau EuroPlast Ltd, Manston Road, Ramsgate, CT12 6HW		Level:	Scale 1:51
Client:	Flambeau EuroPlast Ltd		Dates: 05/07/2023	Logged By JB

Well	Water Strikes	**Sample and In Situ Testing**			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	In Situ Results					
					0.30			Made Ground: brown silty gravelly CLAY with brick fragments and rootlets.	
					1.00			Light brown to pale cream weathered CHALK in a silty CLAY matrix with chalk gravel. (WEATHERED MARGATE CHALK MEMBER)	1
					8.00			White Structureless CHALK in a silt dominated matrix with harder intact fragments of chalk gravel and flint. (MARGATE CHALK MEMBER)	2 3 4 5 6 7 8
								End of Borehole at 8.000m	9 10

Remarks

Groundwater not encountered.

Falling Head infiltration tests completed at 6m and 8m.

Trial Pit Log

Trialpit No
TP01
Sheet 1 of 1

Project Name:	Flambeau EuroPlast Ltd	Project No. UK23.6529	Co-ords: 155012.92 - 6681690.06 Level:
Date	04/07/2023		
Location:	Flambeau EuroPlast Ltd, Manston Road, Ramsgate, CT12 6HW	Dimensions (m): 1.4 × 0.4 Depth 1.50	Scale 1:10
Client:	Flambeau EuroPlast Ltd		Logged JB

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.10		▩	Made Ground: greyish brown sandy clayey SILT with common rootlets and rare brick fragments.
				0.50		▩	Made Ground: brownish grey slightly sandy gravelly silty CLAY with brick, chalk and rubble.
				0.60		▩	Made Ground: dark brown slightly sandy silty CLAY with rare brick fragments.
				1.50		▤	Orangish brown slightly sandy silty CLAY. (HEAD DEPOSITS)
							End of pit at 1.50 m

Remarks: Groundwater not encountered.

Stability: Stable sides whilst excavating.

Trial Pit Log

Trialpit No
TP02
Sheet 1 of 1

Project Name: Flambeau EuroPlast Ltd	Project No. UK23.6529	Co-ords: 155067.26 - 6681668.87 Level:	Date 04/07/2023
Location: Flambeau EuroPlast Ltd, Manston Road, Ramsgate, CT12 6HW		Dimensions (m): 1.7 × 0.4 Depth 1.70	Scale 1:10
Client: Flambeau EuroPlast Ltd			Logged JB

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.25		▨	Made Ground: greyish brown sandy clayey SILT with common rootlets and rare brick fragments.
				0.50		▨	Made Ground: brownish grey slightly sandy gravelly silty CLAY with asphalt, brick, chalk, rubble and suspected asbestos fragment.
				0.65		▨	Made Ground: dark brown slightly sandy silty CLAY with rare brick fragments.
				1.70		⊠	Orangish brown slightly sandy silty CLAY. (HEAD DEPOSITS)
							End of pit at 1.70 m

Remarks: Groundwater not encountered.

Stability: Stable sides whilst excavating.

Trial Pit Log

Trialpit No
TP03
Sheet 1 of 1

Project Name: Flambeau EuroPlast Ltd	Project No. UK23.6529	Co-ords: 154841.83 - 6681715.44 Level:	Date 04/07/2023
Location: Flambeau EuroPlast Ltd, Manston Road, Ramsgate, CT12 6HW		Dimensions (m): 1.5 × 0.4 Depth 0.60	Scale 1:10
Client: Flambeau EuroPlast Ltd			Logged JB

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.12		▨	Made Ground: greyish brown sandy clayey SILT with common rootlets and rare brick fragments.
				0.44		▨	Made Ground: brownish grey slightly sandy gravelly silty CLAY with asphalt, brick and chalk.
				0.60		▨	Light brown to medium brown silty gravelly CLAY. Gravel is fine to coarse subrounded to subangular chalk. (WEATHERED MARGATE CHALK MEMBER)
							End of pit at 0.60 m

1

2

Remarks: Groundwater not encountered.

Stability: Stable sides whilst excavating.

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Appendix A.5 - Surface Water Management Calculations

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	0.350
Return Period (years)	100	Maximum Rainfall (mm/hr)	200.0	Include Intermediate Ground	✓
Additional Flow (%)	45	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	1.000	Connection Type	Level Inverts		
Time of Entry (mins)	4.00	Minimum Backdrop Height (m)	0.200		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Existing	2.000	4.00	41.300	1000	-1.111	6.481	2.270
Existing 1			41.630	1000	10.286	6.147	2.990

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)
Existing	Existing	Existing 1	30.000	0.600	39.030	38.640	0.390	76.9	225	4.34	159.1

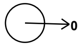
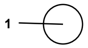
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
Existing	1.492	59.3	1667.5	2.045	2.765	2.000	0.0	225	1.520

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)
Existing	30.000	76.9	225	Circular	41.300	39.030	2.045	41.630	38.640	2.765

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
Existing	Existing	1000	Manhole	Adoptable	Existing 1	1000	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Existing	-1.111	6.481	41.300	2.270	1000	 0	Existing	39.030	225
Existing 1	10.286	6.147	41.630	2.990	1000	1 	Existing	38.640	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)	10080	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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	30	0	0	0
10	0	0	0	100	0	0	0

Node Existing Time-Area Diagram

Overrides Design Area x
Overrides Design Additional Inflow x

Depression Storage Area (m²) 0
Depression Storage Depth (mm) 0
Applies to

Evapo-transpiration (mm/day) 0

Time (mins)	Area (ha)
0-60	0.000

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	103.193	29.200	2 year 600 minute winter	7.093	2.840	2 year 8640 minute summer	1.662	0.424
2 year 15 minute winter	72.416	29.200	2 year 720 minute summer	9.220	2.471	2 year 8640 minute winter	1.073	0.424
2 year 30 minute summer	66.439	18.800	2 year 720 minute winter	6.196	2.471	2 year 10080 minute summer	1.534	0.391
2 year 30 minute winter	46.624	18.800	2 year 960 minute summer	7.507	1.977	2 year 10080 minute winter	0.990	0.391
2 year 60 minute summer	43.894	11.600	2 year 960 minute winter	4.973	1.977	10 year 15 minute summer	201.657	57.062
2 year 60 minute winter	29.162	11.600	2 year 1440 minute summer	5.372	1.440	10 year 15 minute winter	141.513	57.062
2 year 120 minute summer	31.218	8.250	2 year 1440 minute winter	3.610	1.440	10 year 30 minute summer	130.514	36.931
2 year 120 minute winter	20.741	8.250	2 year 2160 minute summer	3.816	1.055	10 year 30 minute winter	91.589	36.931
2 year 180 minute summer	25.353	6.524	2 year 2160 minute winter	2.629	1.055	10 year 60 minute summer	86.449	22.846
2 year 180 minute winter	16.480	6.524	2 year 2880 minute summer	3.180	0.852	10 year 60 minute winter	57.434	22.846
2 year 240 minute summer	20.602	5.445	2 year 2880 minute winter	2.137	0.852	10 year 120 minute summer	55.222	14.594
2 year 240 minute winter	13.688	5.445	2 year 4320 minute summer	2.463	0.644	10 year 120 minute winter	36.688	14.594
2 year 360 minute summer	16.062	4.133	2 year 4320 minute winter	1.622	0.644	10 year 180 minute summer	42.983	11.061
2 year 360 minute winter	10.441	4.133	2 year 5760 minute summer	2.092	0.536	10 year 180 minute winter	27.940	11.061
2 year 480 minute summer	12.697	3.355	2 year 5760 minute winter	1.354	0.536	10 year 240 minute summer	34.139	9.022
2 year 480 minute winter	8.435	3.355	2 year 7200 minute summer	1.839	0.469	10 year 240 minute winter	22.681	9.022
2 year 600 minute summer	10.382	2.840	2 year 7200 minute winter	1.187	0.469	10 year 360 minute summer	26.014	6.694

