

Project Name : Bilsham Road, Yapton

Job No : 19-326

Note Title : Drainage Strategy Addendum No. 1

Author : NA

Checked : GG

Approved : GG

Date : March 2020

1.0 INTRODUCTION

1.1 *Background*

1.1.1 Odyssey was commissioned by Bilsham Road Development LLP to undertake a surface water and foul drainage strategy as part of a reserved matters application associated with the proposed residential development at Bilsham Road, Yapton.

1.1.2 The proposed drainage strategy was submitted to Arun District Council (ADC) in January 2021 as part of planning application Y/3/21/DOC.

1.1.3 Following the submission of the drainage proposals, comments were received from ADC in February 2021. A copy of the ADC comments is provided in **Appendix A**.

1.1.4 This addendum, which should be read in conjunction with the submitted Drainage Strategy and MMP report (reference 19-326-01), provides a response to the ADC comments.

2.0 RESPONSE TO ARUN DISTRICT COUNCIL COMMENTS

2.1.1 ADC provided the following comments (*in bold italics*) in February 2021. Odyssey's response directly follows each comment.



“Infiltration testing was completed in February 2019. Only one test was completed in each location and tests were abandoned quickly. It can be observed that some test pits did show a decrease in water level over the monitoring period and the tests appear to have been terminated because of time constraints rather than evidence of water not falling. I note that in previous correspondence with the applicant it was agreed to ignore infiltration in site design. In the future it should be noted that a greater allowance of time should be given for infiltration testing.”

2.1.2 The infiltration testing principles were previously agreed with ADC.

“Groundwater monitoring results must be provided and should be overlaid on detailed drainage layout drawings.”

2.1.3 The results of groundwater monitoring are provided in **Drawings 19-326/009 and 19-326/010** in **Appendix B**.

“All pipes must be labelled with diameters and falls.”

2.1.4 The diameters of the proposed pipes were included in the submitted drainage strategy drawings. The falls have been added to show the gradient of the pipes, and are shown in **Appendix B**.

“Manhole invert and cover levels must be provided.”

2.1.5 The invert and cover levels of the proposed manholes are shown in **Appendix B**.

“Catchpits must be clearly identified.”

2.1.6 Catchpits would be identified on drawings at the detailed design stage.

“Finish and formation levels of permeable paving must be detailed on plan.”

2.1.7 The finish and formation levels of permeable paving would be provided on drawings at the detailed design stage.



“Layout plans must show connections from roads, driveways and plots to the drainage network.”

2.1.8 Drainage connections from roads, driveways and plots would be identified at the detailed design stage.

“Hydrobrake unit references must be detailed on plans and construction detail drawings.”

2.1.9 Specific Hydrobrake unit references would be provided at the detailed design stage.

“The invert level of the proposed connections to the culvert and watercourse must be provided, along with the invert level of these existing features at the proposed points of connection. Upstream and downstream bed levels of watercourses must also be provided on plans.”

2.1.10 The invert levels of the proposed connections are provided within the drainage calculations in **Appendix C**. The invert level of the connection to the culvert has been interpolated using drainage survey data, and the invert level of the connection to the watercourse has been identified from the topographical survey included on the drawings in **Appendix B**.

“A surcharged outfall should be included in calculations where discharge is to open watercourse.”

2.1.11 A surcharged outfall has been included in the calculations where Basin 3 discharges to the adjacent watercourse. The calculations are provided in **Appendix C**.

“Greenfield runoff rate calculations must be supplied. These calculations must be based upon the proposed impermeable area which is to be positively drained, not entire site area.”

2.1.12 The proposed runoff rate calculations were provided in the approved Flood Risk Assessment (FRA) and Drainage Strategy and were not queried in previous correspondence with ADC.



“An impermeable areas diagram/ catchment plan must be provided.”

2.1.13 An impermeable area catchment plan is provided in **Appendix D**. The catchment areas for each manhole and sustainable drainage systems (SuDS) feature are provided within the drainage calculations.

“Calculations must use latest FEH rainfall, or apply a cv of 1.”

2.1.14 The calculations have been rerun using the latest FEH rainfall data.

“Results have not been included within calculation printouts. Please include full calculation printouts.”

2.1.15 The full drainage calculation printouts are provided in **Appendix C**.

“A detailed review of calculations has not yet been undertaken due to the above. Please ensure that pipe reference numbers are included on layouts to facilitate review.”

2.1.16 The reference numbers of the proposed pipes have been added to the drainage strategy drawings and are shown in **Appendix B**.

“300mm freeboard must be provided on all basins.”

2.1.17 At least 300mm freeboard is provided for two of the basins. Where less than 300mm is provided on the remaining basins, exceedance flows would be directed away from the new homes and as such would not impact on the proposed development.

“Construction detail drawings must be supplied. Please supply construction detail drawings of basins, permeable paving, manholes, catchpits, flow control devices, headwalls, pipe bed and surround etc. Basin construction details must included a minimum of two perpendicular cross sections per basin. Details should be site specific.”

2.1.18 Construction detail drawings of the proposed drainage features would be provided at the detailed design stage.



“Please clearly identify which features are to be lined and which are not. Please supply flotation calculations for lined features.”

2.1.19 The basins would require lining to protect against buoyancy. The flotation calculations are provided in **Appendix E**. A hybrid approach would be adopted with the permeable paving, whereby surface water runoff would be attenuated and discharged at the approved Qbar rate to the watercourse network, whilst allowing infiltration in areas where permeable paving is located above recorded groundwater levels.

“Exceedance flow route drawings must be provided.”

2.1.20 Exceedance flow route drawings are provided in **Appendix F**.

“A maintenance manual must be submitted which is site specific and details maintenance requirements for all proposed drainage features. It must give a brief outline of the drainage strategy used, detail who will complete maintenance and how this will be funded, detail actions and frequencies for maintenance of all drainage elements, and detail expected design lifetimes/ requirements for replacement of elements.”

2.1.21 The typical maintenance requirements were set out in the Drainage Strategy and MMP report. A comprehensive maintenance manual would be provided at the detailed design stage.

“Root potential areas of trees must not conflict with basins which require liners. Proposed trees must not be located over or in close proximity to the surface water drainage network.”

2.1.22 The root protection areas of existing trees do not conflict with the basins, and the proposed trees would be moved further away from the basins and surface water drainage network.

“As previously discussed with the Principal Drainage Engineer, please include details of your proposed improvements to the main river behind The Millers within the information supplied. This should include removal of the undersized culvert and replacement with a bridge.”

2.1.23 There would be no proposed improvements to the main river. Flood risk would not be increased in upstream or downstream areas.



“Note to be added to drawing to state that watercourses will be cleared of vegetation and silt as part of works. These works must be completed near the beginning of construction to ensure the free flow of water.”

2.1.24 A note detailing the works to the watercourses has been added to the drawings in **Appendix B**.

“Details of how the proposed surface water drainage scheme will provide adequate treatment of surface water prior to discharge should be provided.”

2.1.25 Water quality information and the pollution mitigation indices of the proposed drainage features were provided within the approved FRA.

APPENDIX A

Arun District Council Comments

From: Amanda Scholes on behalf of Planning.Responses
Sent: 17 February 2021 10:16
To: Planning Scanning
Subject: FW: Planning Consultation on: Y/3/21/DOC

Amanda Scholes

T: 01903 737453
E: amanda.scholes@arun.gov.uk



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Arun District Council, Civic Centre, Maltravers Rd, Littlehampton, West Sussex, BN17 5LF
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From: Laura Gibbons <Laura.Gibbons@arun.gov.uk>
Sent: 16 February 2021 15:43
To: Planning.Responses <Planning.Responses@arun.gov.uk>
Cc: Simon Davis <Simon.Davis@arun.gov.uk>
Subject: RE: Planning Consultation on: Y/3/21/DOC

Dear Simon,

Thank you for consulting us on this application to discharge conditions, we have the following comments on condition 9 surface water drainage.

1. Infiltration testing was completed in February 2019. Only one test was completed in each location and tests were abandoned quickly. It can be observed that some test pits did show a decrease in water level over the monitoring period and the tests appear to have been terminated because of time constraints rather than evidence of water not falling. I note that in previous correspondence with the applicant it was agreed to ignore infiltration in site design. In the future it should be noted that a greater allowance of time should be given for infiltration testing.
2. Groundwater monitoring results must be provided and should be overlaid on detailed drainage layout drawings.
3. Detailed layout plans must be provided.
 - a. All pipes must be labelled with diameters and falls.

- b. Manhole invert and cover levels must be provided.
 - c. Catchpits must be clearly identified.
 - d. Finish and formation levels of permeable paving must be detailed on plan.
 - e. Layout plans must show connections from roads, driveways and plots to the drainage network.
 - f. Hydrobrake unit references must be detailed on plans and construction detail drawings.
 - g. The invert level of the proposed connections to the culvert and watercourse must be provided, along with the invert level of these existing features at the proposed points of connection. Upstream and downstream bed levels of watercourses must also be provided on plans.
4. A surcharged outfall should be included in calculations where discharge is to open watercourse.
 5. Greenfield runoff rate calculations must be supplied. These calculations must be based upon the proposed impermeable area which is to be positively drained, not entire site area.
 6. An impermeable areas diagram/ catchment plan must be provided.
 7. Calculations must use latest FEH rainfall, or apply a cv of 1.
 8. Results have not been included within calculation printouts. Please include full calculation printouts.
 9. A detailed review of calculations has not yet been undertaken due to the above. Please ensure that pipe reference numbers are included on layouts to facilitate review.
 10. 300mm freeboard must be provided on all basins.
 11. Construction detail drawings must be supplied. Please supply construction detail drawings of basins, permeable paving, manholes, catchpits, flow control devices, headwalls, pipe bed and surround, etc. Basin construction details must include a minimum of two perpendicular cross sections per basin. Details should be site specific.
 12. Please clearly identify which features are to be lined and which are not. Please supply flotation calculations for lined features.
 13. Exceedance flow route drawings must be provided.
 14. A maintenance manual must be submitted which is site specific and details maintenance requirements for all proposed drainage features. It must give a brief outline of the drainage strategy used, detail who will complete maintenance and how this will be funded, detail actions and frequencies for maintenance of all drainage elements, and detail expected design lifetimes/ requirements for replacement of elements.
 15. Root potential areas of trees must not conflict with basins which require liners. Proposed trees must not be located over or in close proximity to the surface water drainage network.
 16. As previously discussed with the Principal Drainage Engineer, please include details of your proposed improvements to the main river behind the millers within the information supplied. This should include removal of the undersized culvert and replacement with a bridge.
 17. Note to be added to drawing to state that watercourses will be cleared of vegetation and silt as part of works. These works must be completed near the beginning of construction to ensure the free flow of water.
 18. Details of how the proposed surface water drainage scheme will provide adequate treatment of surface water prior to discharge should be provided.

We would recommend that the applicant refers to our checklist for full details of our requirements for information at DOC stage. The checklist can be found here: <https://www.arun.gov.uk/surfacewater> .

In summary, we do not recommend discharge of Condition 9 at this time.

Kind regards,

Laura Gibbons

Drainage Engineer

Engineering Services

Please note that I work Tuesdays 08:00-16:00 for Arun only.



T: 01903 221374

E: laura.gibbons@arun.gov.uk

Arun District Council, Civic Centre, Maltravers Rd, Littlehampton, West Sussex, BN17 5LF

From: Planning.Responses <Planning.Responses@arun.gov.uk>

Sent: 13 January 2021 16:49

To: Land Drainage <Land.Drainage@arun.gov.uk>

Subject: Planning Consultation on: Y/3/21/DOC

To: Engineers (Drainage)

NOTIFICATION FROM ARUN DISTRICT COUNCIL

TOWN AND COUNTRY PLANNING ACT 1990

Application No: Y/3/21/DOC

Registered: 11th January 2021

Site Address: Land at Bilsham Road

Description of Works: Approval of details reserved by condition imposed under Y/91/17/OUT relating to conditions 9-surface water drainage scheme & 12-foul drainage scheme.

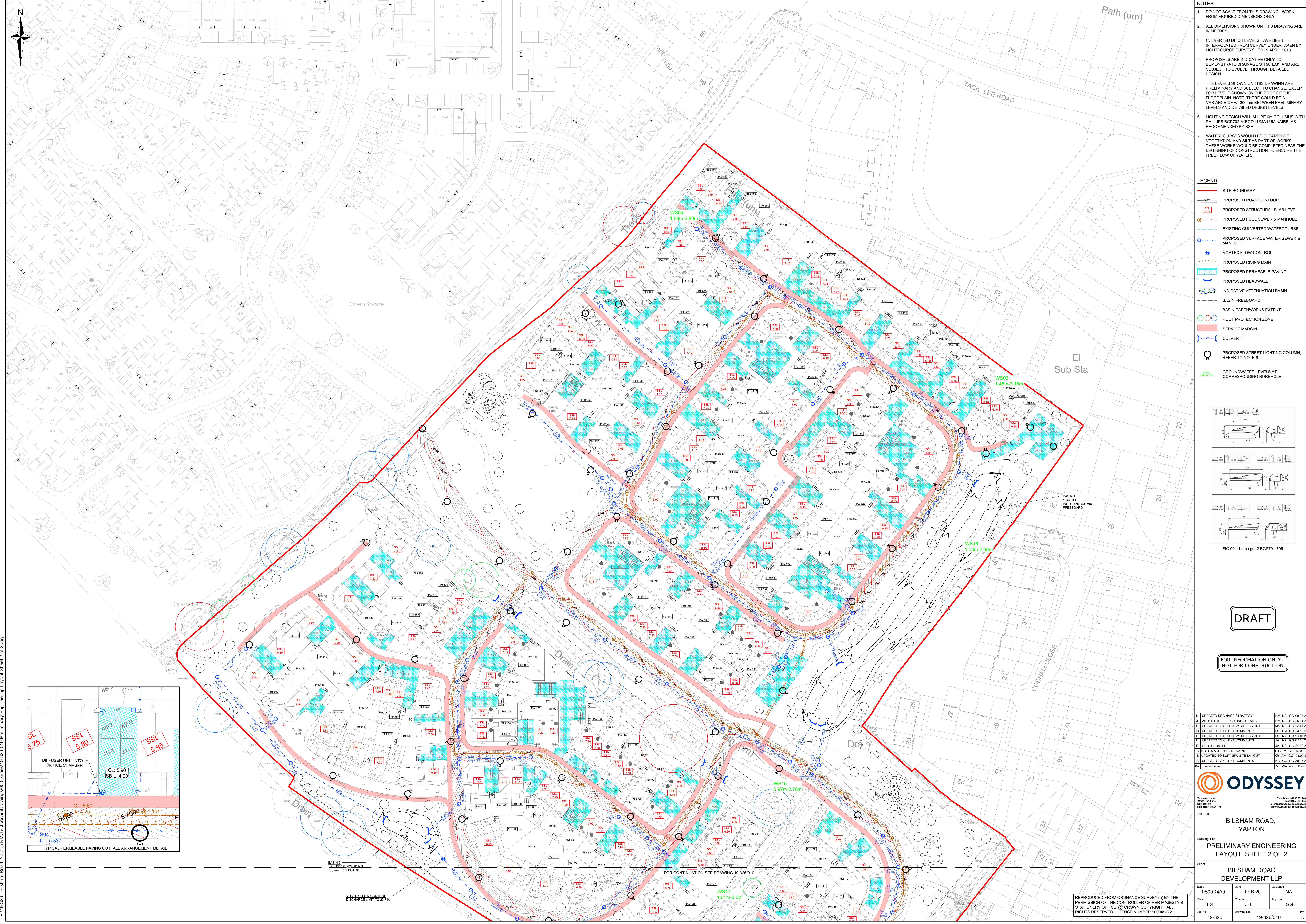
The Council have received the above application to discharge conditions. I shall be pleased to receive any observations you may wish to make in respect of those conditions relating to your field of expertise.

[Click here to view the Discharge of Condition application](#)

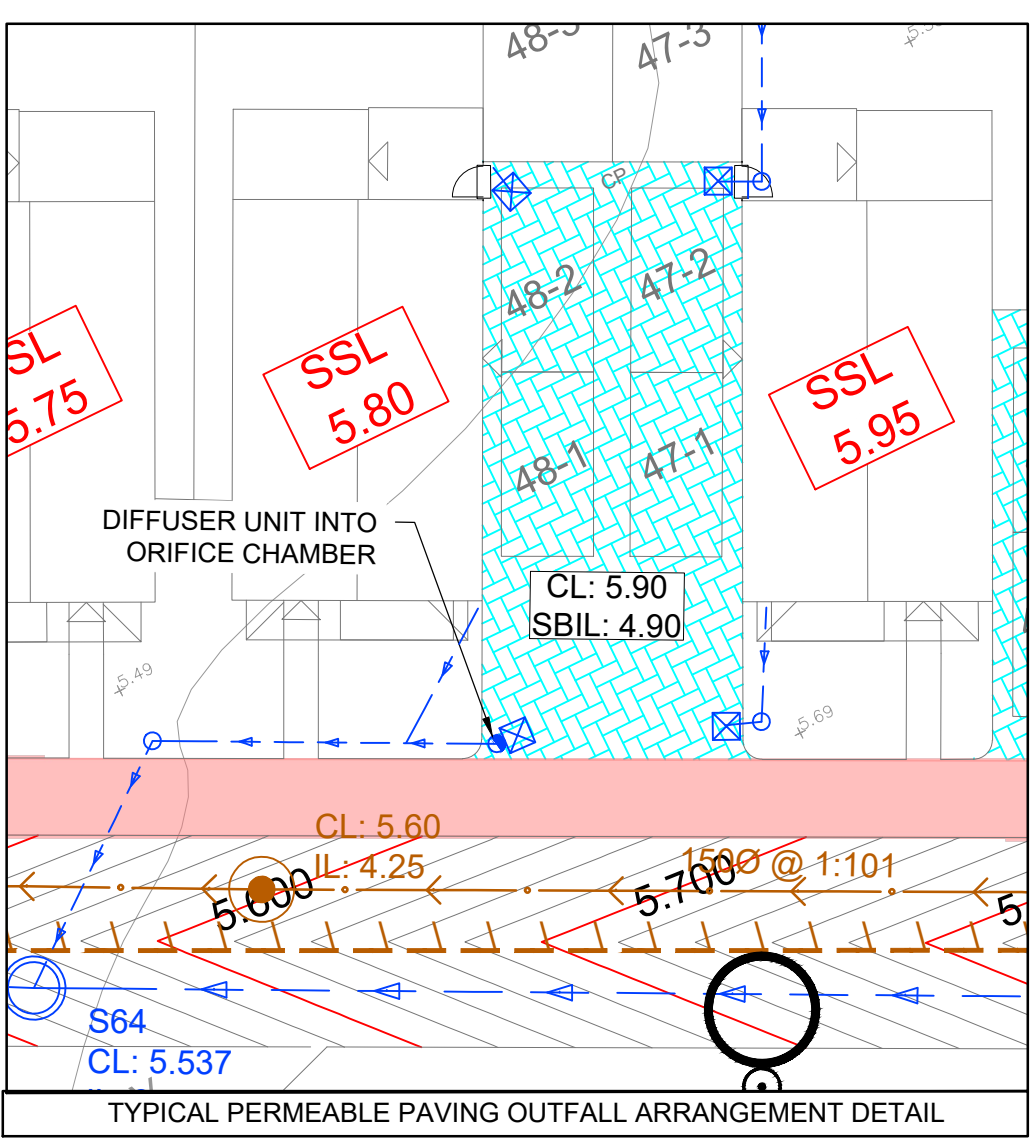
[Click here to view conditions on original application - click on decision tab](#)

APPENDIX B

Proposed Drainage Strategy



P19-326 - Bilsham Road, Yapton RMT Technical Drawings 000 Series 19-326-010 Preliminary Engineering Layout Sheet 2 of 2.dwg



TYPICAL PERMEABLE PAVING OUTFALL ARRANGEMENT DETAIL

- NOTES**
- DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.
 - ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN METRES.
 - CULVERTED DITCH LEVELS HAVE BEEN INTERPOLATED FROM SURVEY UNDERTAKEN BY LIGHTSOURCE SURVEYS LTD IN APRIL 2018
 - PROPOSALS ARE INDICATIVE ONLY TO DEMONSTRATE DRAINAGE STRATEGY AND ARE SUBJECT TO EVOLVE THROUGH DETAILED DESIGN
 - THE LEVELS SHOWN ON THIS DRAWING ARE PRELIMINARY AND SUBJECT TO CHANGE, EXCEPT FOR LEVELS SHOWN ON THE EDGE OF THE FLOODPLAIN NOTE THERE COULD BE A VARIANCE OF +/- 300mm BETWEEN PRELIMINARY LEVELS AND DETAILED DESIGN LEVELS.
 - LIGHTING DESIGN WILL ALL BE 6m COLUMNS WITH PHILLIPS BGP702 MIRCO LUMA LUMINAIRE, AS RECOMMENDED BY SSE.
 - WATERCOURSES WOULD BE CLEARED OF VEGETATION AND SILT AS PART OF WORKS. THESE WORKS WOULD BE COMPLETED NEAR THE BEGINNING OF CONSTRUCTION TO ENSURE THE FREE FLOW OF WATER.

