

SuDS Drainage Statement

Wandleys Farm, Wandleys Lane, Walberton
West Sussex BN18 0QR

Client

Mr Kevin & Mrs Vyvyan Lillywhite
Wandleys Farm
Wandleys Lane
Walberton
BN18 0QR
Ref: 11117

Consulting Engineers

GTA Civils & Transport Ltd
66a Church Walk
Burgess Hill
West Sussex
RH15 9AS

1.0 INTRODUCTION

This statement has been prepared for Mr Kevin & Mrs Vyvyan Lillywhite in relation to a proposed application for Full Planning Permission on land at Wandleys Farm, Wandleys Lane, Walberton, West Sussex BN18 0QR. The proposal is to build 5 new dwelling houses on a vacant site.

This Statement outlines the proposed surface water drainage (SuDS) strategy with the view to satisfy and discharge Appeal Condition #4 as shown on the Decision Notice reference APP/C3810/W/3209249, dated 8 April 2019. This states:

"Development shall not commence until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, the recommendations of the SuDS Manual produced by CIRIA. Winter groundwater monitoring to establish highest annual groundwater levels and percolation testing to BRE 365, or similar approved, will be required to support the design of any infiltration drainage. The development shall be carried out in accordance with the approved details".

No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.

2.0 EXISTING SITE

This site currently comprises greenfield land - previously used for animal grazing with access in from Wandleys Lane. The site area is approximately 1ha.

A small lake, which appears to have been infilled since 2012, is approximately 100m east of the site, with another pond some 200m southeast of the site. A watercourse, flowing broadly south, passes to the north and, at its closest, approximately 880m to the east of the site. Appendix A shows a location map.

Topography: a topographic survey is shown in Appendix B. There is a north-south fall across the site, from 23.92m AOD to 20.09m AOD, approximately.

Geology: the BGS online geological map shows this area dominated by Lambeth Group (clay, silt and sand). Head (gravel, sand, silt and clay) drift deposits overlie this solid bedrock.

A winter groundwater monitoring exercise was undertaken between 06/07/19 and 14/03/20. The 2 graphs in Appendix E show that the water table level rose to within 0.1m of the ground's surface. Such a high water table level precludes the viability of soakage, irrespective of the soil's infiltration characteristics.

Public Sewers: it is understood from the Applicant, that Southern Water owns a foul sewer that runs along Wandley's Lane but there are no public surface water sewers in this area.

The greenfield runoff rate for the total post-development contributing area has been calculated as 1.0l/s. Refer to the first calculation shown in Appendix D.

3.0 PROPOSED SURFACE WATER DRAINAGE

The SuDS Hierarchy (infiltration, watercourses, public sewers, private sewers) was applied. The high water table level and Clay soil type add up to make infiltration features unfeasible here. The ditch watercourse that runs along the south boundary, is clearly the only viable option for discharging the development's surface water.

The new dwellings' roofs' surface water will be routed to a new outfall headwall. It is understood that, although this ditch is in the neighbour's land, relations between these parties are very good and there will be no problem with setting up a legal easement in due course.

The drainage strategy layout is shown in Appendix D (drawing no. 11117/1101 – P2).

The surface water storage proposals have been sized to hold the volume in the critical '1 in 100 years plus 40% climate change' event using FEH rainfall data. 2 sets of Micro Drainage Source Control calculations are contained within Appendix D.

The strategy layout and calculations show 2 areas of pavings, the first to the NE and the main area to the SW. Flow from the NE will be restricted via a control manhole into the lower part of the network at 1l/s. This will join with the main area. The offsite flow rate will be restricted to the Qbar rate determined (see section 2 above), namely 1.0l/s – in the critical '1 in 100 years plus 40% climate change' storm event.

The new outfall will be subject to an application for Ordinary Watercourse Consent from the LLFA, in due course.

The winter groundwater monitoring exercise, strategy layout and calculations address the items listed in the relevant Appeal Condition. This proposal is 100% sustainable and complies fully with the NPPF.