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
10 year 360 minute winter	16.910	6.694
10 year 480 minute summer	20.365	5.382
10 year 480 minute winter	13.530	5.382
10 year 600 minute summer	16.568	4.532
10 year 600 minute winter	11.320	4.532
10 year 720 minute summer	14.672	3.932
10 year 720 minute winter	9.861	3.932
10 year 960 minute summer	11.917	3.138
10 year 960 minute winter	7.894	3.138
10 year 1440 minute summer	8.497	2.277
10 year 1440 minute winter	5.710	2.277
10 year 2160 minute summer	5.976	1.652
10 year 2160 minute winter	4.118	1.652
10 year 2880 minute summer	4.924	1.320
10 year 2880 minute winter	3.309	1.320
10 year 4320 minute summer	3.716	0.972
10 year 4320 minute winter	2.447	0.972
10 year 5760 minute summer	3.081	0.789
10 year 5760 minute winter	1.994	0.789
10 year 7200 minute summer	2.652	0.676
10 year 7200 minute winter	1.711	0.676
10 year 8640 minute summer	2.351	0.600
10 year 8640 minute winter	1.517	0.600
10 year 10080 minute summer	2.132	0.544
10 year 10080 minute winter	1.376	0.544
30 year 15 minute summer	263.529	74.570
30 year 15 minute winter	184.933	74.570
30 year 30 minute summer	171.314	48.476
30 year 30 minute winter	120.220	48.476
30 year 60 minute summer	113.999	30.126
30 year 60 minute winter	75.738	30.126
30 year 120 minute summer	70.691	18.682
30 year 120 minute winter	46.965	18.682
30 year 180 minute summer	54.404	14.000
30 year 180 minute winter	35.364	14.000
30 year 240 minute summer	43.048	11.376
30 year 240 minute winter	28.600	11.376
30 year 360 minute summer	32.904	8.467
30 year 360 minute winter	21.388	8.467
30 year 480 minute summer	26.003	6.872
30 year 480 minute winter	17.276	6.872
30 year 600 minute summer	21.395	5.852
30 year 600 minute winter	14.618	5.852
30 year 720 minute summer	19.170	5.138
30 year 720 minute winter	12.884	5.138
30 year 960 minute summer	15.944	4.199
30 year 960 minute winter	10.562	4.199
30 year 1440 minute summer	11.827	3.170
30 year 1440 minute winter	7.949	3.170
30 year 2160 minute summer	8.602	2.377
30 year 2160 minute winter	5.927	2.377
30 year 2880 minute summer	7.161	1.919
30 year 2880 minute winter	4.813	1.919
30 year 4320 minute summer	5.328	1.393
30 year 4320 minute winter	3.509	1.393
30 year 5760 minute summer	4.311	1.104
30 year 5760 minute winter	2.790	1.104
30 year 7200 minute summer	3.598	0.918
30 year 7200 minute winter	2.322	0.918
30 year 8640 minute summer	3.097	0.790
30 year 8640 minute winter	1.999	0.790
30 year 10080 minute summer	2.733	0.697
30 year 10080 minute winter	1.764	0.697
100 year 15 minute summer	332.201	94.001
100 year 15 minute winter	233.123	94.001
100 year 30 minute summer	218.450	61.814
100 year 30 minute winter	153.298	61.814
100 year 60 minute summer	145.809	38.533
100 year 60 minute winter	96.872	38.533
100 year 120 minute summer	88.847	23.480
100 year 120 minute winter	59.028	23.480
100 year 180 minute summer	68.400	17.602
100 year 180 minute winter	44.461	17.602
100 year 240 minute summer	54.490	14.400
100 year 240 minute winter	36.202	14.400
100 year 360 minute summer	42.630	10.970
100 year 360 minute winter	27.710	10.970
100 year 480 minute summer	34.796	9.196
100 year 480 minute winter	23.118	9.196
100 year 600 minute summer	29.472	8.061
100 year 600 minute winter	20.137	8.061
100 year 720 minute summer	27.061	7.253
100 year 720 minute winter	18.187	7.253
100 year 960 minute summer	23.232	6.118
100 year 960 minute winter	15.390	6.118
100 year 1440 minute summer	17.638	4.727
100 year 1440 minute winter	11.854	4.727
100 year 2160 minute summer	12.828	3.545
100 year 2160 minute winter	8.839	3.545
100 year 2880 minute summer	10.598	2.840
100 year 2880 minute winter	7.122	2.840
100 year 4320 minute summer	7.792	2.037
100 year 4320 minute winter	5.131	2.037
100 year 5760 minute summer	6.211	1.590
100 year 5760 minute winter	4.020	1.590
100 year 7200 minute summer	5.110	1.303

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year 7200 minute winter	3.298	1.303	100 year 8640 minute winter	2.796	1.105	100 year 10080 minute winter	2.429	0.960
100 year 8640 minute summer	4.333	1.105	100 year 10080 minute summer	3.763	0.960			

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Existing	7	41.300	2.270	374.5	1.7820	54.3523	FLOOD
15 minute summer	Existing 1	6	38.853	0.213	138.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Existing	Existing	Existing 1	138.9	3.493	2.341	1.1811	92.5

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Existing	12	41.300	2.270	630.7	1.7820	171.3046	FLOOD
15 minute summer	Existing 1	4	38.853	0.213	138.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Existing	Existing	Existing 1	138.9	3.493	2.341	1.1811	197.1

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Existing	10	41.300	2.270	828.8	1.7820	261.6898	FLOOD
15 minute summer	Existing 1	3	38.853	0.213	138.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Existing	Existing	Existing 1	138.9	3.493	2.341	1.1811	222.3

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	Existing	6	41.300	2.270	816.0	1.7820	380.1036	FLOOD
15 minute summer	Existing 1	3	38.853	0.213	138.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	Existing	Existing	Existing 1	138.9	3.493	2.341	1.1811	237.7

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	0.350
Return Period (years)	100	Maximum Rainfall (mm/hr)	200.0	Include Intermediate Ground	✓
Additional Flow (%)	45	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	1.000	Connection Type	Level Inverts		
Time of Entry (mins)	4.00	Minimum Backdrop Height (m)	0.200		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
PP1	0.967	4.00	41.000		-0.235	7.968	1.100
TANK1			41.000		2.994	8.053	2.100
MH1			41.000	1200	5.841	8.226	2.300
PP2	0.628	4.00	41.000		-0.211	5.370	1.100
TANK2			41.000		3.000	5.367	2.100
MH2			41.000	1200	6.026	5.871	2.300
OUTFALL			41.630	1200	8.595	7.282	2.990
Depth/Area 1			41.630	1200	10.460	7.244	3.010

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)
2.000	PP1	TANK1	3.230	0.600	39.900	39.500	0.400	8.1	300	4.01	157.0
2.001	TANK1	MH1	2.852	0.600	38.900	38.800	0.100	28.5	300	4.03	157.0
2.002	MH1	OUTFALL	2.911	0.600	38.700	38.640	0.060	48.5	225	4.05	157.0
1.000	PP2	TANK2	3.211	0.600	39.900	39.500	0.400	8.0	300	4.01	157.0
1.001	TANK2	MH2	3.068	0.600	38.900	38.800	0.100	30.7	300	4.03	157.0
1.002	MH2	OUTFALL	2.931	0.600	38.700	38.640	0.060	48.8	225	4.05	157.0
1.003	OUTFALL	Depth/Area 1	1.865	0.600	38.640	38.620	0.020	93.3	300	4.07	157.0