- LEGEND**
- SITE BOUNDARY
 - PROPOSED ROAD CONTOUR
 - PROPOSED STRUCTURAL SLAB LEVEL
 - PROPOSED FOUL SEWER & MANHOLE
 - EXISTING CULVERTED WATERCOURSE
 - PROPOSED SURFACE WATER SEWER & MANHOLE
 - VORTEX FLOW CONTROL
 - PROPOSED RISING MAIN
 - PROPOSED PERMEABLE PAVING
 - PROPOSED HEADWALL
 - INDICATIVE ATTENUATION BASIN
 - BASIN FREEBOARD
 - BASIN EARTHWORKS EXTENT
 - ROOT PROTECTION ZONE
 - SERVICE MARGIN
 - CULVERT
 - PROPOSED STREET LIGHTING COLUMN, REFER TO NOTE 6.
 - GROUNDWATER LEVELS AT CORRESPONDING BOREHOLE

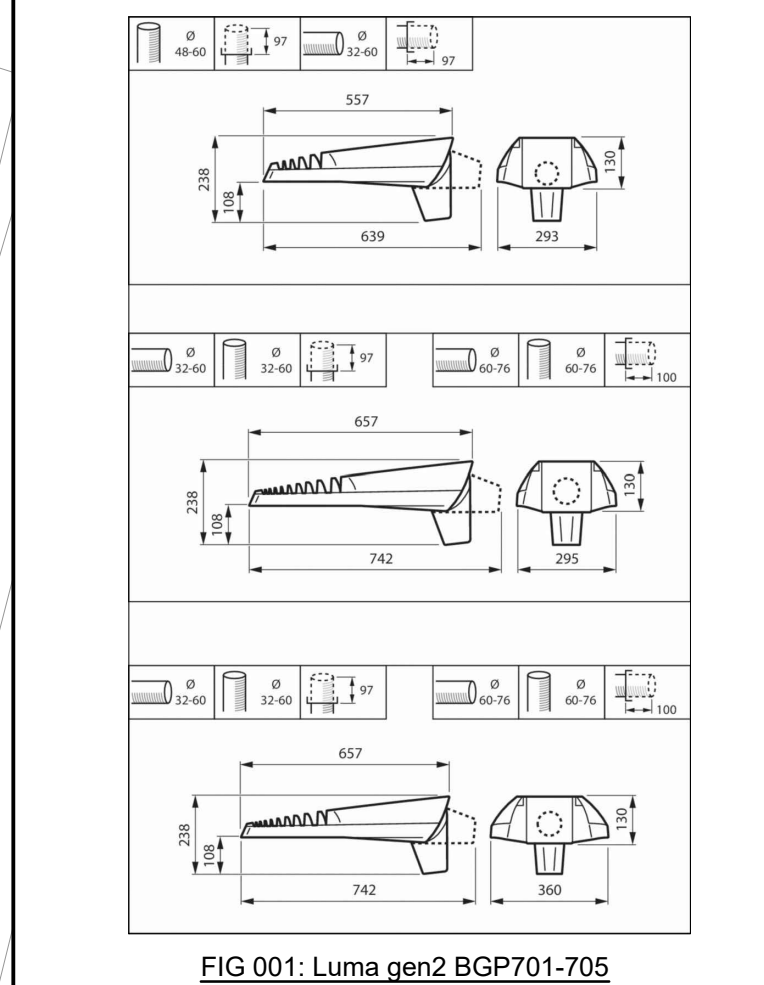


FIG 001: Luma gen2 BGP701-705

DRAFT

FOR INFORMATION ONLY
NOT FOR CONSTRUCTION

1. UPDATED DRAINAGE STRATEGY	HM NA	GC 09.03.21
2. ADDED STREET LIGHTING DETAILS	HM NA	GC 22.01.21
3. UPDATED TO SUIT NEW SITE LAYOUT	HM NA	GC 22.11.20
4. UPDATED TO CLIENT COMMENTS	LS RM	GC 23.10.20
5. UPDATED TO SUIT NEW SITE LAYOUT	LS NA	GC 16.10.20
6. UPDATED TO CLIENT COMMENTS	JA NA	GC 07.10.20
7. FFLS UPDATED	JA NA	GC 04.09.20
8. NOTE 8 ADDED TO DRAWING	THSAM	GC 10.09.20
9. UPDATED TO SUIT NEW SITE LAYOUT	RM NA	GC 23.08.20
10. UPDATED TO CLIENT COMMENTS	NA GC	GC 20.08.20

ODYSSEY

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E: info@odysseyconsult.co.uk
W: www.odysseyconsult.co.uk

Job Title			
BILSHAM ROAD, YAPTON			
Drawing Title			
PRELIMINARY ENGINEERING LAYOUT. SHEET 2 OF 2			
Client			
BILSHAM ROAD DEVELOPMENT LLP			
Scale	Date	Designed	NA
1:500 @A0	FEB 20		
Drawn	Checked	Approved	GG
LS	JH		
Job No	Drawing No	Rev	
19-326	19-326/010	K	

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APPENDIX C

Micro Drainage Calculations

Odyssey Markides LLP		Page 1
Tuscany House White Hart Lane Basingstoke RG21 4AF		
Date 05/03/2021 09:51 File 2021-03-04 Outfall 1 Ne...	Designed by WindesPC4 Checked by	
Micro Drainage Network 2020.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location GB 497526 102719 SU 97526 02719	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.419	4-8	1.269	8-12	1.295	12-16	0.088

Total Area Contributing (ha) = 3.071

Total Pipe Volume (m³) = 229.884

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	29.623	0.182	162.8	0.054	5.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.40	5.469	0.054	0.0	0.0	0.0	1.23	86.9	7.3