Preliminary Issue: 02 March 2021

APPENDIX A – AERIAL LOCATION PLAN



APPENDIX B – TOPOGRAPHIC SURVEY

This topographic map shows a site with numerous spot elevations and contour lines. The map includes a north arrow pointing towards the upper left. A prominent road, labeled 'Rte 101', runs diagonally from the bottom left towards the center. Another road, 'Rte 102', is visible on the right side. The map is covered with a grid of spot elevations, ranging from approximately 20.00 to 22.50. Contour lines are drawn at intervals of 0.20, with labels such as 20.00, 20.20, 20.40, 20.60, 20.80, 21.00, 21.20, 21.40, 21.60, 21.80, and 22.00. The map also shows several buildings and structures, including a large building complex in the upper right and a smaller building in the lower right. The terrain appears to be relatively flat, with some minor depressions and rises. The map is titled '002' in the top left corner.

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Building Lines	
Rooflines	300 12
Top Back of Kerb	500 40
Edge of Surface Footpath	500 40
Edge of Road	500 40
Edge of Concrete	500 40
Top of ban	300 12
Bottom of ban	100 40
Fence Handrail	
Overhead Cables	

Spot Levels

100.00

Gates

Sales

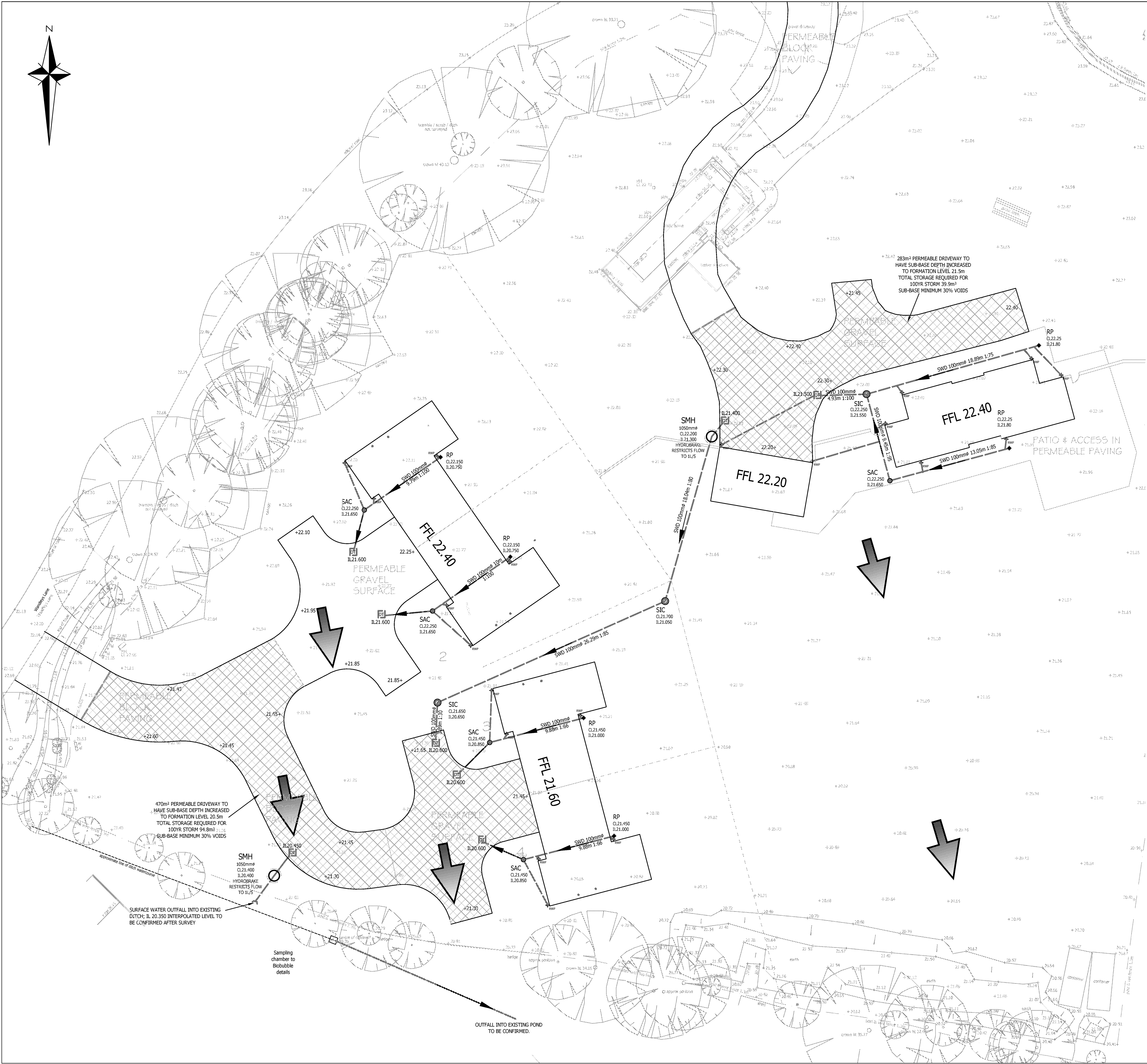
Co-ordinates in OSGB				
Point Number	Existing	New/ing	Elevation	Description
S04	492367 593	156573 590	25.729	Retro Target
S02	495394 501	156689 183	26.490	Retro target
S03	495391 737	156558 927	22.399	Retro target
S017	495340 581	156027 440	24.474	Retro target
S018	495380 201	156947 582	24.427	Retro target