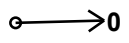
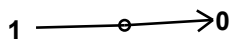
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
2.000	5.564	393.3	795.8	0.800	1.200	0.967	0.0	300	5.636
2.001	2.955	208.8	795.8	1.800	1.900	0.967	0.0	300	2.992
2.002	1.882	74.8	795.8	2.075	2.765	0.967	0.0	225	1.917
1.000	5.581	394.5	516.8	0.800	1.200	0.628	0.0	300	5.652
1.001	2.848	201.3	516.8	1.800	1.900	0.628	0.0	300	2.885
1.002	1.876	74.6	516.8	2.075	2.765	0.628	0.0	225	1.910
1.003	1.628	115.1	1312.6	2.690	2.710	1.595	0.0	300	1.649

Pipeline Schedule

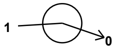
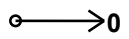
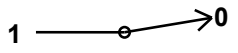
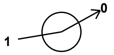
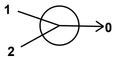
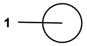
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2.000	3.230	8.1	300	Circular	41.000	39.900	0.800	41.000	39.500	1.200
2.001	2.852	28.5	300	Circular	41.000	38.900	1.800	41.000	38.800	1.900
2.002	2.911	48.5	225	Circular	41.000	38.700	2.075	41.630	38.640	2.765
1.000	3.211	8.0	300	Circular	41.000	39.900	0.800	41.000	39.500	1.200
1.001	3.068	30.7	300	Circular	41.000	38.900	1.800	41.000	38.800	1.900
1.002	2.931	48.8	225	Circular	41.000	38.700	2.075	41.630	38.640	2.765
1.003	1.865	93.3	300	Circular	41.630	38.640	2.690	41.630	38.620	2.710

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.000	PP1		Junction		TANK1		Junction	
2.001	TANK1		Junction		MH1	1200	Manhole	Adoptable
2.002	MH1	1200	Manhole	Adoptable	OUTFALL	1200	Manhole	Adoptable
1.000	PP2		Junction		TANK2		Junction	
1.001	TANK2		Junction		MH2	1200	Manhole	Adoptable
1.002	MH2	1200	Manhole	Adoptable	OUTFALL	1200	Manhole	Adoptable
1.003	OUTFALL	1200	Manhole	Adoptable	Depth/Area 1	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
PP1	-0.235	7.968	41.000	1.100					
						0	2.000	39.900	300
TANK1	2.994	8.053	41.000	2.100		1	2.000	39.500	300
									
						0	2.001	38.900	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
MH1	5.841	8.226	41.000	2.300	1200	1 	2.001	38.800	300
						0	2.002	38.700	225
PP2	-0.211	5.370	41.000	1.100		 0	1.000	39.900	300
TANK2	3.000	5.367	41.000	2.100		1 	1.000	39.500	300
						0	1.001	38.900	300
MH2	6.026	5.871	41.000	2.300	1200	1 	1.001	38.800	300
						0	1.002	38.700	225
OUTFALL	8.595	7.282	41.630	2.990	1200	1	2.002	38.640	225
						2 	1.002	38.640	225
						0	1.003	38.640	300
Depth/Area 1	10.460	7.244	41.630	3.010	1200	1 	1.003	38.620	300

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m^3/ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	10080	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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	10	0	100	0	10	0
10	0	10	0	100	45	10	0
30	0	10	0				

Node MH2 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	38.700	Product Number	CTL-SHE-0034-8000-2300-8000
Design Depth (m)	2.300	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	0.8	Min Node Diameter (mm)	1200

Node MH1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	38.700	Product Number	CTL-SHE-0042-1200-2300-1200
Design Depth (m)	2.300	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.2	Min Node Diameter (mm)	1200

Node PP2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Width (m)	354.000	Depth (m)	0.900
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	39.900	Length (m)	10.000	Inf Depth (m)	
Safety Factor	2.0	Time to half empty (mins)		Slope (1:X)	9999.0		

Node TANK2 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Pit Width (m)	10.000	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	38.900	Pit Length (m)	15.000	Number Required	1
Safety Factor	2.0	Time to half empty (mins)		Depth (m)	1.800		

Node PP1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Width (m)	577.000	Depth (m)	0.900
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	39.900	Length (m)	10.000	Inf Depth (m)	
Safety Factor	2.0	Time to half empty (mins)		Slope (1:X)	9999.0		

Node TANK1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Pit Width (m)	30.000	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	38.900	Pit Length (m)	10.000	Number Required	1
Safety Factor	2.0	Time to half empty (mins)		Depth (m)	1.800		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year +10% A 15 minute summer	103.193	29.200	2 year +10% A 960 minute summer	7.507	1.977
2 year +10% A 15 minute winter	72.416	29.200	2 year +10% A 960 minute winter	4.973	1.977
2 year +10% A 30 minute summer	66.439	18.800	2 year +10% A 1440 minute summer	5.372	1.440
2 year +10% A 30 minute winter	46.624	18.800	2 year +10% A 1440 minute winter	3.610	1.440
2 year +10% A 60 minute summer	43.894	11.600	2 year +10% A 2160 minute summer	3.816	1.055
2 year +10% A 60 minute winter	29.162	11.600	2 year +10% A 2160 minute winter	2.629	1.055
2 year +10% A 120 minute summer	31.218	8.250	2 year +10% A 2880 minute summer	3.180	0.852
2 year +10% A 120 minute winter	20.741	8.250	2 year +10% A 2880 minute winter	2.137	0.852
2 year +10% A 180 minute summer	25.353	6.524	2 year +10% A 4320 minute summer	2.463	0.644
2 year +10% A 180 minute winter	16.480	6.524	2 year +10% A 4320 minute winter	1.622	0.644
2 year +10% A 240 minute summer	20.602	5.445	2 year +10% A 5760 minute summer	2.092	0.536
2 year +10% A 240 minute winter	13.688	5.445	2 year +10% A 5760 minute winter	1.354	0.536
2 year +10% A 360 minute summer	16.062	4.133	2 year +10% A 7200 minute summer	1.839	0.469
2 year +10% A 360 minute winter	10.441	4.133	2 year +10% A 7200 minute winter	1.187	0.469
2 year +10% A 480 minute summer	12.697	3.355	2 year +10% A 8640 minute summer	1.662	0.424
2 year +10% A 480 minute winter	8.435	3.355	2 year +10% A 8640 minute winter	1.073	0.424
2 year +10% A 600 minute summer	10.382	2.840	2 year +10% A 10080 minute summer	1.534	0.391
2 year +10% A 600 minute winter	7.093	2.840	2 year +10% A 10080 minute winter	0.990	0.391
2 year +10% A 720 minute summer	9.220	2.471	10 year +10% A 15 minute summer	201.657	57.062
2 year +10% A 720 minute winter	6.196	2.471	10 year +10% A 15 minute winter	141.513	57.062