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Odyssey Markides LLP											Page 2		
Tuscany House White Hart Lane Basingstoke RG21 4AF													
Date 05/03/2021 09:51						Designed by WindesPC4							
File 2021-03-04 Outfall 1 Ne...						Checked by							
Micro Drainage						Network 2020.1							
<u>Network Design Table for Storm</u>													
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design		
2.000	26.224	0.105	250.0	0.118	5.00	0.0	0.600	o	375	Pipe/Conduit			
2.001	15.003	0.068	220.6	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit			
1.001	15.735	0.050	313.0	0.057	0.00	0.0	0.600	o	375	Pipe/Conduit			
1.002	34.637	0.111	313.0	0.032	0.00	0.0	0.600	o	375	Pipe/Conduit			
1.003	28.730	0.075	385.0	0.082	0.00	0.0	0.600	o	450	Pipe/Conduit			
1.004	27.193	0.200	136.0	0.080	0.00	0.0	0.600	o	450	Pipe/Conduit			
1.005	16.213	0.108	150.0	0.092	0.00	0.0	0.600	o	450	Pipe/Conduit			
3.000	22.527	0.264	85.3	0.039	5.00	0.0	0.600	o	225	Pipe/Conduit			
1.006	108.735	0.392	277.4	0.077	0.00	0.0	0.600	o	450	Pipe/Conduit			
4.000	45.600	0.192	238.0	0.063	5.00	0.0	0.600	o	300	Pipe/Conduit			
4.001	5.748	0.024	238.0	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit			
4.002	38.139	0.160	238.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit			
4.003	19.007	0.255	74.5	0.120	0.00	0.0	0.600	o	375	Pipe/Conduit			
5.000	42.648	0.179	238.0	0.040	5.00	0.0	0.600	o	300	Pipe/Conduit			
5.001	6.249	0.026	238.0	0.040	0.00	0.0	0.600	o	300	Pipe/Conduit			
5.002	6.327	0.126	50.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit			
<u>Network Results Table</u>													
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)			
2.000	50.00	5.38	5.385	0.118	0.0	0.0	0.0	1.14	126.1	16.0			
2.001	50.00	5.59	5.280	0.118	0.0	0.0	0.0	1.22	134.3	16.0			
1.001	50.00	5.85	5.212	0.229	0.0	0.0	0.0	1.02	112.5	31.0			
1.002	50.00	6.41	5.162	0.261	0.0	0.0	0.0	1.02	112.5	35.3			
1.003	50.00	6.88	4.976	0.343	0.0	0.0	0.0	1.03	163.8	46.4			
1.004	50.00	7.14	4.901	0.423	0.0	0.0	0.0	1.74	277.0	57.3			
1.005	50.00	7.30	4.701	0.515	0.0	0.0	0.0	1.66	263.6	69.7			
3.000	50.00	5.27	5.082	0.039	0.0	0.0	0.0	1.42	56.3	5.3			
1.006	50.00	8.79	4.593	0.631	0.0	0.0	0.0	1.22	193.4	85.4			
4.000	50.00	5.75	5.800	0.063	0.0	0.0	0.0	1.01	71.7	8.5			
4.001	50.00	5.84	5.608	0.126	0.0	0.0	0.0	1.01	71.7	17.1			
4.002	50.00	6.47	5.584	0.126	0.0	0.0	0.0	1.01	71.7	17.1			
4.003	50.00	6.62	5.349	0.246	0.0	0.0	0.0	2.10	232.0	33.3			
5.000	50.00	5.70	5.500	0.040	0.0	0.0	0.0	1.01	71.7	5.4			
5.001	50.00	5.80	5.321	0.080	0.0	0.0	0.0	1.01	71.7	10.8			
5.002	50.00	5.85	5.295	0.080	0.0	0.0	0.0	2.22	157.2	10.8			
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Odyssey Markides LLP											Page 3		
Tuscany House White Hart Lane Basingstoke RG21 4AF													
Date 05/03/2021 09:51 File 2021-03-04 Outfall 1 Ne...						Designed by WindesPC4 Checked by							
Micro Drainage						Network 2020.1							
<u>Network Design Table for Storm</u>													
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design		
4.004	26.102	0.068	385.0	0.024	0.00	0.0	0.600	o	450	Pipe/Conduit			
4.005	27.205	0.146	186.3	0.065	0.00	0.0	0.600	o	450	Pipe/Conduit			
6.000	34.873	0.350	99.6	0.136	5.00	0.0	0.600	o	375	Pipe/Conduit			
6.001	9.832	0.245	40.1	0.135	0.00	0.0	0.600	o	375	Pipe/Conduit			
4.006	24.581	0.150	163.9	0.045	0.00	0.0	0.600	o	525	Pipe/Conduit			
4.007	21.692	0.312	69.5	0.027	0.00	0.0	0.600	o	525	Pipe/Conduit			
7.000	5.325	0.036	147.9	0.046	5.00	0.0	0.600	o	150	Pipe/Conduit			
7.001	9.041	0.193	46.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit			
4.008	14.285	0.037	385.0	0.031	0.00	0.0	0.600	o	525	Pipe/Conduit			
8.000	11.091	0.190	58.4	0.027	5.00	0.0	0.600	o	100	Pipe/Conduit			
8.001	3.928	0.258	15.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit			
8.002	18.742	0.197	95.1	0.078	0.00	0.0	0.600	o	225	Pipe/Conduit			
4.009	22.656	0.029	781.2	0.017	0.00	0.0	0.600	o	525	Pipe/Conduit			
9.000	11.337	0.103	110.1	0.055	5.00	0.0	0.600	o	300	Pipe/Conduit			
<u>Network Results Table</u>													
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)			
4.004	50.00	7.04	5.019	0.350	0.0	0.0	0.0	1.03	163.8	47.4			
4.005	50.00	7.35	4.951	0.415	0.0	0.0	0.0	1.49	236.3	56.2			
6.000	50.00	5.32	5.475	0.136	0.0	0.0	0.0	1.82	200.5	18.4			
6.001	50.00	5.38	5.125	0.271	0.0	0.0	0.0	2.87	316.9	36.7			
4.006	50.00	7.58	4.730	0.731	0.0	0.0	0.0	1.75	378.2	99.0			
4.007	50.00	7.72	4.580	0.758	0.0	0.0	0.0	2.69	582.4	102.6			
7.000	50.00	5.11	4.872	0.046	0.0	0.0	0.0	0.82	14.6	6.2			
7.001	50.00	5.21	4.836	0.046	0.0	0.0	0.0	1.48	26.1	6.2			
4.008	50.00	7.93	4.268	0.835	0.0	0.0	0.0	1.14	245.8	113.1			
8.000	50.00	5.18	5.300	0.027	0.0	0.0	0.0	1.01	7.9	3.7			
8.001	50.00	5.22	5.110	0.027	0.0	0.0	0.0	1.99	15.6	3.7			
8.002	50.00	5.45	4.727	0.105	0.0	0.0	0.0	1.34	53.3	14.2			
4.009	50.00	8.40	4.230	0.957	0.0	0.0	0.0	0.79	171.8	129.6			
9.000	50.00	5.13	5.277	0.055	0.0	0.0	0.0	1.50	105.9	7.4			
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Tuscany House White Hart Lane Basingstoke RG21 4AF											
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Designed by WindesPC4 Checked by											
Micro Drainage						Network 2020.1					
<u>Network Design Table for Storm</u>											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
9.001	37.517	0.120	313.0	0.051	0.00	0.0	0.600	o	375	Pipe/Conduit	
9.002	33.536	0.107	313.0	0.052	0.00	0.0	0.600	o	375	Pipe/Conduit	
9.003	31.399	0.100	313.0	0.051	0.00	0.0	0.600	o	375	Pipe/Conduit	
9.004	16.139	0.149	108.3	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
9.005	16.741	0.053	313.0	0.115	0.00	0.0	0.600	o	375	Pipe/Conduit	
9.006	38.524	0.368	104.7	0.023	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.007	41.605	0.068	611.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.008	5.284	0.014	385.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	30.858	0.080	385.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	14.131	0.037	385.0	0.050	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.011	9.197	0.024	385.0	0.012	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.012	11.526	0.030	385.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.013	32.608	0.323	101.0	0.029	0.00	0.0	0.600	o	450	Pipe/Conduit	
10.000	40.323	0.241	167.0	0.053	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.001	5.550	0.033	167.0	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.014	29.639	0.077	385.0	0.033	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.015	33.280	0.086	385.0	0.032	0.00	0.0	0.600	o	450	Pipe/Conduit	
11.000	40.766	0.244	167.0	0.025	5.00	0.0	0.600	o	225	Pipe/Conduit	
<u>Network Results Table</u>											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
9.001	50.00	5.74	5.099	0.106	0.0	0.0	0.0	1.02	112.5	14.4	
9.002	50.00	6.29	4.979	0.158	0.0	0.0	0.0	1.02	112.5	21.4	
9.003	50.00	6.80	4.872	0.209	0.0	0.0	0.0	1.02	112.5	28.3	
9.004	50.00	6.96	4.772	0.209	0.0	0.0	0.0	1.74	192.2	28.3	
9.005	50.00	7.23	4.623	0.324	0.0	0.0	0.0	1.02	112.5	43.9	
9.006	50.00	7.59	4.569	0.347	0.0	0.0	0.0	1.77	195.6	47.0	
1.007	50.00	9.64	4.201	1.935	0.0	0.0	0.0	0.81	129.6	262.0	
1.008	50.00	9.73	4.133	1.935	0.0	0.0	0.0	1.03	163.8	262.0	
1.009	50.00	10.23	4.119	1.935	0.0	0.0	0.0	1.03	163.8	262.0	
1.010	50.00	10.46	4.039	1.985	0.0	0.0	0.0	1.03	163.8	268.8	
1.011	50.00	10.60	4.002	1.997	0.0	0.0	0.0	1.03	163.8	270.4	
1.012	50.00	10.79	3.978	1.997	0.0	0.0	0.0	1.03	163.8	270.4	
1.013	50.00	11.06	3.948	2.026	0.0	0.0	0.0	2.02	321.8	274.3	
10.000	50.00	5.67	4.125	0.053	0.0	0.0	0.0	1.01	40.1	7.2	
10.001	50.00	5.76	3.884	0.106	0.0	0.0	0.0	1.01	40.1	14.4	
1.014	50.00	11.54	3.625	2.165	0.0	0.0	0.0	1.03	163.8	293.2	
1.015	50.00	12.08	3.548	2.197	0.0	0.0	0.0	1.03	163.8	297.5	
11.000	50.00	5.67	4.275	0.025	0.0	0.0	0.0	1.01	40.1	3.4	
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Micro Drainage						Network 2020.1						
<u>Network Design Table for Storm</u>												
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design	
11.001	6.269	0.344	18.2	0.025	0.00	0.0	0.600	o	225	Pipe/Conduit		
1.016	16.777	0.037	455.0	0.059	0.00	0.0	0.600	o	525	Pipe/Conduit		
1.017	51.369	0.101	508.6	0.008	0.00	0.0	0.600	o	525	Pipe/Conduit		
1.018	58.152	0.765	76.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit		
12.000	27.788	0.139	200.0	0.053	5.00	0.0	0.600	o	450	Pipe/Conduit		
13.000	52.581	0.351	149.8	0.067	5.00	0.0	0.600	o	375	Pipe/Conduit		
13.001	5.924	0.181	32.7	0.066	0.00	0.0	0.600	o	375	Pipe/Conduit		
12.001	55.215	0.143	385.0	0.016	0.00	0.0	0.600	o	450	Pipe/Conduit		
12.002	13.627	0.056	243.3	0.074	0.00	0.0	0.600	o	450	Pipe/Conduit		
14.000	50.753	1.015	50.0	0.055	5.00	0.0	0.600	o	300	Pipe/Conduit		
14.001	3.921	0.016	238.0	0.055	0.00	0.0	0.600	o	300	Pipe/Conduit		
12.003	52.036	0.135	385.0	0.012	0.00	0.0	0.600	o	450	Pipe/Conduit		
15.000	32.342	0.647	50.0	0.045	5.00	0.0	0.600	o	225	Pipe/Conduit		
15.001	4.998	0.119	42.0	0.044	0.00	0.0	0.600	o	225	Pipe/Conduit		
<u>Network Results Table</u>												
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)		
11.001	50.00	5.71	4.031	0.050	0.0	0.0	0.0	3.08	122.5	6.8		
1.016	50.00	12.35	3.387	2.306	0.0	0.0	0.0	1.04	225.9	312.3		
1.017	50.00	13.21	3.350	2.314	0.0	0.0	0.0	0.99	213.5	313.3		
1.018	50.00	13.59	3.249	2.314	0.0	0.0	0.0	2.57	556.6	313.3		
12.000	50.00	5.32	4.407	0.053	0.0	0.0	0.0	1.43	228.1	7.2		
13.000	50.00	5.59	4.875	0.067	0.0	0.0	0.0	1.48	163.2	9.1		
13.001	50.00	5.62	4.524	0.133	0.0	0.0	0.0	3.18	350.9	18.0		
12.001	50.00	6.52	4.268	0.202	0.0	0.0	0.0	1.03	163.8	27.4		
12.002	50.00	6.69	4.125	0.276	0.0	0.0	0.0	1.30	206.6	37.4		
14.000	50.00	5.38	5.250	0.055	0.0	0.0	0.0	2.23	157.5	7.4		
14.001	50.00	5.44	4.235	0.110	0.0	0.0	0.0	1.01	71.7	14.9		
12.003	50.00	7.53	4.069	0.398	0.0	0.0	0.0	1.03	163.8	53.9		
15.000	50.00	5.29	4.925	0.045	0.0	0.0	0.0	1.85	73.7	6.1		
15.001	50.00	5.33	4.278	0.089	0.0	0.0	0.0	2.02	80.5	12.1		
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<u>Network Design Table for Storm</u> <table><tr><th>PN</th><th>Length (m)</th><th>Fall (m)</th><th>Slope (1:X)</th><th>I.Area (ha)</th><th>T.E. (mins)</th><th>Base Flow (l/s)</th><th>k (mm)</th><th>HYD SECT</th><th>DIA (mm)</th><th>Section Type</th><th>Auto Design</th></tr><tr><td>12.004</td><td>13.665</td><td>0.035</td><td>385.0</td><td>0.075</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>450</td><td>Pipe/Conduit</td><td></td></tr><tr><td>12.005</td><td>49.152</td><td>0.128</td><td>385.0</td><td>0.040</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>450</td><td>Pipe/Conduit</td><td></td></tr><tr><td>12.006</td><td>27.544</td><td>0.072</td><td>385.0</td><td>0.101</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>450</td><td>Pipe/Conduit</td><td></td></tr><tr><td>12.007</td><td>18.709</td><td>0.311</td><td>60.2</td><td>0.054</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>450</td><td>Pipe/Conduit</td><td></td></tr><tr><td>12.008</td><td>20.031</td><td>0.829</td><td>24.2</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>450</td><td>Pipe/Conduit</td><td></td></tr><tr><td>1.019</td><td>10.643</td><td>0.025</td><td>425.7</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>600</td><td>Pipe/Conduit</td><td></td></tr></table> <u>Network Results Table</u> <table><tr><th>PN</th><th>Rain (mm/hr)</th><th>T.C. (mins)</th><th>US/IL (m)</th><th>Σ I.Area (ha)</th><th>Σ Base Flow (l/s)</th><th>Foul (l/s)</th><th>Add Flow (l/s)</th><th>Vel (m/s)</th><th>Cap (l/s)</th><th>Flow (l/s)</th></tr><tr><td>12.004</td><td>50.00</td><td>7.76</td><td>3.934</td><td>0.562</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.03</td><td>163.8</td><td>76.1</td></tr><tr><td>12.005</td><td>50.00</td><td>8.55</td><td>3.898</td><td>0.602</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.03</td><td>163.8</td><td>81.5</td></tr><tr><td>12.006</td><td>50.00</td><td>9.00</td><td>3.771</td><td>0.703</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.03</td><td>163.8</td><td>95.2</td></tr><tr><td>12.007</td><td>50.00</td><td>9.12</td><td>3.699</td><td>0.757</td><td>0.0</td><td>0.0</td><td>0.0</td><td>2.63</td><td>417.5</td><td>102.5</td></tr><tr><td>12.008</td><td>50.00</td><td>9.20</td><td>3.388</td><td>0.757</td><td>0.0</td><td>0.0</td><td>0.0</td><td>4.15</td><td>659.9</td><td>102.5</td></tr><tr><td>1.019</td><td>50.00</td><td>13.74</td><td>2.409</td><td>3.071</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.17</td><td>331.9</td><td>415.9</td></tr></table>												PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design	12.004	13.665	0.035	385.0	0.075	0.00	0.0	0.600	o	450	Pipe/Conduit		12.005	49.152	0.128	385.0	0.040	0.00	0.0	0.600	o	450	Pipe/Conduit		12.006	27.544	0.072	385.0	0.101	0.00	0.0	0.600	o	450	Pipe/Conduit		12.007	18.709	0.311	60.2	0.054	0.00	0.0	0.600	o	450	Pipe/Conduit		12.008	20.031	0.829	24.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		1.019	10.643	0.025	425.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit		PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	12.004	50.00	7.76	3.934	0.562	0.0	0.0	0.0	1.03	163.8	76.1	12.005	50.00	8.55	3.898	0.602	0.0	0.0	0.0	1.03	163.8	81.5	12.006	50.00	9.00	3.771	0.703	0.0	0.0	0.0	1.03	163.8	95.2	12.007	50.00	9.12	3.699	0.757	0.0	0.0	0.0	2.63	417.5	102.5	12.008	50.00	9.20	3.388	0.757	0.0	0.0	0.0	4.15	659.9	102.5	1.019	50.00	13.74	2.409	3.071	0.0	0.0	0.0	1.17	331.9	415.9
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design																																																																																																																																																																	
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Micro Drainage								Network 2020.1		
<u>Manhole Schedules for Storm</u>										
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)
1	6.969	1.500	Open Manhole	1200	1.000	5.469	300			
2	6.660	1.275	Open Manhole	1350	2.000	5.385	375			
3	6.850	1.570	Open Manhole	1350	2.001	5.280	375	2.000	5.280	375
4	6.929	1.717	Open Manhole	1350	1.001	5.212	375	1.000	5.287	300
								2.001	5.212	375
5	6.846	1.684	Open Manhole	1350	1.002	5.162	375	1.001	5.162	375
6	6.563	1.587	Open Manhole	1350	1.003	4.976	450	1.002	5.051	375
7	6.314	1.413	Open Manhole	1350	1.004	4.901	450	1.003	4.901	450
8	6.051	1.350	Open Manhole	1350	1.005	4.701	450	1.004	4.701	450
9	6.307	1.225	Open Manhole	1200	3.000	5.082	225			
10	5.984	1.391	Open Manhole	1350	1.006	4.593	450	1.005	4.593	450
								3.000	4.818	225
11	7.000	1.200	Open Manhole	1200	4.000	5.800	300			
12	7.250	1.642	Open Manhole	1200	4.001	5.608	300	4.000	5.608	300
13	7.066	1.482	Open Manhole	1200	4.002	5.584	300	4.001	5.584	300
14	6.762	1.413	Open Manhole	1350	4.003	5.349	375	4.002	5.424	300
15	6.700	1.200	Open Manhole	1200	5.000	5.500	300			
16	6.800	1.479	Open Manhole	1200	5.001	5.321	300	5.000	5.321	300
17	6.750	1.455	Open Manhole	1200	5.002	5.295	300	5.001	5.295	300
18	6.567	1.548	Open Manhole	1350	4.004	5.019	450	4.003	5.094	375
								5.002	5.169	300
19	6.374	1.423	Open Manhole	1350	4.005	4.951	450	4.004	4.951	450
20	6.750	1.275	Open Manhole	1350	6.000	5.475	375			
21	6.400	1.275	Open Manhole	1350	6.001	5.125	375	6.000	5.125	375
22	6.155	1.425	Open Manhole	1500	4.006	4.730	525	4.005	4.805	450
								6.001	4.880	375
23	6.005	1.425	Open Manhole	1500	4.007	4.580	525	4.006	4.580	525
24	5.872	1.000	Open Manhole	1200	7.000	4.872	150			
25	5.801	0.965	Open Manhole	1200	7.001	4.836	150	7.000	4.836	150
26	5.834	1.566	Open Manhole	1500	4.008	4.268	525	4.007	4.268	525
								7.001	4.643	150
27	6.300	1.000	Open Manhole	1200	8.000	5.300	100			
28	6.300	1.190	Open Manhole	1200	8.001	5.110	100	8.000	5.110	100
29	5.952	1.225	Open Manhole	1200	8.002	4.727	225	8.001	4.852	100
30	5.755	1.525	Open Manhole	1500	4.009	4.230	525	4.008	4.230	525
								8.002	4.530	225
31	6.777	1.500	Open Manhole	1200	9.000	5.277	300			
32	6.674	1.575	Open Manhole	1350	9.001	5.099	375	9.000	5.174	300
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Micro Drainage				Network 2020.1							
<u>Manhole Schedules for Storm</u>											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	
BASIN 1	33	7.054	2.075	Open Manhole	1350	9.002	4.979	375	9.001	4.979	
	34	6.721	1.849	Open Manhole	1350	9.003	4.872	375	9.002	4.872	
	35	6.362	1.590	Open Manhole	1350	9.004	4.772	375	9.003	4.772	
	36	6.198	1.575	Open Manhole	1350	9.005	4.623	375	9.004	4.623	
	37	6.237	1.668	Open Manhole	1350	9.006	4.569	375	9.005	4.569	
	5.987	1.786	Open Manhole	1500	1.007	4.201	450	1.006	4.201		
								4.009	4.201		
								9.006	4.201		
	38	6.242	2.109	Open Manhole	1350	1.008	4.133	450	1.007	4.133	
	39	6.472	2.353	Open Manhole	1350	1.009	4.119	450	1.008	4.119	
40	6.318	2.279	Open Manhole	1350	1.010	4.039	450	1.009	4.039		
41	6.174	2.172	Open Manhole	1350	1.011	4.002	450	1.010	4.002		
42	6.077	2.099	Open Manhole	1350	1.012	3.978	450	1.011	3.978		
43	5.967	2.019	Open Manhole	1350	1.013	3.948	450	1.012	3.948		
44	5.250	1.125	Open Manhole	1200	10.000	4.125	225				
45	5.750	1.866	Open Manhole	1200	10.001	3.884	225	10.000	3.884		
46	5.687	2.062	Open Manhole	1350	1.014	3.625	450	1.013	3.625		
								10.001	3.850		
47	5.372	1.824	Open Manhole	1350	1.015	3.548	450	1.014	3.548		
48	5.400	1.125	Open Manhole	1200	11.000	4.275	225				
49	5.100	1.069	Open Manhole	1200	11.001	4.031	225	11.000	4.031		
50	5.054	1.667	Open Manhole	1500	1.016	3.387	525	1.015	3.462		
								11.001	3.687		
BASIN 4	51	4.912	1.562	Open Manhole	1500	1.017	3.350	525	1.016	3.350	
	5.000	1.751	Open Manhole	1500	1.018	3.249	525	1.017	3.249		
	52	5.757	1.350	Open Manhole	1350	12.000	4.407	450			
	53	6.150	1.275	Open Manhole	1350	13.000	4.875	375			
	54	6.300	1.776	Open Manhole	1350	13.001	4.524	375	13.000	4.524	
	55	6.248	1.980	Open Manhole	1350	12.001	4.268	450	12.000	4.268	
								13.001	4.343		
	56	6.822	2.697	Open Manhole	1350	12.002	4.125	450	12.001	4.125	
	57	6.450	1.200	Open Manhole	1200	14.000	5.250	300			
	58	6.800	2.565	Open Manhole	1200	14.001	4.235	300	14.000	4.235	
59	6.689	2.620	Open Manhole	1350	12.003	4.069	450	12.002	4.069		
								14.001	4.219		
60	6.350	1.425	Open Manhole	1200	15.000	4.925	225				
61	6.300	2.022	Open Manhole	1200	15.001	4.278	225	15.000	4.278		
62	6.169	2.235	Open Manhole	1350	12.004	3.934	450	12.003	3.934		
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Micro Drainage Network 2020.1		

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
63	6.029	2.131	Open Manhole	1350	12.005	3.898	450	15.001	4.159	225	
64	5.537	1.766	Open Manhole	1350	12.006	3.771	450	12.004	3.898	450	
65	5.269	1.570	Open Manhole	1350	12.007	3.699	450	12.005	3.771	450	
BASIN 5	5.179	1.791	Open Manhole	1350	12.008	3.388	450	12.006	3.699	450	
66	4.758	2.349	Open Manhole	1500	1.019	2.409	600	12.007	3.388	450	
								1.018	2.484	525	
								12.008	2.559	450	
	4.829	2.445	Open Manhole	0		OUTFALL		1.019	2.384	600	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	497552.231	103029.538	497552.231	103029.538	Required	
2	497539.610	103077.088	497539.610	103077.088	Required	
3	497559.350	103059.824	497559.350	103059.824	Required	
4	497571.935	103051.657	497571.935	103051.657	Required	
5	497585.164	103043.136	497585.164	103043.136	Required	
6	497612.241	103021.537	497612.241	103021.537	Required	
7	497635.255	103004.339	497635.255	103004.339	Required	
8	497655.721	102986.433	497655.721	102986.433	Required	
9	497641.332	102952.267	497641.332	102952.267	Required	
10	497654.913	102970.239	497654.913	102970.239	Required	