Scale	Date	Draw
	07/01/21	

Job No.	Drawing No.	R
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Rev.

APPENDIX C – SuDS DRAINAGE STRATEGY LAYOUT

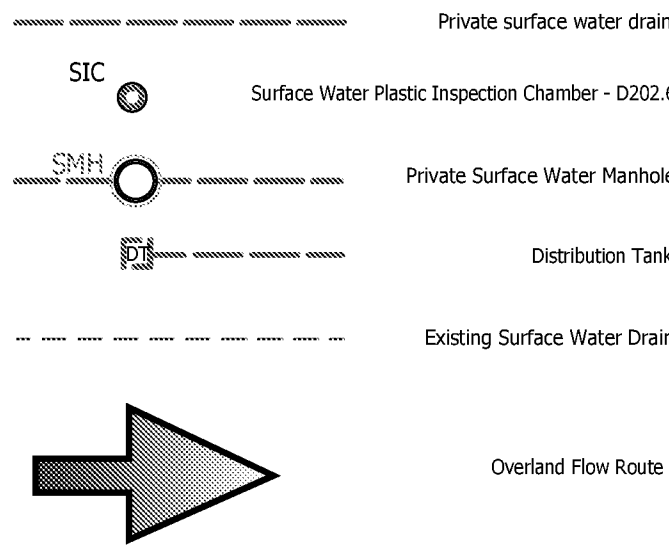


SPECIFICATION NOTES

GENERAL NOTES

1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non-intrusive observations, record drawings or the like. The contractor shall be responsible for any intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. any discrepancies shall be notified to gta prior to works commencing.
2. Tender or billing drawings shall not be used for construction or the ordering of materials.
3. Do not scale. All dimensions and levels to be site confirmed.
4. This drawing shall be read in conjunction with all relevant architects, consultants drawings and specifications, together with H&S plan requirements.
5. Copyright: This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.
6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities. The contractor shall be responsible for obtaining all necessary approvals prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting above works or costs.