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
10 year +10% A 30 minute summer	130.514	36.931
10 year +10% A 30 minute winter	91.589	36.931
10 year +10% A 60 minute summer	86.449	22.846
10 year +10% A 60 minute winter	57.434	22.846
10 year +10% A 120 minute summer	55.222	14.594
10 year +10% A 120 minute winter	36.688	14.594
10 year +10% A 180 minute summer	42.983	11.061
10 year +10% A 180 minute winter	27.940	11.061
10 year +10% A 240 minute summer	34.139	9.022
10 year +10% A 240 minute winter	22.681	9.022
10 year +10% A 360 minute summer	26.014	6.694
10 year +10% A 360 minute winter	16.910	6.694
10 year +10% A 480 minute summer	20.365	5.382
10 year +10% A 480 minute winter	13.530	5.382
10 year +10% A 600 minute summer	16.568	4.532
10 year +10% A 600 minute winter	11.320	4.532
10 year +10% A 720 minute summer	14.672	3.932
10 year +10% A 720 minute winter	9.861	3.932
10 year +10% A 960 minute summer	11.917	3.138
10 year +10% A 960 minute winter	7.894	3.138
10 year +10% A 1440 minute summer	8.497	2.277
10 year +10% A 1440 minute winter	5.710	2.277
10 year +10% A 2160 minute summer	5.976	1.652
10 year +10% A 2160 minute winter	4.118	1.652
10 year +10% A 2880 minute summer	4.924	1.320
10 year +10% A 2880 minute winter	3.309	1.320
10 year +10% A 4320 minute summer	3.716	0.972
10 year +10% A 4320 minute winter	2.447	0.972
10 year +10% A 5760 minute summer	3.081	0.789
10 year +10% A 5760 minute winter	1.994	0.789
10 year +10% A 7200 minute summer	2.652	0.676
10 year +10% A 7200 minute winter	1.711	0.676
10 year +10% A 8640 minute summer	2.351	0.600
10 year +10% A 8640 minute winter	1.517	0.600
10 year +10% A 10080 minute summer	2.132	0.544
10 year +10% A 10080 minute winter	1.376	0.544
30 year +10% A 15 minute summer	263.529	74.570
30 year +10% A 15 minute winter	184.933	74.570
30 year +10% A 30 minute summer	171.314	48.476
30 year +10% A 30 minute winter	120.220	48.476
30 year +10% A 60 minute summer	113.999	30.126
30 year +10% A 60 minute winter	75.738	30.126
30 year +10% A 120 minute summer	70.691	18.682
30 year +10% A 120 minute winter	46.965	18.682
30 year +10% A 180 minute summer	54.404	14.000
30 year +10% A 180 minute winter	35.364	14.000
30 year +10% A 240 minute summer	43.048	11.376
30 year +10% A 240 minute winter	28.600	11.376
30 year +10% A 360 minute summer	32.904	8.467
30 year +10% A 360 minute winter	21.388	8.467
30 year +10% A 480 minute summer	26.003	6.872
30 year +10% A 480 minute winter	17.276	6.872
30 year +10% A 600 minute summer	21.395	5.852
30 year +10% A 600 minute winter	14.618	5.852
30 year +10% A 720 minute summer	19.170	5.138
30 year +10% A 720 minute winter	12.884	5.138
30 year +10% A 960 minute summer	15.944	4.199
30 year +10% A 960 minute winter	10.562	4.199
30 year +10% A 1440 minute summer	11.827	3.170
30 year +10% A 1440 minute winter	7.949	3.170
30 year +10% A 2160 minute summer	8.602	2.377
30 year +10% A 2160 minute winter	5.927	2.377
30 year +10% A 2880 minute summer	7.161	1.919
30 year +10% A 2880 minute winter	4.813	1.919

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +10% A 4320 minute summer	5.328	1.393
30 year +10% A 4320 minute winter	3.509	1.393
30 year +10% A 5760 minute summer	4.311	1.104
30 year +10% A 5760 minute winter	2.790	1.104
30 year +10% A 7200 minute summer	3.598	0.918
30 year +10% A 7200 minute winter	2.322	0.918
30 year +10% A 8640 minute summer	3.097	0.790
30 year +10% A 8640 minute winter	1.999	0.790
30 year +10% A 10080 minute summer	2.733	0.697
30 year +10% A 10080 minute winter	1.764	0.697
100 year +10% A 15 minute summer	332.201	94.001
100 year +10% A 15 minute winter	233.123	94.001
100 year +10% A 30 minute summer	218.450	61.814
100 year +10% A 30 minute winter	153.298	61.814
100 year +10% A 60 minute summer	145.809	38.533
100 year +10% A 60 minute winter	96.872	38.533
100 year +10% A 120 minute summer	88.847	23.480
100 year +10% A 120 minute winter	59.028	23.480
100 year +10% A 180 minute summer	68.400	17.602
100 year +10% A 180 minute winter	44.461	17.602
100 year +10% A 240 minute summer	54.490	14.400
100 year +10% A 240 minute winter	36.202	14.400
100 year +10% A 360 minute summer	42.630	10.970
100 year +10% A 360 minute winter	27.710	10.970
100 year +10% A 480 minute summer	34.796	9.196
100 year +10% A 480 minute winter	23.118	9.196
100 year +10% A 600 minute summer	29.472	8.061
100 year +10% A 600 minute winter	20.137	8.061
100 year +10% A 720 minute summer	27.061	7.253
100 year +10% A 720 minute winter	18.187	7.253
100 year +10% A 960 minute summer	23.232	6.118
100 year +10% A 960 minute winter	15.390	6.118
100 year +10% A 1440 minute summer	17.638	4.727
100 year +10% A 1440 minute winter	11.854	4.727
100 year +10% A 2160 minute summer	12.828	3.545
100 year +10% A 2160 minute winter	8.839	3.545
100 year +10% A 2880 minute summer	10.598	2.840
100 year +10% A 2880 minute winter	7.122	2.840
100 year +10% A 4320 minute summer	7.792	2.037
100 year +10% A 4320 minute winter	5.131	2.037
100 year +10% A 5760 minute summer	6.211	1.590
100 year +10% A 5760 minute winter	4.020	1.590
100 year +10% A 7200 minute summer	5.110	1.303
100 year +10% A 7200 minute winter	3.298	1.303
100 year +10% A 8640 minute summer	4.333	1.105
100 year +10% A 8640 minute winter	2.796	1.105
100 year +10% A 10080 minute summer	3.763	0.960
100 year +10% A 10080 minute winter	2.429	0.960
100 year +45% CC +10% A 15 minute summer	481.691	136.302
100 year +45% CC +10% A 15 minute winter	338.029	136.302
100 year +45% CC +10% A 30 minute summer	316.753	89.630
100 year +45% CC +10% A 30 minute winter	222.283	89.630
100 year +45% CC +10% A 60 minute summer	211.424	55.873
100 year +45% CC +10% A 60 minute winter	140.465	55.873
100 year +45% CC +10% A 120 minute summer	128.828	34.046
100 year +45% CC +10% A 120 minute winter	85.590	34.046
100 year +45% CC +10% A 180 minute summer	99.179	25.522
100 year +45% CC +10% A 180 minute winter	64.469	25.522
100 year +45% CC +10% A 240 minute summer	79.011	20.880
100 year +45% CC +10% A 240 minute winter	52.493	20.880
100 year +45% CC +10% A 360 minute summer	61.813	15.907
100 year +45% CC +10% A 360 minute winter	40.180	15.907
100 year +45% CC +10% A 480 minute summer	50.455	13.334
100 year +45% CC +10% A 480 minute winter	33.521	13.334