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Tuscany House White Hart Lane Basingstoke RG21 4AF			Designed by WindesPC4 Checked by																																																																																																																			
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Micro Drainage			Network 2020.1																																																																																																																			
<u>Manhole Schedules for Storm</u> <table><thead><tr><th>MH Name</th><th>Manhole Easting (m)</th><th>Manhole Northing (m)</th><th>Intersection Easting (m)</th><th>Intersection Northing (m)</th><th>Manhole Access</th><th>Layout (North)</th></tr></thead><tbody><tr><td>11</td><td>497495.757</td><td>103042.229</td><td>497495.757</td><td>103042.229</td><td>Required</td><td></td></tr><tr><td>12</td><td>497527.635</td><td>103009.624</td><td>497527.635</td><td>103009.624</td><td>Required</td><td></td></tr><tr><td>13</td><td>497531.966</td><td>103005.845</td><td>497531.966</td><td>103005.845</td><td>Required</td><td></td></tr><tr><td>14</td><td>497513.640</td><td>102972.397</td><td>497513.640</td><td>102972.397</td><td>Required</td><td></td></tr><tr><td>15</td><td>497462.430</td><td>102993.458</td><td>497462.430</td><td>102993.458</td><td>Required</td><td></td></tr><tr><td>16</td><td>497494.352</td><td>102965.176</td><td>497494.352</td><td>102965.176</td><td>Required</td><td></td></tr><tr><td>17</td><td>497499.391</td><td>102961.481</td><td>497499.391</td><td>102961.481</td><td>Required</td><td></td></tr><tr><td>18</td><td>497503.260</td><td>102956.475</td><td>497503.260</td><td>102956.475</td><td>Required</td><td></td></tr><tr><td>19</td><td>497523.608</td><td>102940.127</td><td>497523.608</td><td>102940.127</td><td>Required</td><td></td></tr><tr><td>20</td><td>497571.251</td><td>102960.030</td><td>497571.251</td><td>102960.030</td><td>Required</td><td></td></tr><tr><td>21</td><td>497551.443</td><td>102931.329</td><td>497551.443</td><td>102931.329</td><td>Required</td><td></td></tr><tr><td>22</td><td>497545.274</td><td>102923.674</td><td>497545.274</td><td>102923.674</td><td>Required</td><td></td></tr><tr><td>23</td><td>497564.994</td><td>102908.999</td><td>497564.994</td><td>102908.999</td><td>Required</td><td></td></tr><tr><td>24</td><td>497575.731</td><td>102884.683</td><td>497575.731</td><td>102884.683</td><td>Required</td><td></td></tr><tr><td>25</td><td>497578.874</td><td>102888.982</td><td>497578.874</td><td>102888.982</td><td>Required</td><td></td></tr></tbody></table>							MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)	11	497495.757	103042.229	497495.757	103042.229	Required		12	497527.635	103009.624	497527.635	103009.624	Required		13	497531.966	103005.845	497531.966	103005.845	Required		14	497513.640	102972.397	497513.640	102972.397	Required		15	497462.430	102993.458	497462.430	102993.458	Required		16	497494.352	102965.176	497494.352	102965.176	Required		17	497499.391	102961.481	497499.391	102961.481	Required		18	497503.260	102956.475	497503.260	102956.475	Required		19	497523.608	102940.127	497523.608	102940.127	Required		20	497571.251	102960.030	497571.251	102960.030	Required		21	497551.443	102931.329	497551.443	102931.329	Required		22	497545.274	102923.674	497545.274	102923.674	Required		23	497564.994	102908.999	497564.994	102908.999	Required		24	497575.731	102884.683	497575.731	102884.683	Required		25	497578.874	102888.982	497578.874	102888.982	Required	
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)																																																																																																																
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23	497564.994	102908.999	497564.994	102908.999	Required																																																																																																																	
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<u>Manhole Schedules for Storm</u>						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
26	497583.062	102896.995	497583.062	102896.995	Required	
27	497600.002	102921.890	497600.002	102921.890	Required	
28	497608.025	102914.232	497608.025	102914.232	Required	
29	497610.535	102911.211	497610.535	102911.211	Required	
30	497597.317	102897.924	497597.317	102897.924	Required	
31	497477.276	102928.909	497477.276	102928.909	Required	
32	497470.178	102920.070	497470.178	102920.070	Required	
33	497499.441	102896.593	497499.441	102896.593	Required	
34	497526.695	102877.052	497526.695	102877.052	Required	
35	497551.262	102857.498	497551.262	102857.498	Required	
36	497566.357	102851.788	497566.357	102851.788	Required	
37	497580.671	102843.107	497580.671	102843.107	Required	
BASIN 1	497601.326	102875.626	497601.326	102875.626	Required	
38	497602.108	102834.028	497602.108	102834.028	Required	
39	497598.771	102829.931	497598.771	102829.931	Required	
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MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)																																																																																																		
40	497622.499	102810.202	497622.499	102810.202	Required																																																																																																			
41	497628.078	102797.219	497628.078	102797.219	Required																																																																																																			
42	497628.354	102788.026	497628.354	102788.026	Required																																																																																																			
43	497625.563	102776.844	497625.563	102776.844	Required																																																																																																			
44	497569.454	102777.724	497569.454	102777.724	Required																																																																																																			
45	497602.044	102753.979	497602.044	102753.979	Required																																																																																																			
46	497606.360	102750.490	497606.360	102750.490	Required																																																																																																			
47	497588.701	102726.686	497588.701	102726.686	Required																																																																																																			
48	497531.441	102728.920	497531.441	102728.920	Required																																																																																																			
49	497563.681	102703.971	497563.681	102703.971	Required																																																																																																			
50	497568.638	102700.133	497568.638	102700.133	Required																																																																																																			
51	497562.977	102684.340	497562.977	102684.340	Required																																																																																																			
BASIN 4	497512.163	102676.808	497512.163	102676.808	Required																																																																																																			
52	497780.981	102515.024	497780.981	102515.024	Required																																																																																																			
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Date 05/03/2021 09:51 File 2021-03-04 Outfall 1 Ne...			Designed by WindesPC4 Checked by			
Micro Drainage			Network 2020.1			
<u>Manhole Schedules for Storm</u>						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
54	497759.191	102533.077	497759.191	102533.077	Required	
55	497756.347	102527.881	497756.347	102527.881	Required	
56	497707.687	102553.975	497707.687	102553.975	Required	
57	497731.662	102604.217	497731.662	102604.217	Required	
58	497701.246	102563.587	497701.246	102563.587	Required	
59	497697.387	102562.897	497697.387	102562.897	Required	
60	497687.331	102631.709	497687.331	102631.709	Required	
61	497667.683	102606.019	497667.683	102606.019	Required	
62	497663.914	102602.737	497663.914	102602.737	Required	
63	497653.393	102611.458	497653.393	102611.458	Required	
64	497609.405	102633.387	497609.405	102633.387	Required	
65	497585.202	102646.535	497585.202	102646.535	Required	
BASIN 5	497573.800	102631.702	497573.800	102631.702	Required	
66	497554.454	102636.894	497554.454	102636.894	Required	
	497549.020	102627.742			No Entry	
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Micro Drainage				Network 2020.1					
PIPELINE SCHEDULES for Storm									
Upstream Manhole									
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	
1.000	o	300	1	6.969	5.469	1.200	Open Manhole		1200
2.000	o	375	2	6.660	5.385	0.900	Open Manhole		1350
2.001	o	375	3	6.850	5.280	1.195	Open Manhole		1350
1.001	o	375	4	6.929	5.212	1.342	Open Manhole		1350
1.002	o	375	5	6.846	5.162	1.309	Open Manhole		1350
1.003	o	450	6	6.563	4.976	1.137	Open Manhole		1350
1.004	o	450	7	6.314	4.901	0.963	Open Manhole		1350
1.005	o	450	8	6.051	4.701	0.900	Open Manhole		1350
3.000	o	225	9	6.307	5.082	1.000	Open Manhole		1200
1.006	o	450	10	5.984	4.593	0.941	Open Manhole		1350
4.000	o	300	11	7.000	5.800	0.900	Open Manhole		1200
4.001	o	300	12	7.250	5.608	1.342	Open Manhole		1200
4.002	o	300	13	7.066	5.584	1.182	Open Manhole		1200
4.003	o	375	14	6.762	5.349	1.038	Open Manhole		1350
5.000	o	300	15	6.700	5.500	0.900	Open Manhole		1200
Downstream Manhole									
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	
1.000	29.623	162.8	4	6.929	5.287	1.342	Open Manhole		1350
2.000	26.224	250.0	3	6.850	5.280	1.195	Open Manhole		1350
2.001	15.003	220.6	4	6.929	5.212	1.342	Open Manhole		1350
1.001	15.735	313.0	5	6.846	5.162	1.309	Open Manhole		1350
1.002	34.637	313.0	6	6.563	5.051	1.137	Open Manhole		1350
1.003	28.730	385.0	7	6.314	4.901	0.963	Open Manhole		1350
1.004	27.193	136.0	8	6.051	4.701	0.900	Open Manhole		1350
1.005	16.213	150.0	10	5.984	4.593	0.941	Open Manhole		1350
3.000	22.527	85.3	10	5.984	4.818	0.941	Open Manhole		1350
1.006	108.735	277.4	BASIN 1	5.987	4.201	1.336	Open Manhole		1500
4.000	45.600	238.0	12	7.250	5.608	1.342	Open Manhole		1200
4.001	5.748	238.0	13	7.066	5.584	1.182	Open Manhole		1200
4.002	38.139	238.0	14	6.762	5.424	1.038	Open Manhole		1350
4.003	19.007	74.5	18	6.567	5.094	1.098	Open Manhole		1350
5.000	42.648	238.0	16	6.800	5.321	1.179	Open Manhole		1200
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Tuscany House White Hart Lane Basingstoke RG21 4AF									
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Micro Drainage				Network 2020.1					
<u>PIPELINE SCHEDULES for Storm</u>									
<u>Upstream Manhole</u>									
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
5.001	o	300	16	6.800	5.321	1.179	Open Manhole		1200
5.002	o	300	17	6.750	5.295	1.155	Open Manhole		1200
4.004	o	450	18	6.567	5.019	1.098	Open Manhole		1350
4.005	o	450	19	6.374	4.951	0.973	Open Manhole		1350
6.000	o	375	20	6.750	5.475	0.900	Open Manhole		1350
6.001	o	375	21	6.400	5.125	0.900	Open Manhole		1350
4.006	o	525	22	6.155	4.730	0.900	Open Manhole		1500
4.007	o	525	23	6.005	4.580	0.900	Open Manhole		1500
7.000	o	150	24	5.872	4.872	0.850	Open Manhole		1200
7.001	o	150	25	5.801	4.836	0.815	Open Manhole		1200
4.008	o	525	26	5.834	4.268	1.041	Open Manhole		1500
8.000	o	100	27	6.300	5.300	0.900	Open Manhole		1200
8.001	o	100	28	6.300	5.110	1.090	Open Manhole		1200
8.002	o	225	29	5.952	4.727	1.000	Open Manhole		1200
<u>Downstream Manhole</u>									
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
5.001	6.249	238.0	17	6.750	5.295	1.155	Open Manhole		1200
5.002	6.327	50.2	18	6.567	5.169	1.098	Open Manhole		1350
4.004	26.102	385.0	19	6.374	4.951	0.973	Open Manhole		1350
4.005	27.205	186.3	22	6.155	4.805	0.900	Open Manhole		1500
6.000	34.873	99.6	21	6.400	5.125	0.900	Open Manhole		1350
6.001	9.832	40.1	22	6.155	4.880	0.900	Open Manhole		1500
4.006	24.581	163.9	23	6.005	4.580	0.900	Open Manhole		1500
4.007	21.692	69.5	26	5.834	4.268	1.041	Open Manhole		1500
7.000	5.325	147.9	25	5.801	4.836	0.815	Open Manhole		1200
7.001	9.041	46.7	26	5.834	4.643	1.041	Open Manhole		1500
4.008	14.285	385.0	30	5.755	4.230	1.000	Open Manhole		1500
8.000	11.091	58.4	28	6.300	5.110	1.090	Open Manhole		1200
8.001	3.928	15.2	29	5.952	4.852	1.000	Open Manhole		1200
8.002	18.742	95.1	30	5.755	4.530	1.000	Open Manhole		1500
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Tuscany House White Hart Lane Basingstoke RG21 4AF									
Date 05/03/2021 09:51 File 2021-03-04 Outfall 1 Ne...				Designed by WindesPC4 Checked by					
Micro Drainage				Network 2020.1					
<u>PIPELINE SCHEDULES for Storm</u>									
<u>Upstream Manhole</u>									
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	
4.009	o	525	30	5.755	4.230	1.000	Open Manhole		1500
9.000	o	300	31	6.777	5.277	1.200	Open Manhole		1200
9.001	o	375	32	6.674	5.099	1.200	Open Manhole		1350
9.002	o	375	33	7.054	4.979	1.700	Open Manhole		1350
9.003	o	375	34	6.721	4.872	1.474	Open Manhole		1350
9.004	o	375	35	6.362	4.772	1.215	Open Manhole		1350
9.005	o	375	36	6.198	4.623	1.200	Open Manhole		1350
9.006	o	375	37	6.237	4.569	1.293	Open Manhole		1350
1.007	o	450	BASIN 1	5.987	4.201	1.336	Open Manhole		1500
1.008	o	450	38	6.242	4.133	1.659	Open Manhole		1350
1.009	o	450	39	6.472	4.119	1.903	Open Manhole		1350
1.010	o	450	40	6.318	4.039	1.829	Open Manhole		1350
1.011	o	450	41	6.174	4.002	1.722	Open Manhole		1350
1.012	o	450	42	6.077	3.978	1.649	Open Manhole		1350
1.013	o	450	43	5.967	3.948	1.569	Open Manhole		1350
10.000	o	225	44	5.250	4.125	0.900	Open Manhole		1200
10.001	o	225	45	5.750	3.884	1.641	Open Manhole		1200
<u>Downstream Manhole</u>									
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	
4.009	22.656	781.2	BASIN 1	5.987	4.201	1.261	Open Manhole		1500
9.000	11.337	110.1	32	6.674	5.174	1.200	Open Manhole		1350
9.001	37.517	313.0	33	7.054	4.979	1.700	Open Manhole		1350
9.002	33.536	313.0	34	6.721	4.872	1.474	Open Manhole		1350
9.003	31.399	313.0	35	6.362	4.772	1.215	Open Manhole		1350
9.004	16.139	108.3	36	6.198	4.623	1.200	Open Manhole		1350
9.005	16.741	313.0	37	6.237	4.569	1.293	Open Manhole		1350
9.006	38.524	104.7	BASIN 1	5.987	4.201	1.411	Open Manhole		1500
1.007	41.605	611.8	38	6.242	4.133	1.659	Open Manhole		1350
1.008	5.284	385.0	39	6.472	4.119	1.903	Open Manhole		1350
1.009	30.858	385.0	40	6.318	4.039	1.829	Open Manhole		1350
1.010	14.131	385.0	41	6.174	4.002	1.722	Open Manhole		1350
1.011	9.197	385.0	42	6.077	3.978	1.649	Open Manhole		1350
1.012	11.526	385.0	43	5.967	3.948	1.569	Open Manhole		1350
1.013	32.608	101.0	46	5.687	3.625	1.612	Open Manhole		1350
10.000	40.323	167.0	45	5.750	3.884	1.641	Open Manhole		1200
10.001	5.550	167.0	46	5.687	3.850	1.612	Open Manhole		1350
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Date 05/03/2021 09:51 File 2021-03-04 Outfall 1 Ne...				Designed by WindesPC4 Checked by					
Micro Drainage				Network 2020.1					
PIPELINE SCHEDULES for Storm									
Upstream Manhole									
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	
1.014	o	450	46	5.687	3.625	1.612	Open Manhole		1350
1.015	o	450	47	5.372	3.548	1.374	Open Manhole		1350
11.000	o	225	48	5.400	4.275	0.900	Open Manhole		1200
11.001	o	225	49	5.100	4.031	0.844	Open Manhole		1200
1.016	o	525	50	5.054	3.387	1.142	Open Manhole		1500
1.017	o	525	51	4.912	3.350	1.037	Open Manhole		1500
1.018	o	525	BASIN 4	5.000	3.249	1.226	Open Manhole		1500
12.000	o	450	52	5.757	4.407	0.900	Open Manhole		1350
13.000	o	375	53	6.150	4.875	0.900	Open Manhole		1350
13.001	o	375	54	6.300	4.524	1.401	Open Manhole		1350
12.001	o	450	55	6.248	4.268	1.530	Open Manhole		1350
12.002	o	450	56	6.822	4.125	2.247	Open Manhole		1350
14.000	o	300	57	6.450	5.250	0.900	Open Manhole		1200
14.001	o	300	58	6.800	4.235	2.265	Open Manhole		1200
Downstream Manhole									
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	
1.014	29.639	385.0	47	5.372	3.548	1.374	Open Manhole		1350
1.015	33.280	385.0	50	5.054	3.462	1.142	Open Manhole		1500
11.000	40.766	167.0	49	5.100	4.031	0.844	Open Manhole		1200
11.001	6.269	18.2	50	5.054	3.687	1.142	Open Manhole		1500
1.016	16.777	455.0	51	4.912	3.350	1.037	Open Manhole		1500
1.017	51.369	508.6	BASIN 4	5.000	3.249	1.226	Open Manhole		1500
1.018	58.152	76.0	66	4.758	2.484	1.749	Open Manhole		1500
12.000	27.788	200.0	55	6.248	4.268	1.530	Open Manhole		1350
13.000	52.581	149.8	54	6.300	4.524	1.401	Open Manhole		1350
13.001	5.924	32.7	55	6.248	4.343	1.530	Open Manhole		1350
12.001	55.215	385.0	56	6.822	4.125	2.247	Open Manhole		1350
12.002	13.627	243.3	59	6.689	4.069	2.170	Open Manhole		1350
14.000	50.753	50.0	58	6.800	4.235	2.265	Open Manhole		1200
14.001	3.921	238.0	59	6.689	4.219	2.170	Open Manhole		1350
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Tuscany House White Hart Lane Basingstoke RG21 4AF																																																																																																																																																																																													
Date 05/03/2021 09:51 File 2021-03-04 Outfall 1 Ne...				Designed by WindesPC4 Checked by																																																																																																																																																																																									
Micro Drainage				Network 2020.1																																																																																																																																																																																									
<u>PIPELINE SCHEDULES for Storm</u> <u>Upstream Manhole</u> <table><tr><th>PN</th><th>Hyd Sect</th><th>Diam (mm)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr><tr><td>12.003</td><td>o</td><td>450</td><td>59</td><td>6.689</td><td>4.069</td><td>2.170</td><td>Open Manhole</td><td>1350</td></tr><tr><td>15.000</td><td>o</td><td>225</td><td>60</td><td>6.350</td><td>4.925</td><td>1.200</td><td>Open Manhole</td><td>1200</td></tr><tr><td>15.001</td><td>o</td><td>225</td><td>61</td><td>6.300</td><td>4.278</td><td>1.797</td><td>Open Manhole</td><td>1200</td></tr><tr><td>12.004</td><td>o</td><td>450</td><td>62</td><td>6.169</td><td>3.934</td><td>1.785</td><td>Open Manhole</td><td>1350</td></tr><tr><td>12.005</td><td>o</td><td>450</td><td>63</td><td>6.029</td><td>3.898</td><td>1.681</td><td>Open Manhole</td><td>1350</td></tr><tr><td>12.006</td><td>o</td><td>450</td><td>64</td><td>5.537</td><td>3.771</td><td>1.316</td><td>Open Manhole</td><td>1350</td></tr><tr><td>12.007</td><td>o</td><td>450</td><td>65</td><td>5.269</td><td>3.699</td><td>1.120</td><td>Open Manhole</td><td>1350</td></tr><tr><td>12.008</td><td>o</td><td>450</td><td>BASIN 5</td><td>5.179</td><td>3.388</td><td>1.341</td><td>Open Manhole</td><td>1350</td></tr><tr><td>1.019</td><td>o</td><td>600</td><td>66</td><td>4.758</td><td>2.409</td><td>1.749</td><td>Open Manhole</td><td>1500</td></tr></table> <u>Downstream Manhole</u> <table><tr><th>PN</th><th>Length (m)</th><th>Slope (1:X)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr><tr><td>12.003</td><td>52.036</td><td>385.0</td><td>62</td><td>6.169</td><td>3.934</td><td>1.785</td><td>Open Manhole</td><td>1350</td></tr><tr><td>15.000</td><td>32.342</td><td>50.0</td><td>61</td><td>6.300</td><td>4.278</td><td>1.797</td><td>Open Manhole</td><td>1200</td></tr><tr><td>15.001</td><td>4.998</td><td>42.0</td><td>62</td><td>6.169</td><td>4.159</td><td>1.785</td><td>Open Manhole</td><td>1350</td></tr><tr><td>12.004</td><td>13.665</td><td>385.0</td><td>63</td><td>6.029</td><td>3.898</td><td>1.681</td><td>Open Manhole</td><td>1350</td></tr><tr><td>12.005</td><td>49.152</td><td>385.0</td><td>64</td><td>5.537</td><td>3.771</td><td>1.316</td><td>Open Manhole</td><td>1350</td></tr><tr><td>12.006</td><td>27.544</td><td>385.0</td><td>65</td><td>5.269</td><td>3.699</td><td>1.120</td><td>Open Manhole</td><td>1350</td></tr><tr><td>12.007</td><td>18.709</td><td>60.2</td><td>BASIN 5</td><td>5.179</td><td>3.388</td><td>1.341</td><td>Open Manhole</td><td>1350</td></tr><tr><td>12.008</td><td>20.031</td><td>24.2</td><td>66</td><td>4.758</td><td>2.559</td><td>1.749</td><td>Open Manhole</td><td>1500</td></tr><tr><td>1.019</td><td>10.643</td><td>425.7</td><td></td><td>4.829</td><td>2.384</td><td>1.845</td><td>Open Manhole</td><td>0</td></tr></table>										PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	12.003	o	450	59	6.689	4.069	2.170	Open Manhole	1350	15.000	o	225	60	6.350	4.925	1.200	Open Manhole	1200	15.001	o	225	61	6.300	4.278	1.797	Open Manhole	1200	12.004	o	450	62	6.169	3.934	1.785	Open Manhole	1350	12.005	o	450	63	6.029	3.898	1.681	Open Manhole	1350	12.006	o	450	64	5.537	3.771	1.316	Open Manhole	1350	12.007	o	450	65	5.269	3.699	1.120	Open Manhole	1350	12.008	o	450	BASIN 5	5.179	3.388	1.341	Open Manhole	1350	1.019	o	600	66	4.758	2.409	1.749	Open Manhole	1500	PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	12.003	52.036	385.0	62	6.169	3.934	1.785	Open Manhole	1350	15.000	32.342	50.0	61	6.300	4.278	1.797	Open Manhole	1200	15.001	4.998	42.0	62	6.169	4.159	1.785	Open Manhole	1350	12.004	13.665	385.0	63	6.029	3.898	1.681	Open Manhole	1350	12.005	49.152	385.0	64	5.537	3.771	1.316	Open Manhole	1350	12.006	27.544	385.0	65	5.269	3.699	1.120	Open Manhole	1350	12.007	18.709	60.2	BASIN 5	5.179	3.388	1.341	Open Manhole	1350	12.008	20.031	24.2	66	4.758	2.559	1.749	Open Manhole	1500	1.019	10.643	425.7		4.829	2.384	1.845	Open Manhole	0
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)																																																																																																																																																																																					
12.003	o	450	59	6.689	4.069	2.170	Open Manhole	1350																																																																																																																																																																																					
15.000	o	225	60	6.350	4.925	1.200	Open Manhole	1200																																																																																																																																																																																					
15.001	o	225	61	6.300	4.278	1.797	Open Manhole	1200																																																																																																																																																																																					
12.004	o	450	62	6.169	3.934	1.785	Open Manhole	1350																																																																																																																																																																																					
12.005	o	450	63	6.029	3.898	1.681	Open Manhole	1350																																																																																																																																																																																					
12.006	o	450	64	5.537	3.771	1.316	Open Manhole	1350																																																																																																																																																																																					
12.007	o	450	65	5.269	3.699	1.120	Open Manhole	1350																																																																																																																																																																																					
12.008	o	450	BASIN 5	5.179	3.388	1.341	Open Manhole	1350																																																																																																																																																																																					
1.019	o	600	66	4.758	2.409	1.749	Open Manhole	1500																																																																																																																																																																																					
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)																																																																																																																																																																																					
12.003	52.036	385.0	62	6.169	3.934	1.785	Open Manhole	1350																																																																																																																																																																																					
15.000	32.342	50.0	61	6.300	4.278	1.797	Open Manhole	1200																																																																																																																																																																																					
15.001	4.998	42.0	62	6.169	4.159	1.785	Open Manhole	1350																																																																																																																																																																																					
12.004	13.665	385.0	63	6.029	3.898	1.681	Open Manhole	1350																																																																																																																																																																																					
12.005	49.152	385.0	64	5.537	3.771	1.316	Open Manhole	1350																																																																																																																																																																																					
12.006	27.544	385.0	65	5.269	3.699	1.120	Open Manhole	1350																																																																																																																																																																																					
12.007	18.709	60.2	BASIN 5	5.179	3.388	1.341	Open Manhole	1350																																																																																																																																																																																					
12.008	20.031	24.2	66	4.758	2.559	1.749	Open Manhole	1500																																																																																																																																																																																					
1.019	10.643	425.7		4.829	2.384	1.845	Open Manhole	0																																																																																																																																																																																					
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Micro Drainage			Network 2020.1			
<u>Area Summary for Storm</u>						
Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.054	0.054	0.054
2.000	-	-	100	0.118	0.118	0.118
2.001	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.057	0.057	0.057
1.002	-	-	100	0.032	0.032	0.032
1.003	-	-	100	0.082	0.082	0.082
1.004	-	-	100	0.080	0.080	0.080
1.005	-	-	100	0.092	0.092	0.092
3.000	-	-	100	0.039	0.039	0.039
1.006	-	-	100	0.077	0.077	0.077
4.000	-	-	100	0.063	0.063	0.063
4.001	-	-	100	0.063	0.063	0.063
4.002	-	-	100	0.000	0.000	0.000
4.003	-	-	100	0.120	0.120	0.120
5.000	-	-	100	0.040	0.040	0.040
5.001	-	-	100	0.040	0.040	0.040
5.002	-	-	100	0.000	0.000	0.000
4.004	-	-	100	0.024	0.024	0.024
4.005	-	-	100	0.065	0.065	0.065
6.000	-	-	100	0.136	0.136	0.136
6.001	-	-	100	0.135	0.135	0.135
4.006	-	-	100	0.045	0.045	0.045
4.007	-	-	100	0.027	0.027	0.027
7.000	-	-	100	0.046	0.046	0.046
7.001	-	-	100	0.000	0.000	0.000
4.008	-	-	100	0.031	0.031	0.031
8.000	-	-	100	0.027	0.027	0.027
8.001	-	-	100	0.000	0.000	0.000
8.002	-	-	100	0.078	0.078	0.078
4.009	-	-	100	0.017	0.017	0.017
9.000	-	-	100	0.055	0.055	0.055
9.001	-	-	100	0.051	0.051	0.051
9.002	-	-	100	0.052	0.052	0.052
9.003	-	-	100	0.051	0.051	0.051
9.004	-	-	100	0.000	0.000	0.000
9.005	-	-	100	0.115	0.115	0.115
9.006	-	-	100	0.023	0.023	0.023
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.050	0.050	0.050
1.011	-	-	100	0.012	0.012	0.012
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.029	0.029	0.029
10.000	-	-	100	0.053	0.053	0.053
10.001	-	-	100	0.053	0.053	0.053
1.014	-	-	100	0.033	0.033	0.033
1.015	-	-	100	0.032	0.032	0.032
11.000	-	-	100	0.025	0.025	0.025
11.001	-	-	100	0.025	0.025	0.025
1.016	-	-	100	0.059	0.059	0.059
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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.017	-	-	100	0.008	0.008	0.008
1.018	-	-	100	0.000	0.000	0.000
12.000	-	-	100	0.053	0.053	0.053
13.000	-	-	100	0.067	0.067	0.067
13.001	-	-	100	0.066	0.066	0.066
12.001	-	-	100	0.016	0.016	0.016
12.002	-	-	100	0.074	0.074	0.074
14.000	-	-	100	0.055	0.055	0.055
14.001	-	-	100	0.055	0.055	0.055
12.003	-	-	100	0.012	0.012	0.012
15.000	-	-	100	0.045	0.045	0.045
15.001	-	-	100	0.044	0.044	0.044
12.004	-	-	100	0.075	0.075	0.075
12.005	-	-	100	0.040	0.040	0.040
12.006	-	-	100	0.101	0.101	0.101
12.007	-	-	100	0.054	0.054	0.054
12.008	-	-	100	0.000	0.000	0.000
1.019	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				3.071	3.071	3.071