Key



P2	PRELIMINARY ISSUE	01/03/21	CM	JP	
P1	INITIAL ISSUE	23/02/21	CM	JP	
Rev	Amendments	Date	Don	Chk	
Status					
PRELIMINARY					
Client					
MR & MRS K LILLYWHITE					
Architect					
SLOANE & BROWN					
Project					
WANDLEYS FARM WANDLEYS LANE, FONTWELL					
Title					
DRAINAGE STRATEGY					
Date	FEBRUARY 2021	Scale @ A1	1	200	
Clients Ref.		Project Ref.	11117		
 Gloucester House, 66a Church Walk, Burgess Hill, West Sussex, RH15 5AS Tel.01444 871444 Web: www.gtacivils.co.uk					
Drawing Number				Rev.	
11117/1101				P2	

DESIGN NOTES

STORAGE DESIGN BASED ON 1 IN 100 YR STORM + 40%
STORAGE TO BE ACHIEVED IN PERMEABLE PAVING SUB-BASE
(HATCHED AREAS), STORAGE VOLUMES AS SHOWN, STORAGE
FROM PLOT 5 CASCADES INTO PLOTS 1-4'S STORAGE.

TOTAL SURFACE WATER DISCHARGE RATE RESTRICTED BY HYDROBRAKE TO 1L/S (RURAL QBAR RATE), DISCHARGE TO EXISTING DITCH.

ALL DRAINAGE POINTS SUBJECT TO CONFIRMATION

APPENDIX D – MICRO DRAINAGE CALCULATIONS

GTA Civils Ltd

66a Church Walk

Burgess Hill

West Sussex RH15 9AS

Date 24/02/2021 05:39

File 11117 cascade.CASX

Micro Drainage

WANDLEYS FARM

PLOTS 1-4

Designed by CM

Checked by JP

Source Control 2020.1

Page 1



Cascade Summary of Results for 11117 PP plots 1-4.SRCX

Upstream Structures

Outflow To

Overflow To

11117 PP plot S.SRCX

(None)

(None)

Half Drain Time : 867 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	20.699	0.199	0.0	1.0	1.0	27.9	O K
30 min Summer	20.773	0.273	0.0	1.0	1.0	38.3	O K
60 min Summer	20.870	0.370	0.0	1.0	1.0	51.8	O K
120 min Summer	20.924	0.424	0.0	1.0	1.0	59.3	O K
180 min Summer	20.965	0.465	0.0	1.0	1.0	65.2	O K
240 min Summer	20.997	0.497	0.0	1.0	1.0	69.6	O K
360 min Summer	21.038	0.538	0.0	1.0	1.0	75.4	O K
480 min Summer	21.062	0.562	0.0	1.0	1.0	78.7	O K
600 min Summer	21.074	0.574	0.0	1.0	1.0	80.4	O K
720 min Summer	21.080	0.580	0.0	1.0	1.0	81.3	O K
960 min Summer	21.080	0.580	0.0	1.0	1.0	81.3	O K
1440 min Summer	21.088	0.588	0.0	1.0	1.0	82.4	O K
2160 min Summer	21.977	0.577	0.0	1.0	1.0	80.9	O K
2880 min Summer	21.051	0.551	0.0	1.0	1.0	77.2	O K
4320 min Summer	20.984	0.484	0.0	1.0	1.0	67.8	O K
5760 min Summer	20.924	0.424	0.0	1.0	1.0	59.4	O K
7200 min Summer	20.873	0.373	0.0	1.0	1.0	52.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	143.146	0.0	46.3	19
30 min Summer	96.228	0.0	63.5	34
60 min Summer	62.028	0.0	83.1	648
120 min Summer	36.334	0.0	97.8	764
180 min Summer	26.639	0.0	107.8	184
240 min Summer	21.329	0.0	115.4	244
360 min Summer	15.469	0.0	125.7	364
480 min Summer	12.249	0.0	132.9	484
600 min Summer	10.199	0.0	138.2	604
720 min Summer	8.773	0.0	142.6	724
960 min Summer	6.908	0.0	149.7	962
1440 min Summer	4.937	0.0	149.5	1444
2160 min Summer	3.547	0.0	171.8	1772
2880 min Summer	2.822	0.0	181.6	2836
4320 min Summer	2.072	0.0	196.6	2724
5760 min Summer	1.684	0.0	213.8	3568
7200 min Summer	1.448	0.0	228.8	4292