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +45% CC +10% A 600 minute summer	42.734	11.689	100 year +45% CC +10% A 2880 minute winter	10.327	4.118
100 year +45% CC +10% A 600 minute winter	29.198	11.689	100 year +45% CC +10% A 4320 minute summer	11.298	2.954
100 year +45% CC +10% A 720 minute summer	39.238	10.516	100 year +45% CC +10% A 4320 minute winter	7.440	2.954
100 year +45% CC +10% A 720 minute winter	26.371	10.516	100 year +45% CC +10% A 5760 minute summer	9.006	2.306
100 year +45% CC +10% A 960 minute summer	33.687	8.871	100 year +45% CC +10% A 5760 minute winter	5.829	2.306
100 year +45% CC +10% A 960 minute winter	22.315	8.871	100 year +45% CC +10% A 7200 minute summer	7.409	1.890
100 year +45% CC +10% A 1440 minute summer	25.575	6.854	100 year +45% CC +10% A 7200 minute winter	4.782	1.890
100 year +45% CC +10% A 1440 minute winter	17.188	6.854	100 year +45% CC +10% A 8640 minute summer	6.282	1.603
100 year +45% CC +10% A 2160 minute summer	18.601	5.141	100 year +45% CC +10% A 8640 minute winter	4.055	1.603
100 year +45% CC +10% A 2160 minute winter	12.817	5.141	100 year +45% CC +10% A 10080 minute summer	5.456	1.392
100 year +45% CC +10% A 2880 minute summer	15.367	4.118	100 year +45% CC +10% A 10080 minute winter	3.521	1.392

Results for 2 year +10% A Critical Storm Duration. Lowest mass balance: 90.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	PP1	108	39.962	0.062	74.9	105.7253	0.0000	OK
10080 minute summer	TANK1	6900	39.942	1.042	11.7	297.0930	0.0000	SURCHARGED
10080 minute summer	MH1	6540	39.944	1.244	3.2	1.4065	0.0000	SURCHARGED
10080 minute summer	PP2	6720	39.968	0.068	27.2	71.3925	0.0000	OK
10080 minute summer	TANK2	7020	40.011	1.111	38.0	158.3233	0.0000	SURCHARGED
10080 minute summer	MH2	6780	40.010	1.310	2.1	1.4817	0.0000	SURCHARGED
10080 minute summer	OUTFALL	6360	38.666	0.026	1.5	0.0297	0.0000	OK
10080 minute summer	Depth/Area 1	7080	38.644	0.024	1.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute summer	PP1	2.000	TANK1	36.7	3.540	0.093	0.0335	
10080 minute summer	TANK1	2.001	MH1	3.2	0.660	0.015	0.2008	
10080 minute summer	MH1	Hydro-Brake®	OUTFALL	0.9				
10080 minute summer	PP2	1.000	TANK2	38.0	1.558	0.096	0.1322	
10080 minute summer	TANK2	1.001	MH2	2.1	0.562	0.011	0.2160	
10080 minute summer	MH2	1.002	OUTFALL	0.6	0.354	0.008	0.0054	
10080 minute summer	OUTFALL	1.003	Depth/Area 1	1.5	0.544	0.013	0.0053	1152.6

Results for 10 year +10% A Critical Storm Duration. Lowest mass balance: 90.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
10080 minute summer	PP1	7140	40.037	0.137	41.6	236.9897	0.0000	OK
10080 minute summer	TANK1	7500	40.075	1.175	80.4	334.9664	0.0000	SURCHARGED
10080 minute summer	MH1	7500	40.078	1.378	3.2	1.5581	0.0000	SURCHARGED
10080 minute winter	PP2	7620	40.081	0.181	40.7	191.5459	0.0000	OK
8640 minute summer	TANK2	5100	40.088	1.188	68.0	169.2371	0.0000	SURCHARGED
8640 minute summer	MH2	5100	40.088	1.388	2.5	1.5700	0.0000	SURCHARGED
10080 minute summer	OUTFALL	7500	38.667	0.027	1.6	0.0303	0.0000	OK
10080 minute summer	Depth/Area 1	7500	38.645	0.025	1.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m^3)	Discharge Vol (m^3)
10080 minute summer	PP1	2.000	TANK1	80.4	1.865	0.205	0.1645	
10080 minute summer	TANK1	2.001	MH1	3.2	0.661	0.015	0.2008	
10080 minute summer	MH1	Hydro-Brake®	OUTFALL	1.0				
10080 minute winter	PP2	1.000	TANK2	78.1	1.451	0.198	0.1843	
8640 minute summer	TANK2	1.001	MH2	2.5	0.561	0.012	0.2160	
8640 minute summer	MH2	1.002	OUTFALL	0.6	0.354	0.009	0.0055	
10080 minute summer	OUTFALL	1.003	Depth/Area 1	1.6	0.550	0.014	0.0054	1562.2

Results for 30 year +10% A Critical Storm Duration. Lowest mass balance: 90.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute winter	PP1	4200	40.188	0.288	42.5	498.0010	0.0000	OK
4320 minute winter	TANK1	4200	40.188	1.288	81.3	367.1471	0.0000	SURCHARGED
4320 minute winter	MH1	4260	40.188	1.488	3.4	1.6828	0.0000	SURCHARGED
4320 minute winter	PP2	4200	40.243	0.343	39.2	363.3708	0.0000	SURCHARGED
4320 minute winter	TANK2	4200	40.243	1.343	69.3	191.3344	0.0000	SURCHARGED
4320 minute winter	MH2	4260	40.243	1.543	2.1	1.7449	0.0000	SURCHARGED
4320 minute winter	OUTFALL	4200	38.667	0.027	1.7	0.0309	0.0000	OK
4320 minute winter	Depth/Area 1	4200	38.645	0.025	1.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
4320 minute winter	PP1	2.000	TANK1	81.3	2.083	0.207	0.2260	
4320 minute winter	TANK1	2.001	MH1	3.4	0.590	0.016	0.2008	
4320 minute winter	MH1	Hydro-Brake®	OUTFALL	1.0				
4320 minute winter	PP2	1.000	TANK2	69.3	1.724	0.176	0.2261	
4320 minute winter	TANK2	1.001	MH2	2.1	0.511	0.011	0.2160	
4320 minute winter	MH2	1.002	OUTFALL	0.7	0.355	0.009	0.0057	
4320 minute winter	OUTFALL	1.003	Depth/Area 1	1.7	0.557	0.014	0.0056	1294.3

Results for 100 year +10% A Critical Storm Duration. Lowest mass balance: 90.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute winter	PP1	4260	40.426	0.526	57.3	909.6039	0.0000	SURCHARGED
4320 minute winter	TANK1	4260	40.426	1.526	59.4	434.9148	0.0000	SURCHARGED
4320 minute winter	MH1	4260	40.426	1.726	2.1	1.9517	0.0000	SURCHARGED
4320 minute winter	PP2	4260	40.495	0.595	46.4	631.8234	0.0000	SURCHARGED
4320 minute winter	TANK2	4260	40.496	1.596	44.6	227.3589	0.0000	SURCHARGED
4320 minute summer	MH2	4320	40.494	1.794	1.9	2.0288	0.0000	SURCHARGED
4320 minute winter	OUTFALL	4260	38.668	0.028	1.8	0.0320	0.0000	OK
4320 minute winter	Depth/Area 1	4260	38.646	0.026	1.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
4320 minute winter	PP1	2.000	TANK1	59.4	2.073	0.151	0.2275	
4320 minute winter	TANK1	2.001	MH1	2.1	0.583	0.010	0.2008	
4320 minute winter	MH1	Hydro-Brake®	OUTFALL	1.1				
4320 minute winter	PP2	1.000	TANK2	44.6	1.640	0.113	0.2261	
4320 minute winter	TANK2	1.001	MH2	2.1	0.434	0.010	0.2160	
4320 minute summer	MH2	1.002	OUTFALL	0.7	0.361	0.010	0.0060	
4320 minute winter	OUTFALL	1.003	Depth/Area 1	1.8	0.567	0.015	0.0058	1388.4

Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 90.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
4320 minute winter	PP1	3960	40.701	0.801	66.2	1386.2590	0.0000	FLOOD RISK
5760 minute winter	TANK1	5160	40.727	1.827	55.3	513.1425	0.0000	FLOOD RISK
8640 minute winter	MH1	7020	40.713	2.013	13.2	2.2769	0.0000	FLOOD RISK
4320 minute winter	PP2	3060	40.717	0.817	40.1	867.1391	0.0000	FLOOD RISK
5760 minute winter	TANK2	4080	40.814	1.914	64.2	256.5713	0.0000	FLOOD RISK
5760 minute winter	MH2	4260	40.753	2.053	11.4	2.3222	0.0000	FLOOD RISK
2880 minute summer	OUTFALL	2760	38.669	0.029	1.9	0.0330	0.0000	OK
2880 minute summer	Depth/Area 1	2760	38.647	0.027	1.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
4320 minute winter	PP1	2.000	TANK1	-48.3	1.973	-0.123	0.2275	
5760 minute winter	TANK1	2.001	MH1	-6.2	0.527	-0.030	0.2008	
8640 minute winter	MH1	Hydro-Brake®	OUTFALL	1.1				
4320 minute winter	PP2	1.000	TANK2	77.4	1.617	0.196	0.2261	
5760 minute winter	TANK2	1.001	MH2	-17.7	0.425	-0.088	0.2160	
5760 minute winter	MH2	1.002	OUTFALL	0.8	0.367	0.010	0.0062	
2880 minute summer	OUTFALL	1.003	Depth/Area 1	1.9	0.575	0.016	0.0061	1349.5

hr wallingford

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Natasha Ames
Site name:	Manston Road
Site location:	Ramsgate

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.33974° N
Longitude:	1.39235° E
Reference:	1172141404
Date:	Jan 04 2024 13:08

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha): 3.5

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.788
Q_{MED} (l/s):	
Q_{BAR} / Q_{MED} factor:	1.14

Hydrological characteristics

	Default	Edited
SAAR (mm):	583	595
Hydrological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

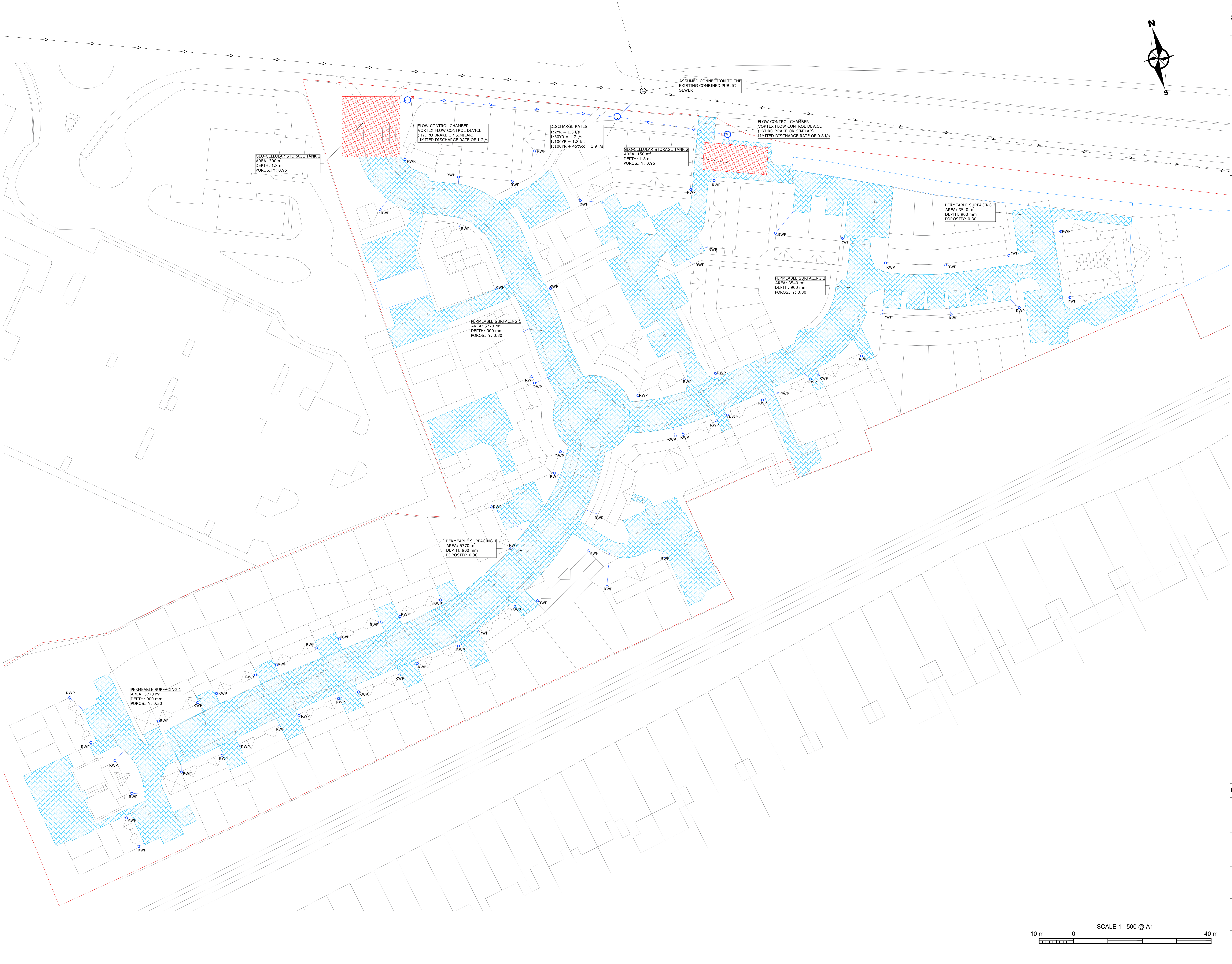
Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):		2.32
1 in 1 year (l/s):		1.97
1 in 30 years (l/s):		5.34
1 in 100 year (l/s):		7.41
1 in 200 years (l/s):		8.69

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Appendix A.6 – Indicative Drainage Layout



GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
2. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT BRITISH STANDARDS, EUROPEAN NORMS, CODES OF PRACTICE AND BUILDING PRACTICE.
3. ALL DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR PRIOR TO STARTING THE WORKS ON SITE. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
4. ALL DRAINAGE SYSTEMS WILL NEED TO BE INSTALLED AND DESIGNED FOR SUITABLE LOADING REQUIREMENTS.
5. THE CONTRACTOR SHALL OBTAIN PRIOR APPROVAL AND ALL NECESSARY LICENCES FROM THE THE HIGHWAY AUTHORITY AND/OR SEWERAGE UNDERTAKER BEFORE CARRYING OUT ANY WORKS.
6. THIS DRAWING WAS PRODUCED FOR USE IN CONJUNCTION WITH A PLANNING SUBMISSION AND SHOULD NOT BE USED FOR OTHER PURPOSES. A MORE DETAILED DESIGN INCLUDING PRODUCT SPECIFICATIONS WILL NEED TO BE PRODUCED PRIOR TO CONSTRUCTION.