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.019		4.829	2.384	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 497050 103400 SU 97050 03400

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<u>Synthetic Rainfall Details</u> C (1km) -0.025 D1 (1km) 0.395 D2 (1km) 0.244 D3 (1km) 0.395 E (1km) 0.309 F (1km) 2.339 Summer Storms Yes Winter Storms Yes Cv (Summer) 0.750 Cv (Winter) 0.840 Storm Duration (mins) 30		
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Online Controls for Storm

Orifice Manhole: 25, DS/PN: 7.001, Volume (m³): 1.2

Diameter (m) 0.024 Discharge Coefficient 0.600 Invert Level (m) 4.836

Orifice Manhole: 28, DS/PN: 8.001, Volume (m³): 1.4

Diameter (m) 0.020 Discharge Coefficient 0.600 Invert Level (m) 5.110

Hydro-Brake® Optimum Manhole: BASIN 1, DS/PN: 1.007, Volume (m³): 28.9

Unit Reference	MD-SHE-0146-1200-1800-1200
Design Head (m)	1.800
Design Flow (l/s)	12.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	146
Invert Level (m)	4.201
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	12.0
Flush-Flo™	0.524	12.0
Kick-Flo®	1.098	9.5
Mean Flow over Head Range	-	10.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.3	1.200	9.9	3.000	15.3	7.000	22.9
0.200	10.3	1.400	10.7	3.500	16.4	7.500	23.7
0.300	11.4	1.600	11.3	4.000	17.5	8.000	24.4
0.400	11.8	1.800	12.0	4.500	18.5	8.500	25.2
0.500	12.0	2.000	12.6	5.000	19.5	9.000	25.9
0.600	11.9	2.200	13.2	5.500	20.4	9.500	26.6
0.800	11.5	2.400	13.7	6.000	21.3		
1.000	10.5	2.600	14.3	6.500	22.1		

Hydro-Brake® Optimum Manhole: BASIN 4, DS/PN: 1.018, Volume (m³): 13.9

Unit Reference	MD-SHE-0173-1680-1750-1680
Design Head (m)	1.750
Design Flow (l/s)	16.8

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Micro Drainage Network 2020.1																																																																																																																																														
<u>Hydro-Brake® Optimum Manhole: BASIN 4, DS/PN: 1.018, Volume (m³): 13.9</u> <table><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td></tr><tr><td>Application</td><td>Surface</td></tr><tr><td>Sump Available</td><td>Yes</td></tr><tr><td>Diameter (mm)</td><td>173</td></tr><tr><td>Invert Level (m)</td><td>3.249</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>225</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1500</td></tr></table> <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>1.750</td><td>16.8</td></tr><tr><td>Flush-Flo™</td><td>0.512</td><td>16.8</td></tr><tr><td>Kick-Flo®</td><td>1.093</td><td>13.4</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>14.6</td></tr></table> The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>6.1</td><td>1.200</td><td>14.0</td><td>3.000</td><td>21.7</td><td>7.000</td><td>32.6</td></tr><tr><td>0.200</td><td>14.6</td><td>1.400</td><td>15.1</td><td>3.500</td><td>23.4</td><td>7.500</td><td>33.7</td></tr><tr><td>0.300</td><td>16.0</td><td>1.600</td><td>16.1</td><td>4.000</td><td>24.9</td><td>8.000</td><td>34.8</td></tr><tr><td>0.400</td><td>16.6</td><td>1.800</td><td>17.0</td><td>4.500</td><td>26.4</td><td>8.500</td><td>35.8</td></tr><tr><td>0.500</td><td>16.8</td><td>2.000</td><td>17.9</td><td>5.000</td><td>27.7</td><td>9.000</td><td>36.8</td></tr><tr><td>0.600</td><td>16.7</td><td>2.200</td><td>18.7</td><td>5.500</td><td>29.1</td><td>9.500</td><td>37.8</td></tr><tr><td>0.800</td><td>16.2</td><td>2.400</td><td>19.5</td><td>6.000</td><td>30.3</td><td></td><td></td></tr><tr><td>1.000</td><td>14.8</td><td>2.600</td><td>20.3</td><td>6.500</td><td>31.5</td><td></td><td></td></tr></table> <u>Hydro-Brake® Optimum Manhole: BASIN 5, DS/PN: 12.008, Volume (m³): 5.3</u> <table><tr><td>Unit Reference</td><td>MD-SHE-0108-6500-1800-6500</td></tr><tr><td>Design Head (m)</td><td>1.800</td></tr><tr><td>Design Flow (l/s)</td><td>6.5</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td></tr><tr><td>Application</td><td>Surface</td></tr><tr><td>Sump Available</td><td>Yes</td></tr><tr><td>Diameter (mm)</td><td>108</td></tr><tr><td>Invert Level (m)</td><td>3.388</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>150</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr></table> <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>1.800</td><td>6.5</td></tr><tr><td>Flush-Flo™</td><td>0.472</td><td>6.1</td></tr><tr><td>Kick-Flo®</td><td>0.961</td><td>4.8</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>5.5</td></tr></table> The hydrological calculations have been based on the Head/Discharge relationship for the			Flush-Flo™	Calculated	Objective	Minimise upstream storage	Application	Surface	Sump Available	Yes	Diameter (mm)	173	Invert Level (m)	3.249	Minimum Outlet Pipe Diameter (mm)	225	Suggested Manhole Diameter (mm)	1500	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.750	16.8	Flush-Flo™	0.512	16.8	Kick-Flo®	1.093	13.4	Mean Flow over Head Range	-	14.6	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	6.1	1.200	14.0	3.000	21.7	7.000	32.6	0.200	14.6	1.400	15.1	3.500	23.4	7.500	33.7	0.300	16.0	1.600	16.1	4.000	24.9	8.000	34.8	0.400	16.6	1.800	17.0	4.500	26.4	8.500	35.8	0.500	16.8	2.000	17.9	5.000	27.7	9.000	36.8	0.600	16.7	2.200	18.7	5.500	29.1	9.500	37.8	0.800	16.2	2.400	19.5	6.000	30.3			1.000	14.8	2.600	20.3	6.500	31.5			Unit Reference	MD-SHE-0108-6500-1800-6500	Design Head (m)	1.800	Design Flow (l/s)	6.5	Flush-Flo™	Calculated	Objective	Minimise upstream storage	Application	Surface	Sump Available	Yes	Diameter (mm)	108	Invert Level (m)	3.388	Minimum Outlet Pipe Diameter (mm)	150	Suggested Manhole Diameter (mm)	1200	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.800	6.5	Flush-Flo™	0.472	6.1	Kick-Flo®	0.961	4.8	Mean Flow over Head Range	-	5.5
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<u>Storage Structures for Storm</u> <u>Porous Car Park Manhole: 24, DS/PN: 7.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Width (m)</td><td>9.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>25.0</td></tr><tr><td>Max Percolation (l/s)</td><td>62.5</td><td>Slope (1:X)</td><td>79.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>4.872</td><td>Membrane Depth (mm)</td><td>0</td></tr></table> <u>Porous Car Park Manhole: 27, DS/PN: 8.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Width (m)</td><td>5.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>70.0</td></tr><tr><td>Max Percolation (l/s)</td><td>97.2</td><td>Slope (1:X)</td><td>500.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>5.300</td><td>Membrane Depth (mm)</td><td>0</td></tr></table> <u>Tank or Pond Manhole: BASIN 1, DS/PN: 1.007</u> Invert Level (m) 4.201 <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td></tr><tr><td>0.000</td><td>523.6</td><td>1.800</td><td>2374.9</td></tr></table> <u>Tank or Pond Manhole: BASIN 4, DS/PN: 1.018</u> Invert Level (m) 3.249 <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td></tr><tr><td>0.000</td><td>20.3</td><td>1.750</td><td>299.5</td></tr></table> <u>Tank or Pond Manhole: BASIN 5, DS/PN: 12.008</u> Invert Level (m) 3.388 <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td></tr><tr><td>0.000</td><td>106.1</td><td>1.800</td><td>878.6</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	9.0	Membrane Percolation (mm/hr)	1000	Length (m)	25.0	Max Percolation (l/s)	62.5	Slope (1:X)	79.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	4.872	Membrane Depth (mm)	0	Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0	Membrane Percolation (mm/hr)	1000	Length (m)	70.0	Max Percolation (l/s)	97.2	Slope (1:X)	500.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	5.300	Membrane Depth (mm)	0	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	523.6	1.800	2374.9	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	20.3	1.750	299.5	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	106.1	1.800	878.6
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Areal Reduction Factor		1.000		Additional Flow - % of Total Flow		0.000																																																																																																																										
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage		2.000																																																																																																																										
Hot Start Level (mm)		0		Inlet Coeffiecient		0.800																																																																																																																										
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day)		0.000																																																																																																																										
Foul Sewage per hectare (l/s)		0.000																																																																																																																														
Number of Input Hydrographs		0		Number of Storage Structures		5																																																																																																																										
Number of Online Controls		5		Number of Time/Area Diagrams		0																																																																																																																										
Number of Offline Controls		0		Number of Real Time Controls		0																																																																																																																										
<u>Synthetic Rainfall Details</u>																																																																																																																																
Rainfall Model				FEH																																																																																																																												
FEH Rainfall Version				1999																																																																																																																												
Site Location				GB 497050 103400 SU 97050 03400																																																																																																																												
C (1km)				-0.025																																																																																																																												
D1 (1km)				0.395																																																																																																																												
D2 (1km)				0.244																																																																																																																												
D3 (1km)				0.395																																																																																																																												
E (1km)				0.309																																																																																																																												
F (1km)				2.339																																																																																																																												
Cv (Summer)				0.750																																																																																																																												
Cv (Winter)				0.840																																																																																																																												
Margin for Flood Risk Warning (mm)				300.0																																																																																																																												
Analysis Timestep				2.5 Second Increment (Extended)																																																																																																																												
DTS Status				ON																																																																																																																												
DVD Status				OFF																																																																																																																												
Inertia Status				OFF																																																																																																																												
Profile(s)				Summer and Winter																																																																																																																												
Duration(s) (mins)				15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080																																																																																																																												
Return Period(s) (years)				100																																																																																																																												
Climate Change (%)				40																																																																																																																												
<table><tr><th></th><th>US/MH</th><th></th><th>Return</th><th>Climate</th><th>First (X)</th><th>First (Y)</th><th>First (Z)</th><th>Overflow</th><th>Water</th></tr><tr><th>PN</th><th>Name</th><th>Storm</th><th>Period</th><th>Change</th><th>Surcharge</th><th>Flood</th><th>Overflow</th><th>Act.</th><th>Level</th></tr><tr><td>1.000</td><td>1</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>6.601</td></tr><tr><td>2.000</td><td>2</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>6.645</td></tr><tr><td>2.001</td><td>3</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>6.600</td></tr><tr><td>1.001</td><td>4</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>6.564</td></tr><tr><td>1.002</td><td>5</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>6.466</td></tr><tr><td>1.003</td><td>6</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>6.285</td></tr><tr><td>1.004</td><td>7</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>6.179</td></tr><tr><td>1.005</td><td>8</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>6.026</td></tr><tr><td>3.000</td><td>9</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>5.873</td></tr><tr><td>1.006</td><td>10</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>5.819</td></tr></table>										US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water	PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level	1.000	1	15 Winter	100	+40%	100/15 Summer				6.601	2.000	2	15 Winter	100	+40%	100/15 Summer				6.645	2.001	3	15 Winter	100	+40%	100/15 Summer				6.600	1.001	4	15 Winter	100	+40%	100/15 Summer				6.564	1.002	5	15 Winter	100	+40%	100/15 Summer				6.466	1.003	6	15 Winter	100	+40%	100/15 Summer				6.285	1.004	7	15 Winter	100	+40%	100/15 Summer				6.179	1.005	8	15 Winter	100	+40%	100/15 Summer				6.026	3.000	9	15 Winter	100	+40%	100/15 Summer				5.873	1.006	10	15 Winter	100	+40%	100/15 Summer				5.819
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water																																																																																																																							
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1.002	5	15 Winter	100	+40%	100/15 Summer				6.466																																																																																																																							
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1.004	7	15 Winter	100	+40%	100/15 Summer				6.179																																																																																																																							
1.005	8	15 Winter	100	+40%	100/15 Summer				6.026																																																																																																																							
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Date 05/03/2021 09:51 File 2021-03-04 Outfall 1 Ne...									
Micro Drainage					Network 2020.1				
<u>Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>									
PN	US/MH Name	Depth (m)	Surcharged Volume (m³)	Flooded Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.832	0.000	0.39			30.7	SURCHARGED	
2.000	2	0.885	0.000	0.61			67.3	FLOOD RISK	
2.001	3	0.945	0.000	0.65			69.4	FLOOD RISK	
1.001	4	0.977	0.000	1.39			126.0	SURCHARGED	
1.002	5	0.929	0.000	1.38			139.2	SURCHARGED	
1.003	6	0.859	0.000	1.23			172.5	FLOOD RISK	
1.004	7	0.827	0.000	0.88			207.5	FLOOD RISK	
1.005	8	0.875	0.000	1.37			253.2	FLOOD RISK	
3.000	9	0.566	0.000	0.47			24.1	SURCHARGED	
1.006	10	0.776	0.000	1.62			298.1	FLOOD RISK	
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Micro Drainage				Network 2020.1				
<u>Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>								
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
4.000	11	15 Winter	100	+40%	100/15 Summer			
4.001	12	15 Winter	100	+40%	100/15 Summer			
4.002	13	15 Winter	100	+40%	100/15 Summer			
4.003	14	15 Winter	100	+40%	100/15 Summer			
5.000	15	15 Winter	100	+40%	100/15 Summer			
5.001	16	15 Winter	100	+40%	100/15 Summer			
5.002	17	15 Winter	100	+40%	100/15 Summer			
4.004	18	15 Winter	100	+40%	100/15 Summer			
4.005	19	15 Winter	100	+40%	100/15 Summer			
6.000	20	15 Winter	100	+40%	100/15 Summer			
6.001	21	15 Winter	100	+40%	100/15 Summer			
4.006	22	15 Winter	100	+40%	100/15 Summer			
4.007	23	15 Winter	100	+40%	100/15 Summer			
7.000	24	720 Winter	100	+40%	100/15 Summer			
7.001	25	960 Winter	100	+40%	100/15 Summer			
4.008	26	720 Winter	100	+40%	100/15 Summer			
8.000	27	720 Winter	100	+40%	100/15 Summer			
8.001	28	720 Winter	100	+40%	100/15 Summer			
8.002	29	720 Winter	100	+40%	100/15 Summer			
4.009	30	720 Winter	100	+40%	100/15 Summer			
9.000	31	15 Winter	100	+40%	100/15 Summer			
9.001	32	15 Winter	100	+40%	100/15 Summer			
9.002	33	15 Winter	100	+40%	100/15 Summer			
9.003	34	15 Winter	100	+40%	100/15 Summer			
9.004	35	720 Winter	100	+40%	100/15 Summer			
9.005	36	720 Winter	100	+40%	100/15 Summer			
9.006	37	720 Winter	100	+40%	100/15 Summer			
1.007	BASIN 1	720 Winter	100	+40%	100/15 Summer			
1.008	38	600 Winter	100	+40%	100/120 Winter			
1.009	39	600 Winter	100	+40%	100/120 Winter			
1.010	40	600 Winter	100	+40%	100/60 Winter			
1.011	41	600 Winter	100	+40%	100/60 Winter			
1.012	42	600 Winter	100	+40%	100/60 Winter			
1.013	43	600 Winter	100	+40%	100/60 Summer			
10.000	44	600 Winter	100	+40%	100/15 Summer			
10.001	45	600 Winter	100	+40%	100/15 Summer			
1.014	46	600 Winter	100	+40%	100/15 Summer			
1.015	47	600 Winter	100	+40%	100/15 Summer			
11.000	48	600 Winter	100	+40%	100/120 Summer			
11.001	49	600 Winter	100	+40%	100/15 Winter			
1.016	50	600 Winter	100	+40%	100/15 Summer			
1.017	51	600 Winter	100	+40%	100/15 Summer			
1.018	BASIN 4	600 Winter	100	+40%	100/15 Summer			
12.000	52	15 Winter	100	+40%	100/15 Summer			
13.000	53	15 Winter	100	+40%	100/15 Summer			
13.001	54	15 Winter	100	+40%	100/15 Summer			
12.001	55	15 Winter	100	+40%	100/15 Summer			
12.002	56	15 Winter	100	+40%	100/15 Summer			
14.000	57	15 Winter	100	+40%				
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Micro Drainage				Network 2020.1					
<u>Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>									
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
4.000	11	6.628	0.528	0.000	0.54			36.6	SURCHARGED
4.001	12	6.574	0.666	0.000	1.41			69.8	SURCHARGED
4.002	13	6.495	0.611	0.000	1.04			68.9	SURCHARGED
4.003	14	6.336	0.613	0.000	0.69			133.5	SURCHARGED
5.000	15	6.281	0.481	0.000	0.35			23.4	SURCHARGED
5.001	16	6.249	0.629	0.000	0.84			42.2	SURCHARGED
5.002	17	6.230	0.635	0.000	0.51			45.2	SURCHARGED
4.004	18	6.212	0.743	0.000	1.31			181.6	SURCHARGED
4.005	19	6.093	0.692	0.000	1.06			212.6	FLOOD RISK
6.000	20	6.180	0.330	0.000	0.49			87.6	SURCHARGED
6.001	21	6.103	0.603	0.000	0.85			164.8	FLOOD RISK
4.006	22	5.926	0.671	0.000	1.32			392.1	FLOOD RISK
4.007	23	5.657	0.553	0.000	0.95			405.6	SURCHARGED
7.000	24	5.519	0.497	0.000	0.21		893	2.4	SURCHARGED
7.001	25	5.564	0.578	0.000	0.03			0.6	FLOOD RISK
4.008	26	5.485	0.693	0.000	0.30			46.4	SURCHARGED
8.000	27	5.518	0.118	0.000	0.06		566	0.5	SURCHARGED
8.001	28	5.518	0.308	0.000	0.04			0.5	SURCHARGED
8.002	29	5.485	0.533	0.000	0.10			4.9	SURCHARGED
4.009	30	5.484	0.729	0.000	0.49			51.8	FLOOD RISK
9.000	31	5.707	0.130	0.000	0.46			37.0	SURCHARGED
9.001	32	5.682	0.208	0.000	0.66			66.7	SURCHARGED
9.002	33	5.632	0.278	0.000	0.94			94.1	SURCHARGED
9.003	34	5.534	0.287	0.000	1.23			122.6	SURCHARGED
9.004	35	5.486	0.339	0.000	0.07			10.6	SURCHARGED
9.005	36	5.485	0.488	0.000	0.18			16.8	SURCHARGED
9.006	37	5.484	0.540	0.000	0.10			18.0	SURCHARGED
1.007	BASIN 1	5.482	0.831	0.000	0.10			12.0	SURCHARGED
1.008	38	4.829	0.246	0.000	0.11			12.2	SURCHARGED
1.009	39	4.827	0.258	0.000	0.09			12.2	SURCHARGED
1.010	40	4.821	0.332	0.000	0.14			14.9	SURCHARGED
1.011	41	4.817	0.365	0.000	0.16			15.6	SURCHARGED
1.012	42	4.814	0.386	0.000	0.15			15.5	SURCHARGED
1.013	43	4.811	0.413	0.000	0.06			17.1	SURCHARGED
10.000	44	4.807	0.457	0.000	0.09			3.3	SURCHARGED
10.001	45	4.806	0.697	0.000	0.22			6.7	SURCHARGED
1.014	46	4.805	0.730	0.000	0.17			23.4	SURCHARGED
1.015	47	4.798	0.800	0.000	0.17			24.6	SURCHARGED
11.000	48	4.792	0.292	0.000	0.04			1.7	SURCHARGED
11.001	49	4.792	0.536	0.000	0.04			3.0	SURCHARGED
1.016	50	4.792	0.880	0.000	0.21			30.4	FLOOD RISK
1.017	51	4.788	0.913	0.000	0.16			30.4	FLOOD RISK
1.018	BASIN 4	4.782	1.008	0.000	0.03			16.2	FLOOD RISK
12.000	52	5.575	0.718	0.000	0.15			29.0	FLOOD RISK
13.000	53	5.612	0.362	0.000	0.27			41.1	SURCHARGED
13.001	54	5.581	0.682	0.000	0.44			72.6	SURCHARGED
12.001	55	5.564	0.846	0.000	0.66			98.8	SURCHARGED
12.002	56	5.500	0.926	0.000	0.84			129.6	SURCHARGED
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Tuscany House White Hart Lane Basingstoke RG21 4AF										
Date 05/03/2021 09:51 File 2021-03-04 Outfall 1 Ne...				Designed by WindesPC4 Checked by						
Micro Drainage				Network 2020.1						
<u>Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>										
		Water	Surcharged	Flooded			Half Drain	Pipe		
PN	US/MH	Level	Depth	Volume	Flow /	Overflow	Time	Flow		Status
	Name	(m)	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)		
14.000	57	5.525	-0.025	0.000	0.27			39.6		OK
						</				