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GTA Civils Ltd							Page 2
66a Church Walk Burgess Hill West Sussex RH15 9AS			WANDLEYS FARM PLOTS 1-4				
Date 24/02/2021 05:39			Designed by CM				
File 11117 cascade.CASX			Checked by JP				
Micro Drainage			Source Control 2020.1				
<u>Cascade Summary of Results for 11117 PP plots 1-4.SRCX</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	20.813	0.313	0.0	1.0	1.0	43.9	O K
10080 min Summer	20.765	0.265	0.0	1.0	1.0	37.1	O K
15 min Winter	20.725	0.225	0.0	1.0	1.0	31.5	O K
30 min Winter	20.808	0.308	0.0	1.0	1.0	43.2	O K
60 min Winter	20.908	0.408	0.0	1.0	1.0	57.2	O K
120 min Winter	20.975	0.475	0.0	1.0	1.0	66.5	O K
180 min Winter	21.023	0.523	0.0	1.0	1.0	73.3	O K
240 min Winter	21.058	0.558	0.0	1.0	1.0	78.2	O K
360 min Winter	21.106	0.606	0.0	1.0	1.0	84.9	O K
480 min Winter	21.137	0.637	0.0	1.0	1.0	89.2	O K
600 min Winter	21.154	0.654	0.0	1.0	1.0	91.7	O K
720 min Winter	21.165	0.665	0.0	1.0	1.0	93.2	O K
960 min Winter	21.173	0.673	0.0	1.0	1.0	94.3	O K
1440 min Winter	21.171	0.671	0.0	1.0	1.0	94.0	O K
2160 min Winter	21.177	0.677	0.0	1.0	1.0	94.8	O K
2880 min Winter	21.133	0.633	0.0	1.0	1.0	88.6	O K
4320 min Winter	21.020	0.520	0.0	1.0	1.0	72.0	O K
5760 min Winter	20.923	0.423	0.0	1.0	1.0	59.3	O K
7200 min Winter	20.819	0.319	0.0	1.0	1.0	44.7	O K
8640 min Winter	20.728	0.228	0.0	1.0	1.0	32.0	O K
10080 min Winter	20.663	0.163	0.0	1.0	1.0	22.9	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
8640 min Summer	1.288	0.0	242.9	5104			
10080 min Summer	1.172	0.0	256.7	5848			
15 min Winter	143.146	0.0	52.3	19			
30 min Winter	96.228	0.0	71.6	34			
60 min Winter	62.028	0.0	93.6	728			
120 min Winter	36.334	0.0	110.1	170			
180 min Winter	26.639	0.0	121.4	184			
240 min Winter	21.329	0.0	129.8	244			
360 min Winter	15.469	0.0	141.4	362			
480 min Winter	12.249	0.0	149.2	480			
600 min Winter	10.199	0.0	155.5	598			
720 min Winter	8.773	0.0	157.8	716			
960 min Winter	6.908	0.0	156.3	950			
1440 min Winter	4.937	0.0	153.3	1426			
2160 min Winter	3.547	0.0	193.3	1840			
2880 min Winter	2.822	0.0	204.4	2048			
4320 min Winter	2.072	0.0	223.9	2944			
5760 min Winter	1.684	0.0	241.0	3856			
7200 min Winter	1.448	0.0	258.0	4680			
8640 min Winter	1.288	0.0	274.1	5280			
10080 min Winter	1.172	0.0	289.9	5952			
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66a Church Walk	WANDLEYS FARM																															
Burgess Hill	PLOTS 1-4																															
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Date 24/02/2021 05:39	Designed by CM																															
File 11117 cascade.CASX	Checked by JP																															
Micro Drainage	Source Control 2020.1																															
<u>Cascade Rainfall Details for 11117 PP plots 1-4.SRCK</u> <table> <tr> <td>Rainfall Model</td> <td>FEN</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>FEN Rainfall Version</td> <td>2013</td> </tr> <tr> <td>Site Location</td> <td>GB 495398 106588 30 95398 06588</td> </tr> <tr> <td>Data Type</td> <td>Point</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> </tr> <tr> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Climate Change %</td> <td>+40</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 0.113 <table> <tr> <th>Time (mins)</th> <th>Area</th> </tr> <tr> <th>From:</th> <th>To: (ha)</th> </tr> <tr> <td>0</td> <td>4 0.113</td> </tr> </table>			Rainfall Model	FEN	Return Period (years)	100	FEN Rainfall Version	2013	Site Location	GB 495398 106588 30 95398 06588	Data Type	Point	Summer Storms	Yes	Winter Storms	Yes	Cv (Summer)	0.750	Cv (Winter)	0.840	Shortest Storm (mins)	15	Longest Storm (mins)	10080	Climate Change %	+40	Time (mins)	Area	From:	To: (ha)	0	4 0.113
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66a Church Walk Burgess Hill West Sussex RH15 9AS	WANDLEYS FARM PLOTS 1-4	
Date 24/02/2021 05:39	Designed by CM	
File 11117 cascade.CASX	Checked by JP	
Micro Drainage		Source Control 2020.1