KEY:

— → — → —	EXISTING COMBINED SEWER
○	EXISTING COMBINED SEWER CHAMBER
— → — → —	SURFACE WATER DRAIN
○ MH	SURFACE WATER MANHOLE
∘ RWP	RAINWATER PIPE
☒	FLOW CONTROL DEVICE
▨	PERMEABLE SURFACE
▨	GEOCELLULAR STORAGE

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Rev	Description	Author	Checked	Date
P0	First issue	BW	EC	12/02/24

CLIENT
Flambeau Europlast Limited

PROJECT
Manston Road, Ramsgate

SCALE	PROJ REF	ORIGINATOR	CHECKED BY
1:500	1077	BW	EC

HC DWG REF.
1077_DWG_r1

DWG TITLE
INDICATIVE SURFACE WATER
DRAINAGE LAYOUT

DWG No.
HC-1077-501

Appendix A.7 – Maintenance Schedules

Operation and Maintenance Schedule – Geo-Cellular Storage System

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months then annually
	Remove debris and sediment from the catchment surface, wherever is presents a risk to the performance of the drainage system,	Monthly, or as required based on inspection frequencies.
	Remove sediment from pre-treatment structurers (e.g. sediment traps) and from internal forebays	Annually or as required based on inspection frequencies
Remedial Actions	Repair; inlets, outlets, overflow pipes, and vent mechanisms	As required, based on inspections
	Replace tank or geotextile if significant damage is observed or geotextile is torn.	As required
Monitoring	Inspect and check all inlets, outlets, vents, and overflows to ensure that they are in good condition and operating as designed.	Following installation, and annually hereafter
	Survey inside of tank, and at any sediment trap mechanisms, for sediment build-up and remove sediment if necessary. Use inspections to develop a regular maintenance and inspection procedure for sediment removal.	Every 5 years, or as required if inspections show high siltation rates.

General Operation and Maintenance Table for Geo-Cellular Storage Systems

Operation and Maintenance Schedule – Pervious paving / surfacing		
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Brushing and vacuuming (for driveways this can be a standard cosmetic sweep over whole surface).	At minimum once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – particular attention must be payed to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weeds or management using a suitable weed killer which will not adversely affect water quality. Weed killer should be applied directly into the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements.
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving / surfacing.	As required when damage or erosion is detected following inspection. For block paving systems jointing material to be replaced shortly after installation and subsequently when required.
	Remedial work to any depressions. Rutting and cracked or broken blocks and replace lost jointing material (where block paving is used).	
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

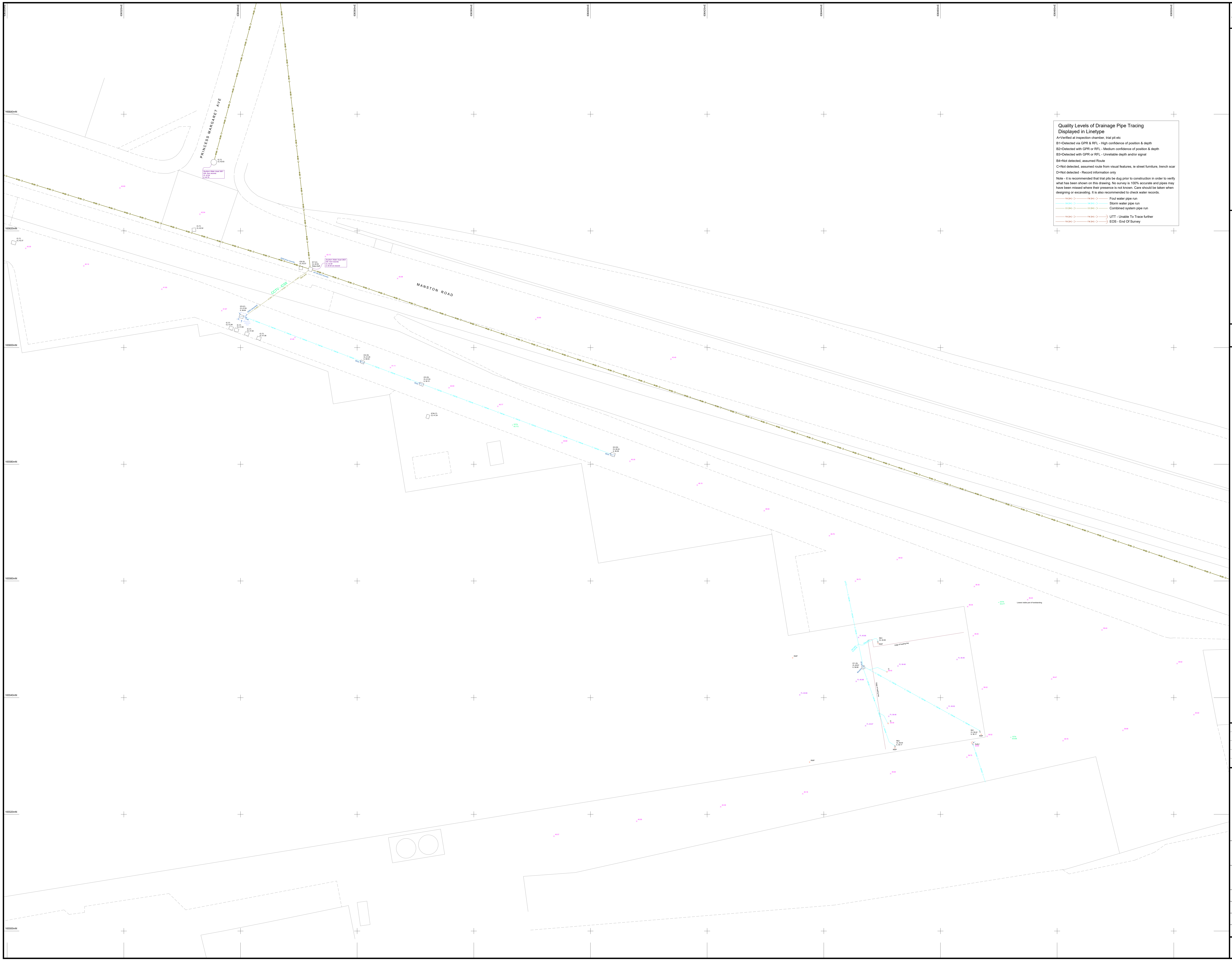
General Maintenance Requirements for Permeable Surfacing (additional requirements may apply depending on type of surfacing material used).

Operation and Maintenance Schedule – Water Butts

Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections and Maintenance	Inspection and cleaning of debris and sedimentation at the base of the tank.	At least once per year and following any noticeable deterioration in performance (e.g. observation of sediment entrained within water).
	Cleaning out of house guttering	As frequently as advised by maintenance plan for the property. Must be cleaned as soon as possible if blockage of guttering occurs.
	Inspection and repair of areas receiving overflow from the tank in the event of erosion	Inspected at least once every 3 months for the first year following installation, reduced inspection frequencies thereafter, at least once per year.
	inspection and repair of the inlet, outlet and overflows.	Inspected at least once every 3 months for the first year following installation, reduced inspection frequencies thereafter, at least once per year.
	cleaning of the tank, inlets, outlets, filters (if present) and removal of debris.	Inspected at least once every 3 months for the first year following installation, reduced inspection frequencies thereafter, at least once per year.
Remedial Maintenance	Repairing of any erosive damage or damage to the tank	As required, whenever damage leaks or erosion is detected.
	Inspection of the tank for debris, leaks or other damage and repair where necessary.	
	Inspection of area receiving overflow from the tank in the event of erosion	
Occasional maintenance	Replacement of any filters	When Required, due to clogging, or manufacturer specific instructions.