Odyssey Markides LLP		Page 31																								
Tuscany House White Hart Lane Basingstoke RG21 4AF																										
Date 05/03/2021 09:51	Designed by WindesPC4																									
File 2021-03-04 Outfall 1 Ne...	Checked by																									
Micro Drainage	Network 2020.1																									
<u>Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>																										
	<table> <tr> <th>PN</th><th>US/MH Name</th><th>Level Exceeded</th></tr> <tr> <td>1.018</td><td>BASIN 4</td><td></td></tr> <tr> <td>12.000</td><td>52</td><td></td></tr> <tr> <td>13.000</td><td>53</td><td></td></tr> <tr> <td>13.001</td><td>54</td><td></td></tr> <tr> <td>12.001</td><td>55</td><td></td></tr> <tr> <td>12.002</td><td>56</td><td></td></tr> <tr> <td>14.000</td><td>57</td><td></td></tr> </table>	PN	US/MH Name	Level Exceeded	1.018	BASIN 4		12.000	52		13.000	53		13.001	54		12.001	55		12.002	56		14.000	57		
PN	US/MH Name	Level Exceeded																								
1.018	BASIN 4																									
12.000	52																									
13.000	53																									
13.001	54																									
12.001	55																									
12.002	56																									
14.000	57																									
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Date 05/03/2021 09:51 File 2021-03-04 Outfall 1 Ne...		Designed by WindesPC4 Checked by							
Micro Drainage					Network 2020.1				
<u>Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	
14.001	58	15 Winter	100	+40%	100/15	Summer			
12.003	59	15 Winter	100	+40%	100/15	Summer			
15.000	60	15 Winter	100	+40%	100/15	Summer			
15.001	61	15 Winter	100	+40%	100/15	Summer			
12.004	62	15 Winter	100	+40%	100/15	Summer			
12.005	63	15 Winter	100	+40%	100/15	Summer			
12.006	64	720 Winter	100	+40%	100/15	Summer			
12.007	65	720 Winter	100	+40%	100/15	Summer			
12.008	BASIN 5	720 Winter	100	+40%	100/15	Summer			
1.019	66	2160 Summer	100	+40%					
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
14.001	58	5.481	0.946	0.000	1.24			60.4	SURCHARGED
12.003	59	5.457	0.938	0.000	1.24			185.0	SURCHARGED
15.000	60	5.415	0.265	0.000	0.43			29.6	SURCHARGED
15.001	61	5.337	0.834	0.000	1.08			52.5	SURCHARGED
12.004	62	5.240	0.857	0.000	2.40			260.0	SURCHARGED
12.005	63	5.025	0.677	0.000	1.83			272.5	SURCHARGED
12.006	64	4.817	0.596	0.000	0.26			36.3	SURCHARGED
12.007	65	4.814	0.665	0.000	0.12			39.3	SURCHARGED
12.008	BASIN 5	4.812	0.974	0.000	0.01			6.0	SURCHARGED
1.019	66	2.549	-0.460	0.000	0.12			22.2	OK
PN	US/MH Name	Level Exceeded							
		14.001 58							
		12.003 59							
		15.000 60							
		15.001 61							
		12.004 62							
		12.005 63							
		12.006 64							
		12.007 65							
		12.008 BASIN 5							
		1.019 66							
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Designed by WindesPC4 Checked by		
Micro Drainage		Network 2020.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	1999
Site Location GB 497050 103400 SU 97050 03400	
C (1km)	-0.025
D1 (1km)	0.395
D2 (1km)	0.244
D3 (1km)	0.395
E (1km)	0.309
F (1km)	2.339
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.275	4-8	0.705	8-12	0.016

Total Area Contributing (ha) = 0.996

Total Pipe Volume (m³) = 55.872

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
----	---------------	-------------	----------------	----------------	----------------	--------------------	-----------	-------------	-------------	--------------	----------------

Network Results Table

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Tuscany House White Hart Lane Basingstoke RG21 4AF												
Date 05/03/2021 10:01 File 2021-03-04 Outfall 2 Ne...						Designed by WindesPC4 Checked by						
Micro Drainage						Network 2020.1						
<u>Network Design Table for Storm</u>												
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design	
16.000	17.581	0.056	313.0	0.238	4.00	0.0	0.600	o	375	Pipe/Conduit		
16.001	30.508	0.126	242.1	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
17.000	7.591	0.032	238.0	0.101	4.00	0.0	0.600	o	300	Pipe/Conduit		
16.002	19.313	0.055	350.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
16.003	63.640	0.143	445.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
18.000	10.638	0.045	238.0	0.065	4.00	0.0	0.600	o	300	Pipe/Conduit		
18.001	21.671	0.195	111.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
18.002	12.081	0.100	120.8	0.083	0.00	0.0	0.600	o	300	Pipe/Conduit		
19.000	19.390	0.260	74.6	0.105	4.00	0.0	0.600	o	300	Pipe/Conduit		
19.001	11.982	0.120	99.9	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit		
18.003	19.710	0.300	65.7	0.032	0.00	0.0	0.600	o	375	Pipe/Conduit		
18.004	21.927	0.105	208.8	0.103	0.00	0.0	0.600	o	375	Pipe/Conduit		
16.004	34.378	0.089	385.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
16.005	23.818	0.062	385.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
16.006	24.965	0.083	300.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
<u>Network Results Table</u>												
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)		
16.000	50.00	4.29	5.275	0.238	0.0	0.0	0.0	1.02	112.5	32.2		
16.001	50.00	4.68	5.144	0.238	0.0	0.0	0.0	1.30	207.1	32.2		
17.000	50.00	4.12	5.200	0.101	0.0	0.0	0.0	1.01	71.7	13.7		
16.002	50.00	4.98	5.018	0.339	0.0	0.0	0.0	1.08	171.9	45.9		
16.003	50.00	6.08	4.963	0.339	0.0	0.0	0.0	0.96	152.2	45.9		
18.000	50.00	4.17	5.640	0.065	0.0	0.0	0.0	1.01	71.7	8.8		
18.001	50.00	4.42	5.595	0.065	0.0	0.0	0.0	1.49	105.4	8.8		
18.002	50.00	4.56	5.400	0.148	0.0	0.0	0.0	1.43	101.0	20.0		
19.000	50.00	4.18	5.680	0.105	0.0	0.0	0.0	1.82	128.8	14.2		
19.001	50.00	4.30	5.420	0.155	0.0	0.0	0.0	1.57	111.2	21.0		
18.003	50.00	4.70	5.225	0.335	0.0	0.0	0.0	2.24	247.2	45.4		
18.004	50.00	5.00	4.925	0.438	0.0	0.0	0.0	1.25	138.1	59.3		
16.004	50.00	6.64	4.820	0.777	0.0	0.0	0.0	1.03	163.8	105.2		
16.005	50.00	7.03	4.731	0.777	0.0	0.0	0.0	1.03	163.8	105.2		
16.006	50.00	7.38	4.669	0.777	0.0	0.0	0.0	1.17	185.8	105.2		
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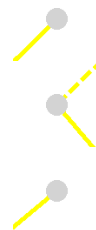
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Tuscany House White Hart Lane Basingstoke RG21 4AF													
Date 05/03/2021 10:01						Designed by WindesPC4							
File 2021-03-04 Outfall 2 Ne...						Checked by							
Micro Drainage						Network 2020.1							
<u>Network Design Table for Storm</u>													
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design		
20.000	15.513	0.140	110.8	0.056	4.00	0.0	0.600	o	300	Pipe/Conduit			
20.001	10.102	0.042	238.0	0.033	0.00	0.0	0.600	o	300	Pipe/Conduit			
20.002	35.257	0.258	136.7	0.046	0.00	0.0	0.600	o	300	Pipe/Conduit			
20.003	21.012	0.164	128.1	0.084	0.00	0.0	0.600	o	300	Pipe/Conduit			
16.007	19.583	0.065	301.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit			
16.008	29.571	0.059	501.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit			
<u>Network Results Table</u>													
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)			
20.000	50.00	4.17	5.340	0.056	0.0	0.0	0.0	1.49	105.5	7.6			
20.001	50.00	4.34	5.200	0.089	0.0	0.0	0.0	1.01	71.7	12.1			
20.002	50.00	4.78	5.158	0.135	0.0	0.0	0.0	1.34	94.9	18.3			
20.003	50.00	5.03	4.900	0.219	0.0	0.0	0.0	1.39	98.1	29.7			
16.007	50.00	7.66	4.586	0.996	0.0	0.0	0.0	1.17	185.4	134.9			
16.008	50.00	8.28	4.521	0.996	0.0	0.0	0.0	0.80	88.6«	134.9			
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Date 05/03/2021 10:01	Designed by WindesPC4	
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Micro Drainage		Network 2020.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., I*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
43	6.850	1.575	Open Manhole	1350	16.000	5.275	375				
44	6.400	1.256	Open Manhole	1350	16.001	5.144	450	16.000	5.219	375	
45	6.400	1.200	Open Manhole	1200	17.000	5.200	300				
46	6.232	1.214	Open Manhole	1350	16.002	5.018	450	16.001	5.018	450	
								17.000	5.168	300	
47	6.180	1.217	Open Manhole	1350	16.003	4.963	450	16.002	4.963	450	
48	7.140	1.500	Open Manhole	1200	18.000	5.640	300				
49	7.120	1.525	Open Manhole	1200	18.001	5.595	300	18.000	5.595	300	
50	6.900	1.500	Open Manhole	1200	18.002	5.400	300	18.001	5.400	300	
51	7.180	1.500	Open Manhole	1200	19.000	5.680	300				
53	6.920	1.500	Open Manhole	1200	19.001	5.420	300	19.000	5.420	300	
54	6.800	1.575	Open Manhole	1350	18.003	5.225	375	18.002	5.300	300	
								19.001	5.300	300	
55	6.500	1.575	Open Manhole	1350	18.004	4.925	375	18.003	4.925	375	
BASIN 2	6.015	1.195	Open Manhole	1350	16.004	4.820	450	16.003	4.820	450	
								18.004	4.820	375	
56	6.337	1.606	Open Manhole	1350	16.005	4.731	450	16.004	4.731	450	
57	6.369	1.700	Open Manhole	1350	16.006	4.669	450	16.005	4.669	450	
58	6.840	1.500	Open Manhole	1200	20.000	5.340	300				
59	6.700	1.500	Open Manhole	1200	20.001	5.200	300	20.000	5.200	300	
60	6.680	1.522	Open Manhole	1200	20.002	5.158	300	20.001	5.158	300	
61	6.400	1.500	Open Manhole	1200	20.003	4.900	300	20.002	4.900	300	
62	6.031	1.445	Open Manhole	1350	16.007	4.586	450	16.006	4.586	450	
								20.003	4.736	300	
BASIN 3	5.664	1.143	Open Manhole	1350	16.008	4.521	375	16.007	4.521	450	
	5.510	1.048	Open Manhole	0		OUTFALL		16.008	4.462	375	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
43	497341.517	102892.612	497341.517	102892.612	Required	
44	497329.023	102880.244	497329.023	102880.244	Required	
45	497354.643	102861.878	497354.643	102861.878	Required	