Cascade Model Details for 11117 PP plots 1-4.SRCX

Storage is Online Cover Level (m) 21.350

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	46.7
Max Percolation (l/s)	129.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	20.500	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0050-1000-0750-1000
Design Head (m)	0.750
Design Flow (l/s)	1.0
Flush-Flow™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	50
Invert Level (m)	20.400
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.750	1.0	Kick-Flow	0.445	0.8
Flush-Flow™	0.222	1.0	Mean Flow over Head Range	-	0.9

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	0.9	1.200	1.2	3.000	1.9	7.000	2.8
0.200	1.0	1.400	1.3	3.500	2.0	7.500	2.9
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.9	1.800	1.5	4.500	2.3	8.500	3.0
0.500	0.8	2.000	1.6	5.000	2.4	9.000	3.1
0.600	0.9	2.200	1.6	5.500	2.5	9.500	3.2
0.800	1.0	2.400	1.7	6.000	2.6		
1.000	1.1	2.600	1.7	6.500	2.7		

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GTA Civils Ltd

66a Church Walk

Burgess Hill

West Sussex RH15 9AS

Date 24/02/2021 05:38

File 11117 cascade.CASX

Micro Drainage

Source Control 2020.1

WANDLEYS FARM

PLOT 5

Designed by CM

Checked by JP

Page 1



Cascade Summary of Results for 11117 PP plot 5.SRCX

Upstream Structures

Outflow To

Overflow To

(None) 11117 PP plots 1-4.SRCX

(None)