Typical Maintenance Requirements for Water Butts.

Appendix A.8 Drainage Survey



Quality Levels of Drainage Pipe Tracing Displayed in Linetype

A=Verified at inspection chamber, trial pit etc

B1=Detected via GPR & RFL - High confidence of position & depth

B2=Detected with GPR or RFL - Medium confidence of position & depth

B3=Detected with GPR or RFL - Unreliable depth and/or signal

B4=Not detected, assumed Route

C=Not detected, assumed route from visual features, ie street furniture, trench scar

D=Not detected - Record information only

Note - it is recommended that trial pits be dug prior to construction in order to verify what has been shown on this drawing. No survey is 100% accurate and pipes may have been missed where their presence is not known. Care should be taken when designing or excavating. It is also recommended to check water records.

FW (B4) -> FW (B4) ->	Foul water pipe run
SW (B4) -> SW (B4) ->	Storm water pipe run
CO (B4) -> CO (B4) ->	Combined system pipe run
FW (B4) -> FW (B4) ->	UTT - Unable To Trace further
FW (B4) -> FW (B4) ->	EOS - End Of Survey

Project Datum

All levels and coordinates are related to the Ordnance Survey national grid by means of GPS.
One survey control point has been fixed using GPS and then the survey orientated to additional GPS points.
No scale factor has been applied therefore only the fixed GPS point is a true Ordnance Survey position.

Topographical Survey Legend

BEB	Belisha Beacon	FH	Fire Hydrant	RL	Ridge Level
BH	Borehole	FL	Flood Light	RS	Road Sign
BL	Base Level	FP	Flag Pole	RTW	Retaining Wall
BO	Bollard	G	Gully	RWP	Rain Water Pipe
BP	Brick Pillar	GB	Grit Box	SEG	Side Entry Gully
BPav	Brick Paving	GIC	Gas Inspection Cover	SI	Sign
BRW	Brick Wall	GM	Gas Meter	SSL	Structural Slab Level
BS	Bus Stop	GP	Gas Pipe	STN	Survey Station
BW	Block Wall	GV	Gas Valve	STW	Stone Wall
CBF	Close Board Fence	Ht	Height (in meters)	SU	Step Up
CL	Cover Level	IC	Inspection Cover	SV	Stop Valve(W)Water(G)Gas
CLF	Chain Link Fence	IC(C)	(C)Combined(F)Foul(S)Storm	SVP	Soil Vent Pipe
Conc	Concrete	IL	Invert Level	TAC	Tactile Paving
CPF	Chestnut Paling Fence	JB	Junction Box	TCB	Telephone Call Box
CPO	Concrete Post	LP	Lamp Post	TEP	Telegraph & Electric Pole
CPS	Concrete Paving Slabs	MB	Multi Boled Tree	THL	Threshold Level
CRW	Concrete Retaining Wall	MK	Service Marker	TIC	Telecom Inspection Cover
CW	Concrete Wall	MRF	Metal Railing Fence	TM	Ticket Machine
DC	Drainage Channel	NP	Name Plate	TL	Traffic Light
DIL	Dilapidated	OBF	Open Board Fence	TLCB	Traffic Light Control Box
DP	Down Pipe	PB	Post Box	TP	Telegraph Pole
DPC	Damp Proof Course	PCF	Post & Chain Fence	TWL	Top Of Wall Level
EIC	Electric Inspection Cover	PM	Parking Meter	UTL	Unable To Lift
EL	Eaves Level	PNF	Panel Fence	WIC	Water Inspection Cover
EP	Electric Pole	PRF	Post & Rail Fence	WM	Water Meter
ER	Earth Rod	PRL	Parapet Wall Level	WMF	Wire Mesh Fence
FB	Flower Bed	PWF	Post & Wire Fence	WTL	Water Level
FFL	Finished Floor Level	RE	Rodding Eye	VP	Vent Pipe

Tree Species

AC	Acer	FR	Fruit	LN	London Plane	SC	Sweet Chestnut
AL	Alder	HA	Hawthorn	LO	Locust	SP	Spruce
AS	Ash	HB	Hornbeam	MA	Maple	ST	Stump
BE	Beech	HC	Horse Chestnut	MG	Magnolia	SY	Sycamore
CE	Cedar	HY	Holly	OA	Oak	U	Unidentified
CH	Cherry	HZ	Hazel	PI	Pine	WA	Walnut
CY	Cypress	LA	Larch	PO	Poplar	WB	Whitebeam
DE	Dead	LB	Laburnum	RO	Rowan	WI	Willow
EL	Elm	LI	Lime	SB	Silver Birch	YE	Yew

Line Types

	Steps / Ramps		Fence
	Top / Bottom of Banking		Building Face
	Bushes / Vegetation		Drop Kerb
	Change of Surface		Kerb
	Detail		Wall / Structure
	Overhead Structure		Single Gate
T	Telecom Overhead		Double Gate
T & E	Telecom & Power Overhead		Banking
E	Power Overhead	△	Survey Station

All levels and dimensions are quoted in metres. Tree girths and canopy spreads are surveyed as a mean size and shown to scale. Tree heights are quoted based on an estimation taken from the ground and have not been accurately confirmed.
Whilst every effort is made to identify tree species and sizes, no responsibility can be taken for the accuracy of this information and an Arborologist should be consulted for confirmation.
Eave levels are taken at the bottom of the lowest roof tile.
It is recommended that all invert levels and pipe sizes be checked prior to construction.
Drawing correct at time of survey and to scale.
Any setting out works should be undertaken using Omega Geomatics Ltd survey control only.

Measured Building Survey Legend

ACL	Arch Center Level / Height above floor
ASL	Arch Spring Level / Height above floor
C-H	Window Cill to Window Head Dimension
CLG	Ceiling Level / Height above floor
DH	Door Head Height above floor
DHL	Door Head Level
F-C	Floor to Window Cill Dimension
FL	Floor Level
RU	Ramp Up
SCLG	Suspended / False Ceiling Level / Height above floor
SL	Slab Level
SU	Step(s) Up
TH	Threshold Height above floor
THL	Threshold Level
TWL	Top of Wall Level
US	Underside Level / Height above floor
USB	Underside of Beam level / Height to underside above floor
USJ	Underside of Joist level / Height to underside above floor
WACL	Window Arch Center Level
WASL	Window Arch Spring Level
WCL	Window Cill Level
WHL	Window Head Level

Sloping Roof	Building Line / Wall Line
Sloped Ceiling (Points up)	Detail
Arched / Vaulted Ceiling	Steps
	Overhead Detail
	Partitions
	Glazing

All building measurements are taken to existing finishes or faces which are constant and represent an average face or wall line. All levels and dimensions are quoted in metres.
All window head and window cill levels are internal measurements.
Ceiling height measurements are taken to a point which best represents the general room height.

An Ordnance Survey map is shown in the background in grey. Omega Geomatics Ltd takes no responsibility for the accuracy of this information. Its purpose on this drawing is as a guide only and should not be relied upon.

Drawing Revisions

Rev No.	Date	Details
B		
A		
Original	See below	Original survey carried out

OmegaGeo

chartered ICES
RICS

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Kent ME8 0BF

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Client	Flambeau Europlast Ltd
Project	Flambeau Europlast Ltd Manston Road, Ramsgate, Kent, CT12 6HW
Original Survey Date	November 2023
Job Ref	2314673
Presentation Scale	1:200 @ A0
Drawing Number	1 of 1