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Date 05/03/2021 10:01 File 2021-03-04 Outfall 2 Ne...						
Micro Drainage			Network 2020.1			
<u>Manhole Schedules for Storm</u>						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
46	497348.809	102857.022	497348.809	102857.022	Required	
47	497361.334	102842.322	497361.334	102842.322	Required	
48	497438.881	102887.624	497438.881	102887.624	Required	
49	497434.432	102877.962	497434.432	102877.962	Required	
50	497434.531	102856.291	497434.531	102856.291	Required	
51	497466.708	102845.045	497466.708	102845.045	Required	
53	497447.327	102844.469	497447.327	102844.469	Required	
54	497435.347	102844.237	497435.347	102844.237	Required	
55	497435.267	102824.527	497435.267	102824.527	Required	
BASIN 2	497417.280	102811.988	497417.280	102811.988	Required	
56	497440.390	102786.537	497440.390	102786.537	Required	
57	497460.693	102774.084	497460.693	102774.084	Required	
58	497505.438	102818.775	497505.438	102818.775	Required	
59	497517.882	102809.512	497517.882	102809.512	Required	
60	497525.654	102803.059	497525.654	102803.059	Required	
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Tuscany House White Hart Lane Basingstoke RG21 4AF																																												
Date 05/03/2021 10:01 File 2021-03-04 Outfall 2 Ne...		Designed by WindesPC4 Checked by																																										
Micro Drainage			Network 2020.1																																									
<u>Manhole Schedules for Storm</u> <table><thead><tr><th>MH Name</th><th>Manhole Easting (m)</th><th>Manhole Northing (m)</th><th>Intersection Easting (m)</th><th>Intersection Northing (m)</th><th>Manhole Access</th><th>Layout (North)</th></tr></thead><tbody><tr><td>61</td><td>497498.970</td><td>102780.015</td><td>497498.970</td><td>102780.015</td><td>Required</td><td rowspan="5"></td></tr><tr><td>62</td><td>497484.037</td><td>102765.233</td><td>497484.037</td><td>102765.233</td><td>Required</td></tr><tr><td>BASIN 3</td><td>497502.328</td><td>102758.238</td><td>497502.328</td><td>102758.238</td><td>Required</td></tr><tr><td></td><td>497514.583</td><td>102731.327</td><td></td><td></td><td>No Entry</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>							MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)	61	497498.970	102780.015	497498.970	102780.015	Required		62	497484.037	102765.233	497484.037	102765.233	Required	BASIN 3	497502.328	102758.238	497502.328	102758.238	Required		497514.583	102731.327			No Entry						
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)																																						
61	497498.970	102780.015	497498.970	102780.015	Required																																							
62	497484.037	102765.233	497484.037	102765.233	Required																																							
BASIN 3	497502.328	102758.238	497502.328	102758.238	Required																																							
	497514.583	102731.327			No Entry																																							
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Micro Drainage				Network 2020.1					
<u>PIPELINE SCHEDULES for Storm</u>									
<u>Upstream Manhole</u>									
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	
16.000	o	375	43	6.850	5.275	1.200	Open Manhole		1350
16.001	o	450	44	6.400	5.144	0.806	Open Manhole		1350
17.000	o	300	45	6.400	5.200	0.900	Open Manhole		1200
16.002	o	450	46	6.232	5.018	0.764	Open Manhole		1350
16.003	o	450	47	6.180	4.963	0.767	Open Manhole		1350
18.000	o	300	48	7.140	5.640	1.200	Open Manhole		1200
18.001	o	300	49	7.120	5.595	1.225	Open Manhole		1200
18.002	o	300	50	6.900	5.400	1.200	Open Manhole		1200
19.000	o	300	51	7.180	5.680	1.200	Open Manhole		1200
19.001	o	300	53	6.920	5.420	1.200	Open Manhole		1200
18.003	o	375	54	6.800	5.225	1.200	Open Manhole		1350
18.004	o	375	55	6.500	4.925	1.200	Open Manhole		1350
16.004	o	450	BASIN 2	6.015	4.820	0.745	Open Manhole		1350
16.005	o	450	56	6.337	4.731	1.156	Open Manhole		1350
16.006	o	450	57	6.369	4.669	1.250	Open Manhole		1350
<u>Downstream Manhole</u>									
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	
16.000	17.581	313.0	44	6.400	5.219	0.806	Open Manhole		1350
16.001	30.508	242.1	46	6.232	5.018	0.764	Open Manhole		1350
17.000	7.591	238.0	46	6.232	5.168	0.764	Open Manhole		1350
16.002	19.313	350.0	47	6.180	4.963	0.767	Open Manhole		1350
16.003	63.640	445.0	BASIN 2	6.015	4.820	0.745	Open Manhole		1350
18.000	10.638	238.0	49	7.120	5.595	1.225	Open Manhole		1200
18.001	21.671	111.1	50	6.900	5.400	1.200	Open Manhole		1200
18.002	12.081	120.8	54	6.800	5.300	1.200	Open Manhole		1350
19.000	19.390	74.6	53	6.920	5.420	1.200	Open Manhole		1200
19.001	11.982	99.9	54	6.800	5.300	1.200	Open Manhole		1350
18.003	19.710	65.7	55	6.500	4.925	1.200	Open Manhole		1350
18.004	21.927	208.8	BASIN 2	6.015	4.820	0.820	Open Manhole		1350
16.004	34.378	385.0	56	6.337	4.731	1.156	Open Manhole		1350
16.005	23.818	385.0	57	6.369	4.669	1.250	Open Manhole		1350
16.006	24.965	300.0	62	6.031	4.586	0.995	Open Manhole		1350
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Micro Drainage	Network 2020.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
20.000	o	300	58	6.840	5.340	1.200	Open Manhole	1200
20.001	o	300	59	6.700	5.200	1.200	Open Manhole	1200
20.002	o	300	60	6.680	5.158	1.222	Open Manhole	1200
20.003	o	300	61	6.400	4.900	1.200	Open Manhole	1200
16.007	o	450	62	6.031	4.586	0.995	Open Manhole	1350
16.008	o	375	BASIN 3	5.664	4.521	0.768	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
20.000	15.513	110.8	59	6.700	5.200	1.200	Open Manhole	1200
20.001	10.102	238.0	60	6.680	5.158	1.222	Open Manhole	1200
20.002	35.257	136.7	61	6.400	4.900	1.200	Open Manhole	1200
20.003	21.012	128.1	62	6.031	4.736	0.995	Open Manhole	1350
16.007	19.583	301.3	BASIN 3	5.664	4.521	0.693	Open Manhole	1350
16.008	29.571	501.2		5.510	4.462	0.673	Open Manhole	0

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Micro Drainage Network 2020.1		

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
16.000	-	-	100	0.238	0.238	0.238
16.001	-	-	100	0.000	0.000	0.000
17.000	-	-	100	0.101	0.101	0.101
16.002	-	-	100	0.000	0.000	0.000
16.003	-	-	100	0.000	0.000	0.000
18.000	-	-	100	0.065	0.065	0.065
18.001	-	-	100	0.000	0.000	0.000
18.002	-	-	100	0.083	0.083	0.083
19.000	-	-	100	0.105	0.105	0.105
19.001	-	-	100	0.050	0.050	0.050
18.003	-	-	100	0.032	0.032	0.032
18.004	-	-	100	0.103	0.103	0.103
16.004	-	-	100	0.000	0.000	0.000
16.005	-	-	100	0.000	0.000	0.000
16.006	-	-	100	0.000	0.000	0.000
20.000	-	-	100	0.056	0.056	0.056
20.001	-	-	100	0.033	0.033	0.033
20.002	-	-	100	0.046	0.046	0.046
20.003	-	-	100	0.084	0.084	0.084
16.007	-	-	100	0.000	0.000	0.000
16.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.996	0.996	0.996

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
---------------------	--------------	--------------	--------------	------------------	----------	--------

16.008		5.510	4.462	4.410	0	0
--------	--	-------	-------	-------	---	---

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1440	4.837	5760	4.837	10080	4.837	14400	4.837	18720	4.837
2880	4.837	7200	4.837	11520	4.837	15840	4.837	20160	4.837
4320	4.837	8640	4.837	12960	4.837	17280	4.837		

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Simulation Criteria for Storm

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 497050 103400 SU 97050 03400
C (1km)	-0.025
D1 (1km)	0.395
D2 (1km)	0.244
D3 (1km)	0.395
E (1km)	0.309
F (1km)	2.339
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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Storage Structures for Storm

Tank or Pond Manhole: BASIN 2, DS/PN: 16.004

Invert Level (m) 4.820

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	137.0	1.190	457.0

Tank or Pond Manhole: BASIN 3, DS/PN: 16.008

Invert Level (m) 4.521

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	164.0	1.150	481.0

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Micro Drainage Network 2020.1		

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 497526 102719 SU 97526 02719
Data Type	Point
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
16.000	43	120 Winter	100	+40%	100/15 Summer			
16.001	44	120 Winter	100	+40%	100/15 Summer			
17.000	45	120 Winter	100	+40%	100/15 Summer			
16.002	46	120 Winter	100	+40%	100/15 Summer			
16.003	47	120 Winter	100	+40%	100/15 Summer			
18.000	48	15 Winter	100	+40%	100/15 Summer			
18.001	49	15 Winter	100	+40%	100/15 Summer			
18.002	50	15 Winter	100	+40%	100/15 Summer			
19.000	51	15 Winter	100	+40%	100/15 Summer			
19.001	53	15 Winter	100	+40%	100/15 Summer			
18.003	54	15 Winter	100	+40%	100/15 Summer			
18.004	55	120 Winter	100	+40%	100/15 Summer			
16.004	BASIN 2	120 Winter	100	+40%	100/15 Summer			
16.005	56	360 Winter	100	+40%	100/120 Summer			
16.006	57	360 Winter	100	+40%	100/60 Summer			
20.000	58	15 Winter	100	+40%	100/15 Summer			

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Date 05/03/2021 10:01 File 2021-03-04 Outfall 2 Ne...				Designed by WindesPC4 Checked by				
Micro Drainage				Network 2020.1				
<u>Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>								
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
16.000	43	5.969	0.319	0.000	0.52		48.2	SURCHARGED
16.001	44	5.964	0.370	0.000	0.26		47.1	SURCHARGED
17.000	45	5.962	0.462	0.000	0.38		20.0	SURCHARGED
16.002	46	5.960	0.492	0.000	0.48		66.1	FLOOD RISK
16.003	47	5.956	0.543	0.000	0.46		65.2	FLOOD RISK
18.000	48	6.169	0.229	0.000	0.68		38.6	SURCHARGED
18.001	49	6.143	0.248	0.000	0.39		36.6	SURCHARGED
18.002	50	6.105	0.405	0.000	1.06		83.8	SURCHARGED
19.000	51	6.190	0.210	0.000	0.56		62.3	SURCHARGED
19.001	53	6.118	0.398	0.000	1.04		90.5	SURCHARGED
18.003	54	5.998	0.398	0.000	0.93		192.4	SURCHARGED
18.004	55	5.958	0.658	0.000	0.71		83.3	SURCHARGED
16.004	BASIN 2	5.949	0.679	0.000	0.17		24.4	FLOOD RISK
16.005	56	5.395	0.214	0.000	0.16		21.8	SURCHARGED
16.006	57	5.388	0.269	0.000	0.14		21.7	SURCHARGED
20.000	58	5.699	0.059	0.000	0.38		33.7	SURCHARGED
PN	US/MH Name	Level Exceeded						
16.000	43							
16.001	44							
17.000	45							
16.002	46							
16.003	47							
18.000	48							
18.001	49							
18.002	50							
19.000	51							
19.001	53							
18.003	54							
18.004	55							
16.004	BASIN 2							
16.005	56							
16.006	57							
20.000	58							
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Tuscany House White Hart Lane Basingstoke RG21 4AF									
Date 05/03/2021 10:01 File 2021-03-04 Outfall 2 Ne...		Designed by WindesPC4 Checked by							
Micro Drainage				Network 2020.1					
<u>Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	
20.001	59	15 Winter	100	+40%	100/15 Summer				
20.002	60	15 Winter	100	+40%	100/15 Summer				
20.003	61	15 Winter	100	+40%	100/15 Summer				
16.007	62	360 Winter	100	+40%	100/60 Summer				
16.008	BASIN 3	360 Winter	100	+40%	100/15 Winter				
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
20.001	59	5.666	0.166	0.000	0.95			53.6	SURCHARGED
20.002	60	5.626	0.169	0.000	0.92			80.3	SURCHARGED
20.003	61	5.399	0.200	0.000	1.50			129.3	SURCHARGED
16.007	62	5.380	0.344	0.000	0.24			36.3	SURCHARGED
16.008	BASIN 3	5.374	0.478	0.000	0.22			16.9	FLOOD RISK
PN	US/MH Name	Level Exceeded							
20.001	59								
20.002	60								
20.003	61								
16.007	62								
16.008	BASIN 3								
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APPENDIX D

Impermeable Areas Catchment Plan



P:\19-326 - Bilsham Road - Vapour RMTech\Acad\Drawings\000 Series\19-326-016 Catchments Sheet 1 of 2.dwg

NOTES

KEY

SITE BOUNDARY

Rev	Amendments	Des	CHK	App	Date

**ODYSSEY**

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Job Title

BILSHAM ROAD,
YAPTON

Drawing Title

CATCHMENTS
SHEET 1 OF 2

Client

BILSHAM ROAD
DEVELOPMENT LLP

Scale	Date	Designed
1:500 @A0	MAR 21	NA

Drawn	Checked	Approved
HM	NA	GG

Job No	Drawing No	Rev
19-326	19-326/015	

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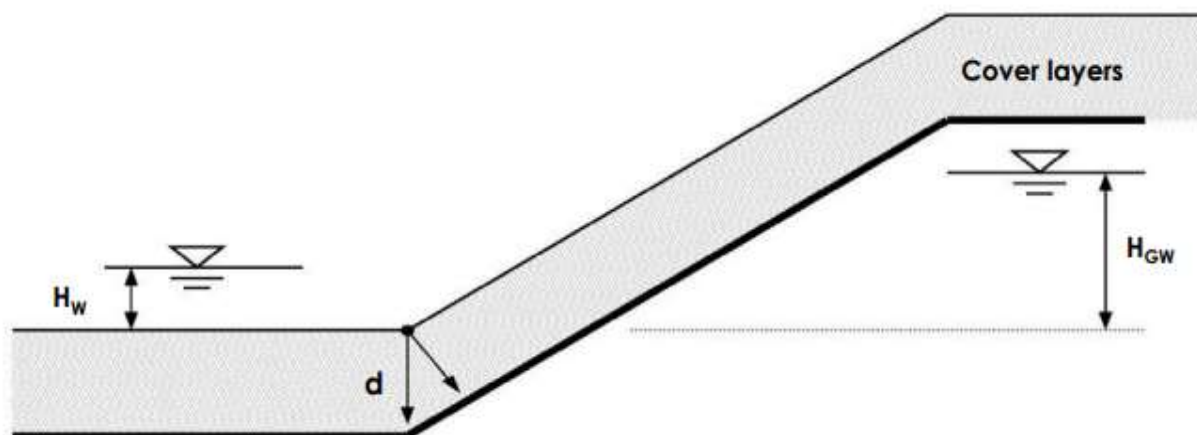
APPENDIX E

Flotation Calculations

TUSCANY HOUSE, WHITE HART LANE, BASINGSTOKE, RG21 4AF

Project:	Bilsham Road, Yapton	Reference:	19-326
Purpose:	Flotation Calculations	Sheet No:	1 of 5
Calcs By:	JW	Date:	08/03/2021
Checked:	GG	Date:	09/03/2021

REF	CALCULATION	OUTPUT
-----	-------------	--------

Attenuation Basin 1 Details

Basin Cover Level	6.001 mAOD
Basin Invert Level	4.201 mAOD
<u>Groundwater Level at Basin</u>	
WS 16	1.03 mbgl
Ground level at location of WS 16	6.2 mAOD
Groundwater level at location of WS 16	5.17 mAOD
Equivalent level of water if bgl value taken, below level at the basin	4.971 mAOD
Use the higher level of G38 or G40 cells	5.17 mAOD

Note: highest level
recorded

Water level in the pond above the sealing system	Hw =	0 m	Note: Basins normally dry
Groundwater Level above the pond surface	Hgw =	0.969 m	
Unit weight of water	Yw =	10 kN/m3	
Thickness of the cover layers above the sealing system	d =	0.9 m	
Unit weight of soil above the sealing system	Yb =	23 kN/m3	
Partial safety Factor (favourable, permanent loads)	Yg, stb =	0.95 -	
Partial safety Factor (unfavourable, permanent loads)	Yg, dst =	1.05 -	

Buoyancy force σ_a below the liner

$$\sigma_a = (H_{gw} + d) \cdot \gamma_w \cdot \gamma_{g,dst}$$

$$\sigma_{a,d} = 19.6245$$

Load σ_g above the liner

$$\sigma_{g,d} = (d \cdot \gamma_b + H_w \cdot \gamma_w) \cdot \gamma_{g,stb}$$

$$\sigma_{g,d} = 19.665$$

This is the load from any permanent existing water in the basin and the soil

Degree of Utilisation

$$\mu = \sigma_{a,d} / \sigma_{g,d} \leq 1$$

$$\text{Degree of Utilisation} = 0.99794$$

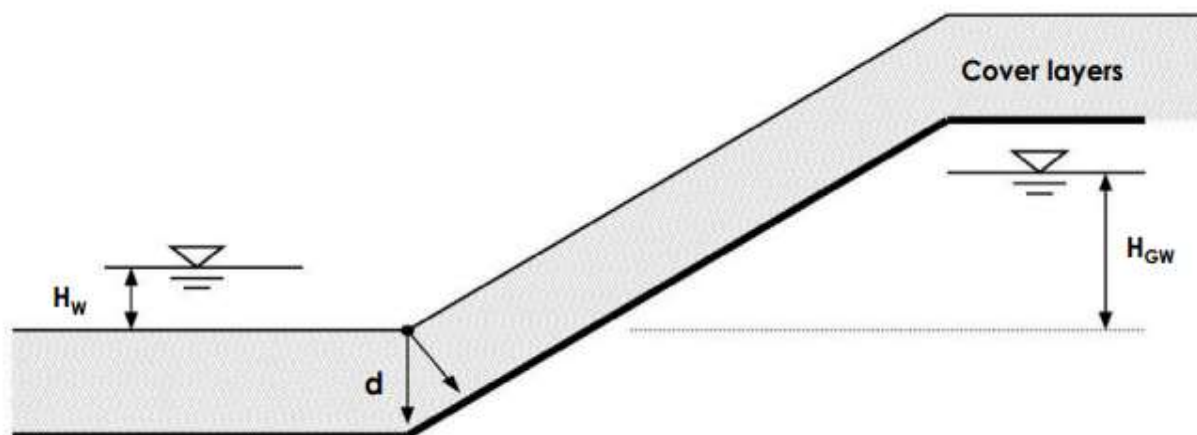
Degree of Utilisation is less than 1 therefore OK