Half Drain Time : 397 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	21.798	0.208	0.0	0.9	0.9	17.7	O K
30 min Summer	21.781	0.281	0.0	0.9	0.9	23.9	O K
60 min Summer	21.855	0.355	0.0	0.9	0.9	30.1	O K
120 min Summer	21.890	0.390	0.0	0.9	0.9	33.1	O K
180 min Summer	21.902	0.402	0.0	0.9	0.9	34.1	O K
240 min Summer	21.902	0.402	0.0	0.9	0.9	34.1	O K
360 min Summer	21.883	0.383	0.0	0.9	0.9	32.6	O K
480 min Summer	21.864	0.364	0.0	0.9	0.9	30.9	O K
600 min Summer	21.847	0.347	0.0	0.9	0.9	29.5	O K
720 min Summer	21.832	0.332	0.0	0.9	0.9	28.2	O K
960 min Summer	21.803	0.303	0.0	0.9	0.9	25.7	O K
1440 min Summer	21.749	0.249	0.0	0.9	0.9	21.1	O K
2160 min Summer	21.671	0.171	0.0	0.9	0.9	14.9	O K
2880 min Summer	21.612	0.112	0.0	0.9	0.9	9.6	O K
4320 min Summer	21.540	0.040	0.0	0.9	0.9	3.4	O K
5760 min Summer	21.507	0.007	0.0	0.9	0.9	0.6	O K
7200 min Summer	21.500	0.000	0.0	0.9	0.9	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	143.146	0.0	16.4	19
30 min Summer	96.228	0.0	25.2	33
60 min Summer	62.028	0.0	32.9	62
120 min Summer	36.334	0.0	38.7	122
180 min Summer	26.639	0.0	42.7	182
240 min Summer	21.329	0.0	45.7	240
360 min Summer	15.469	0.0	49.9	328
480 min Summer	12.249	0.0	52.7	384
600 min Summer	10.199	0.0	54.7	448
720 min Summer	8.773	0.0	56.5	514
960 min Summer	6.908	0.0	59.3	652
1440 min Summer	4.937	0.0	63.5	924
2160 min Summer	3.547	0.0	68.1	1360
2880 min Summer	2.822	0.0	72.1	1648
4320 min Summer	2.072	0.0	76.6	2332
5760 min Summer	1.684	0.0	84.8	2952
7200 min Summer	1.448	0.0	90.6	0

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GTA Civils Ltd							Page 2
66a Church Walk Burgess Hill West Sussex RH15 9AS			WANDLEYS FARM PLOT 5				
Date 24/02/2021 05:38			Designed by CM				
File 11117 cascade.CASX			Checked by JP				
Micro Drainage			Source Control 2020.1				
<u>Cascade Summary of Results for 11117 PP plot 5.SRCX</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	21.500	0.000	0.0	0.8	0.8	0.0	O K
10080 min Summer	21.500	0.000	0.0	0.7	0.7	0.0	O K
15 min Winter	21.737	0.237	0.0	0.9	0.9	20.1	O K
30 min Winter	21.819	0.319	0.0	0.9	0.9	27.0	O K
60 min Winter	21.904	0.404	0.0	0.9	0.9	34.3	O K
120 min Winter	21.947	0.447	0.0	0.9	0.9	37.9	O K
180 min Winter	21.965	0.465	0.0	0.9	0.9	39.5	O K
240 min Winter	21.970	0.470	0.0	0.9	0.9	39.9	O K
360 min Winter	21.958	0.458	0.0	0.9	0.9	38.8	O K
480 min Winter	21.930	0.430	0.0	0.9	0.9	36.5	O K
600 min Winter	21.909	0.409	0.0	0.9	0.9	34.7	O K
720 min Winter	21.889	0.389	0.0	0.9	0.9	33.0	O K
960 min Winter	21.848	0.348	0.0	0.9	0.9	29.6	O K
1440 min Winter	21.769	0.269	0.0	0.9	0.9	22.9	O K
2160 min Winter	21.649	0.149	0.0	0.9	0.9	12.7	O K
2880 min Winter	21.567	0.067	0.0	0.9	0.9	5.7	O K
4320 min Winter	21.500	0.000	0.0	0.9	0.9	0.0	O K
5760 min Winter	21.500	0.000	0.0	0.7	0.7	0.0	O K
7200 min Winter	21.500	0.000	0.0	0.6	0.6	0.0	O K
8640 min Winter	21.500	0.000	0.0	0.6	0.6	0.0	O K
10080 min Winter	21.500	0.000	0.0	0.5	0.5	0.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
8640 min Summer	1.288	0.0	96.4	0			
10080 min Summer	1.172	0.0	101.9	0			
15 min Winter	143.146	0.0	20.8	18			
30 min Winter	96.228	0.0	28.4	33			
60 min Winter	62.028	0.0	37.1	62			
120 min Winter	36.334	0.0	43.6	120			
180 min Winter	26.639	0.0	48.1	178			
240 min Winter	21.329	0.0	51.4	234			
360 min Winter	15.469	0.0	56.0	344			
480 min Winter	12.249	0.0	59.1	442			
600 min Winter	10.199	0.0	61.6	474			
720 min Winter	8.773	0.0	63.5	550			
960 min Winter	6.908	0.0	66.6	704			
1440 min Winter	4.937	0.0	71.3	1008			
2160 min Winter	3.547	0.0	76.7	1394			
2880 min Winter	2.822	0.0	81.1	1704			
4320 min Winter	2.072	0.0	88.8	0			
5760 min Winter	1.684	0.0	95.7	0			
7200 min Winter	1.448	0.0	102.4	0			
8640 min Winter	1.288	0.0	108.8	0			
10080 min Winter	1.172	0.0	115.1	0			
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GTA Civils Ltd		Page 3																																	
66a Church Walk Burgess Hill West Sussex RH15 9AS	WANDLEYS FARM PLOT 5																																		
Date 24/02/2021 05:38	Designed by CM																																		
File 11117 cascade.CASX	Checked by JP																																		
Micro Drainage		Source Control 2020.1																																	
<u>Cascade Rainfall Details for 11117 PP plot 5.SRCX</u> <table> <tr> <td>Rainfall Model</td> <td>FEN</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>FEN Rainfall Version</td> <td>2013</td> </tr> <tr> <td>Site Location</td> <td>GB 495398 106588 30 95398 06588</td> </tr> <tr> <td>Data Type</td> <td>Point</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> </tr> <tr> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Climate Change %</td> <td>+40</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 0.074 <table> <tr> <th align="left" colspan="3">Time (mins) Area</th> </tr> <tr> <th align="left">From:</th> <th align="left">To:</th> <th align="left">(ha)</th> </tr> <tr> <td>0</td> <td>4</td> <td>0.074</td> </tr> </table>			Rainfall Model	FEN	Return Period (years)	100	FEN Rainfall Version	2013	Site Location	GB 495398 106588 30 95398 06588	Data Type	Point	Summer Storms	Yes	Winter Storms	Yes	Cv (Summer)	0.750	Cv (Winter)	0.840	Shortest Storm (mins)	15	Longest Storm (mins)	10080	Climate Change %	+40	Time (mins) Area			From:	To:	(ha)	0	4	0.074
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GTA Civils Ltd		Page 4
66a Church Walk	WANDLEYS FARM	
Burgess Hill	PLOT 5	
West Sussex RH15 9AS		
Date 24/02/2021 05:38	Designed by CM	
File 11117 cascade.CASX	Checked by JP	
Micro Drainage	Source Control 2020.1	