0.9 m depth of soil on top of the liner is required

TUSCANY HOUSE, WHITE HART LANE, BASINGSTOKE, RG21 4AF

Project:	Bilsham Road, Yapton	Reference:	19-326
Purpose:	Flotation Calculations	Sheet No:	1 of 5
Calcs By:	JW	Date:	08/03/2021
Checked:	GG	Date:	09/03/2021

REF	CALCULATION	OUTPUT
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Attenuation Basin 2 Details

Basin Cover Level	6.01 mAOD
Basin Invert Level	4.82 mAOD
<u>Groundwater Level at Basin</u>	
WS 17	1.01 mbgl
Ground level at location of WS 17	5.64 mAOD
Groundwater level at location of WS 17	4.63 mAOD
Equivalent level of water if bgl value taken, below level at the basin	5 mAOD
Use the higher level of G38 or G40 cells	5.005 mAOD

Note: highest level
recorded

Water level in the pond above the sealing system	Hw =	0 m	Note: Basins normally dry
Groundwater Level above the pond surface	Hgw =	0.185 m	
Unit weight of water	Yw =	10 kN/m3	
Thickness of the cover layers above the sealing system	d =	0.3 m	
Unit weight of soil above the sealing system	Yb =	23 kN/m3	
Partial safety Factor (favourable, permanent loads)	Yg,stb =	0.95 -	
Partial safety Factor (unfavourable, permanent loads)	Yg,dst =	1.05 -	

Buoyancy force σ_a below the liner

$$\sigma_a = (H_{gw} + d) \cdot \gamma_w \cdot \gamma_{g,dst}$$

$$\sigma_{a,d} = 5.0925$$

Load σ_g above the liner

$$\sigma_{g,d} = (d \cdot \gamma_b + H_w \cdot \gamma_w) \cdot \gamma_{g,stb}$$

$$\sigma_{g,d} = 6.555$$

This is the load from any permanent existing water in the basin and the soil

Degree of Utilisation

$$\mu = \sigma_{a,d} / \sigma_{g,d} \leq 1$$

$$\text{Degree of Utilisation} = 0.77689$$

Degree of Utilisation is less than 1 therefore OK

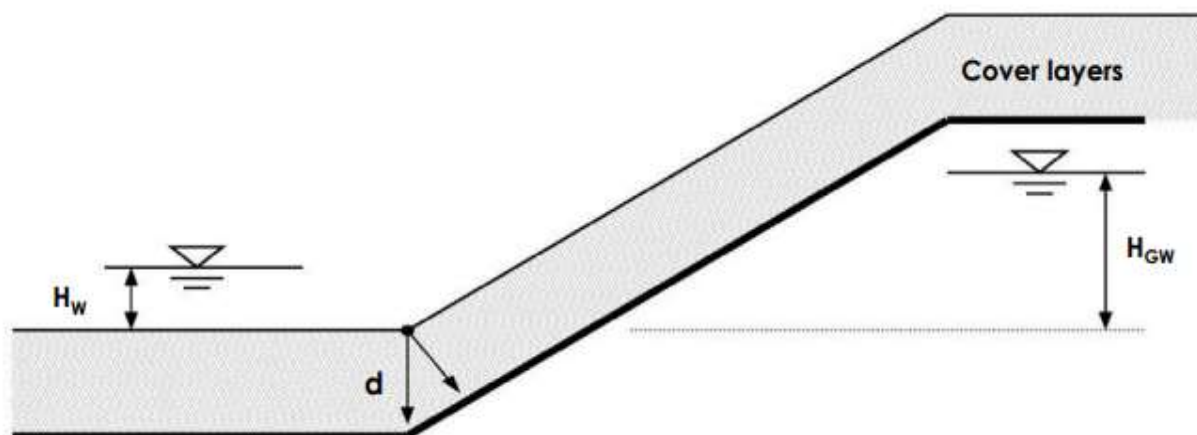
0.3 m depth of soil on top of the liner is required

TUSCANY HOUSE, WHITE HART LANE, BASINGSTOKE, RG21 4AF

Project:	Bilsham Road, Yapton	Reference:	19-326
Purpose:	Flotation Calculations	Sheet No:	1 of 5
Calcs By:	JW	Date:	08/03/2021
Checked:	GG	Date:	09/03/2021

REF	CALCULATION	OUTPUT
-----	-------------	--------

Attenuation Basin 3 Details



Basin Cover Level	5.671 mAOD
Basin Invert Level	4.521 mAOD
<u>Groundwater Level at Basin</u>	
WS 17	1.01 mbgl
Ground level at location of WS 17	5.64 mAOD
Groundwater level at location of WS 17	4.63 mAOD
Equivalent level of water if bgl value taken, below level at the basin	4.661 mAOD
Use the higher level of G38 or G40 cells	4.654 mAOD

Note: highest level
recorded

Water level in the pond above the sealing system	Hw =	0 m	Note: Basins normally dry
Groundwater Level above the pond surface	Hgw =	0.133 m	
Unit weight of water	Yw =	10 kN/m3	
Thickness of the cover layers above the sealing system	d =	0.3 m	
Unit weight of soil above the sealing system	Yb =	23 kN/m3	
Partial safety Factor (favourable, permanent loads)	Yg,stb =	0.95 -	
Partial safety Factor (unfavourable, permanent loads)	Yg,dst =	1.05 -	

Buoyancy force σ_a below the liner

$$\sigma_a = (H_{gw} + d) \cdot \gamma_w \cdot \gamma_{g,dst}$$

$$\sigma_{a,d} = 4.5465$$

Load σ_g above the liner

$$\sigma_{g,d} = (d \cdot \gamma_b + H_w \cdot \gamma_w) \cdot \gamma_{g,stb}$$

$$\sigma_{g,d} = 6.555$$

This is the load from any permanent existing water in the basin and the soil

Degree of Utilisation

$$\mu = \sigma_{a,d} / \sigma_{g,d} \leq 1$$

$$\text{Degree of Utilisation} = 0.69359$$

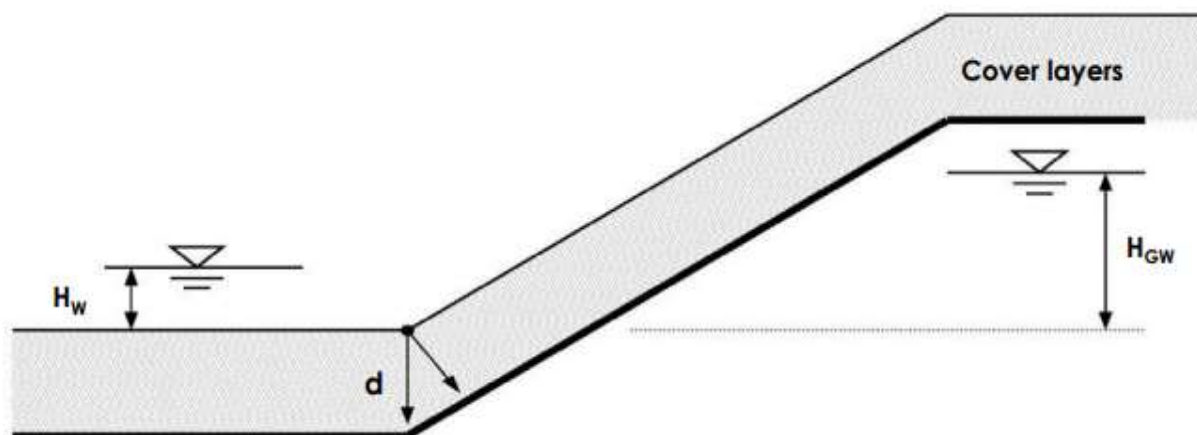
Degree of Utilisation is less than 1 therefore OK

0.3 m depth of soil on top of the liner is required

TUSCANY HOUSE, WHITE HART LANE, BASINGSTOKE, RG21 4AF

Project:	Bilsham Road, Yapton	Reference:	19-326
Purpose:	Flotation Calculations	Sheet No:	1 of 5
Calcs By:	JW	Date:	08/03/2021
Checked:	GG	Date:	09/03/2021

REF	CALCULATION	OUTPUT
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Attenuation Basin 4 Details

Basin Cover Level	4.999 mAOD
Basin Invert Level	3.249 mAOD
<u>Groundwater Level at Basin</u>	
WS 14	1.22 mbgl
Ground level at location of WS 14	4.85 mAOD
Groundwater level at location of WS 17	3.63 mAOD
Equivalent level of water if bgl value taken, below level at the basin	3.779 mAOD
Use the higher level of G38 or G40 cells	3.78 mAOD

Note: highest level
recorded

Water level in the pond above the sealing system	Hw =	0 m	Note: Basins normally dry
Groundwater Level above the pond surface	Hgw =	0.531 m	
Unit weight of water	Yw =	10 kN/m3	
Thickness of the cover layers above the sealing system	d =	0.55 m	
Unit weight of soil above the sealing system	Yb =	23 kN/m3	
Partial safety Factor (favourable, permanent loads)	Yg, stb =	0.95 -	
Partial safety Factor (unfavourable, permanent loads)	Yg, dst =	1.05 -	

Buoyancy force σ_a below the liner

$$\sigma_a = (H_{gw} + d) \cdot \gamma_w \cdot \gamma_{g,dst}$$

$$\sigma_{a,d} = 11.3505$$

Load σ_g above the liner

$$\sigma_{g,d} = (d \cdot \gamma_b + H_w \cdot \gamma_w) \cdot \gamma_{g,stb}$$

$$\sigma_{g,d} = 12.0175$$

This is the load from any permanent existing water in the basin and the soil

Degree of Utilisation

$$\mu = \sigma_{a,d} / \sigma_{g,d} \leq 1$$

$$\text{Degree of Utilisation} = 0.9445$$

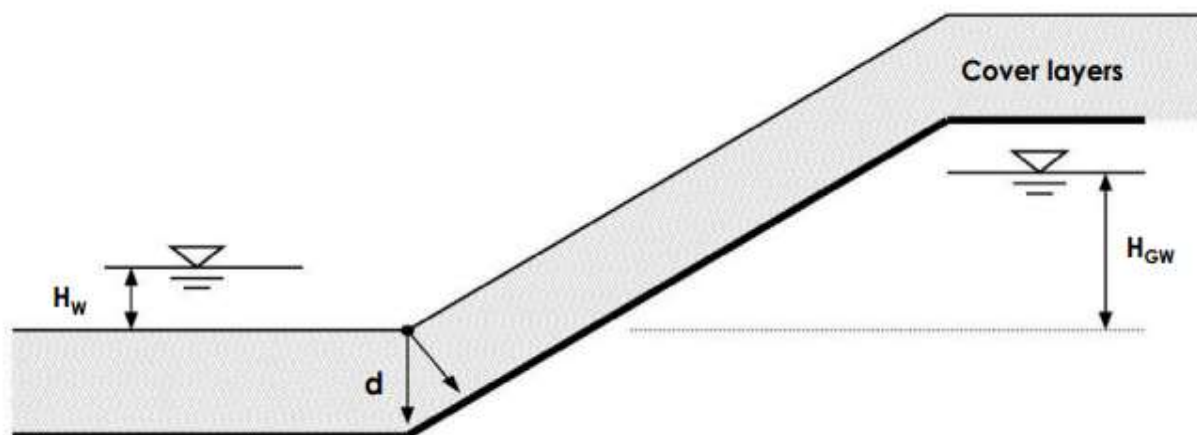
Degree of Utilisation is less than 1 therefore OK

0.55 m depth of soil on top of the liner is required

TUSCANY HOUSE, WHITE HART LANE, BASINGSTOKE, RG21 4AF

Project:	Bilsham Road, Yapton	Reference:	19-326
Purpose:	Flotation Calculations	Sheet No:	1 of 5
Calcs By:	JW	Date:	08/03/2021
Checked:	GG	Date:	09/03/2021

REF	CALCULATION	OUTPUT
-----	-------------	--------

Attenuation Basin 5 Details

Basin Cover Level	5.188 mAOD
Basin Invert Level	3.388 mAOD
<u>Groundwater Level at Basin</u>	
WS 14	1.22 mbgl
Ground level at location of WS 14	4.85 mAOD
Groundwater level at location of WS 14	3.63 mAOD
Equivalent level of water if bgl value taken, below level at the basin	3.968 mAOD
Use the higher level of G38 or G40 cells	3.959 mAOD

Note: highest level
recorded

Water level in the pond above the sealing system	Hw =	0 m	Note: Basins normally dry
Groundwater Level above the pond surface	Hgw =	0.571 m	
Unit weight of water	γ_w =	10 kN/m ³	
Thickness of the cover layers above the sealing system	d =	0.6 m	
Unit weight of soil above the sealing system	γ_b =	23 kN/m ³	
Partial safety Factor (favourable, permanent loads)	$\gamma_{g, stb}$ =	0.95 -	
Partial safety Factor (unfavourable, permanent loads)	$\gamma_{g, dst}$ =	1.05 -	

Buoyancy force σ_a below the liner

$$\sigma_a = (H_{gw} + d) \cdot \gamma_w \cdot \gamma_{g,dst}$$

$$\sigma_{a,d} = 12.2955$$

Load σ_g above the liner

$$\sigma_{g,d} = (d \cdot \gamma_b + H_w \cdot \gamma_w) \cdot \gamma_{g,stb}$$

$$\sigma_{g,d} = 13.11$$

This is the load from any permanent existing water in the basin and the soil

Degree of Utilisation

$$\mu = \sigma_{a,d} / \sigma_{g,d} \leq 1$$

$$\text{Degree of Utilisation} = 0.93787$$

Degree of Utilisation is less than 1 therefore OK

0.6 m depth of soil on top of the liner is required

	Cover level (mAOD)	Invert level (mAOD)	Depth (m)	Borehole number	Cover level - Borehole location (mAOD)
Basin 1	6.001	4.201	1.8	WS 16	6.2
Basin 2	6.01	4.82	1.19	WS17	5.64
Basin 3	5.671	4.521	1.15	WS17	5.64
Basin 4	4.999	3.249	1.75	WS17	4.85
Basin 5	5.188	3.388	1.8	WS14 or WS17	4.85

Highest
groundwater
level in that
location

1.03

1.01

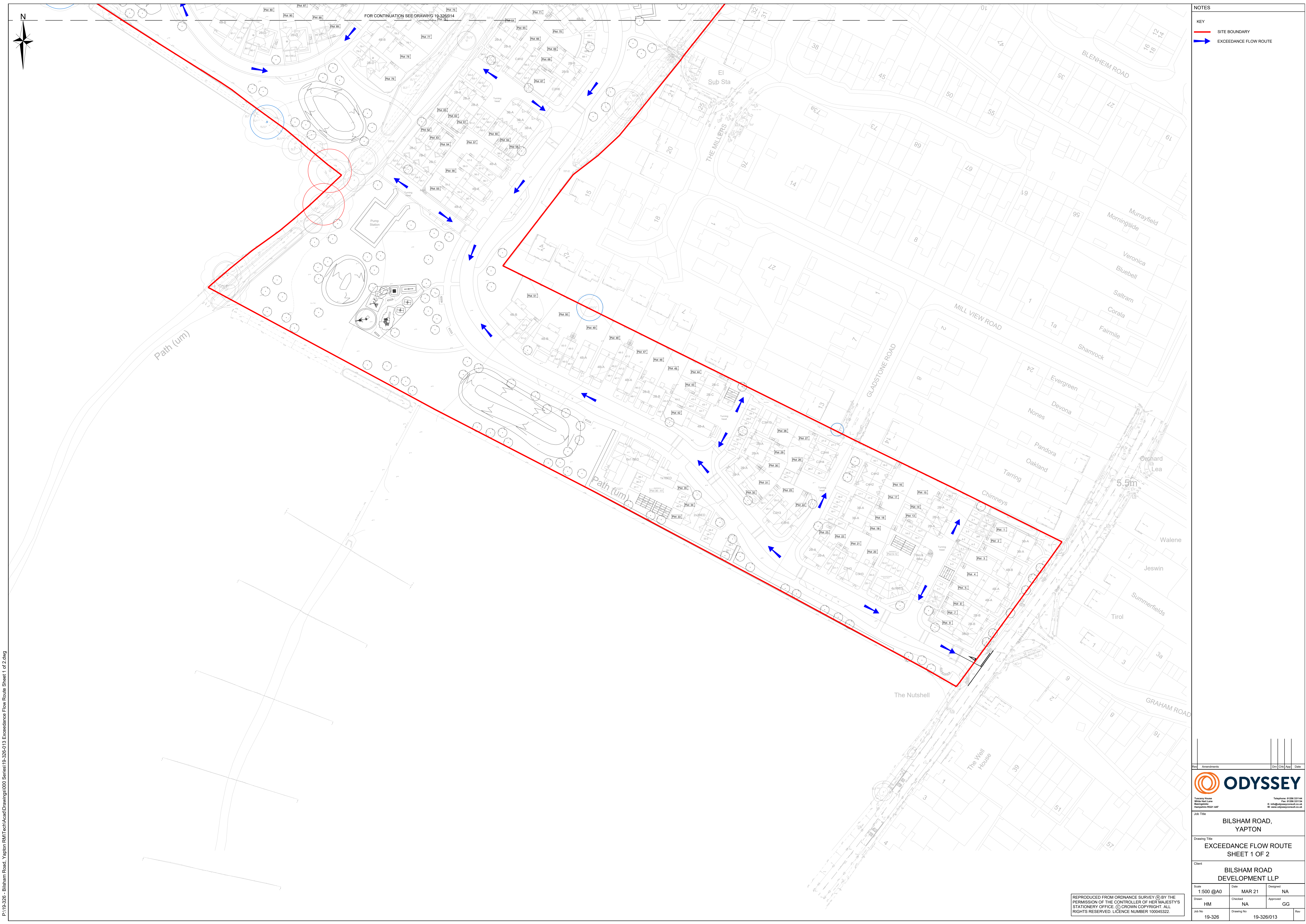
1.01

1.22

1.22

APPENDIX F

Exceedance Flow Routes



P:\19-326 - Bilsham Road, Yapton RMTech\Acad\Drawings\000 Series\19-326-013 Exceedance Flow Route Sheet 1 of 2.dwg

NOTES

KEY

SITE BOUNDARY

EXCEEDANCE FLOW ROUTE

Rev	Amendments	Des	CHK	App	Date



ODYSSEY

Tacamy House
White Hart Lane
Barnsley
S70 2AT
Telephone: 01226 321144
Fax: 01226 321144
E: info@odysseyconsult.co.uk
W: www.odysseyconsult.co.uk

Telephone: 01226 321144
Fax: 01226 321144
E: info@odysseyconsult.co.uk
W: www.odysseyconsult.co.uk

Job Title

BILSHAM ROAD,
YAPTON

Drawing Title

EXCEEDANCE FLOW ROUTE
SHEET 1 OF 2

Client

BILSHAM ROAD
DEVELOPMENT LLP

Scale	Date	Designed
1:500 @A0	MAR 21	NA
Drawn	Checked	Approved
HM	NA	GG
Job No	Drawing No	Rev
19-326	19-326/013	

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