Cascade Model Details for 11117 PP plot 5.SRCX

Storage is Online Cover Level (m) 22.200

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	28.3
Max Percolation (l/s)	78.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.500	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0049-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flow™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	49
Invert Level (m)	21.300
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0	Kick-Flow	0.437	0.8
Flush-Flow™	0.215	0.9	Mean Flow over Head Range	-	0.9

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	0.8	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.9	1.400	1.3	3.500	1.9	7.500	2.8
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.8	1.800	1.4	4.500	2.2	8.500	2.9
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.0
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

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APPENDIX E – EXCERPT FROM WINTER GROUNDWATER MONITORING EXERCISE

GROUND WATER MONITORING AND SUPPLEMENTARY TESTING

AT

WANDLEYS FARM, WANDLEYS LANE, FONTWELL

FOR

MR & MRS K LILLYWHITE

G6386

30 March 2020



Ground Management Ltd
Civil and Geotechnical Engineering Services

Ground Management Ltd

Civil and Geotechnical Engineering Services

Robin Hill Farm, Clay Lane, Fishbourne
CHICHESTER, West Sussex PO18 8AB
Phone/Fax 01243 575073

PROJECT NO: G6386

FIGURE REF: Figure 4

PROJECT: Wandleys Farm, Wandleys Lane, Fontwell

PREPARED: AJHT

SECTION: Preliminary Ground Investigation

CHECKED: AJHT

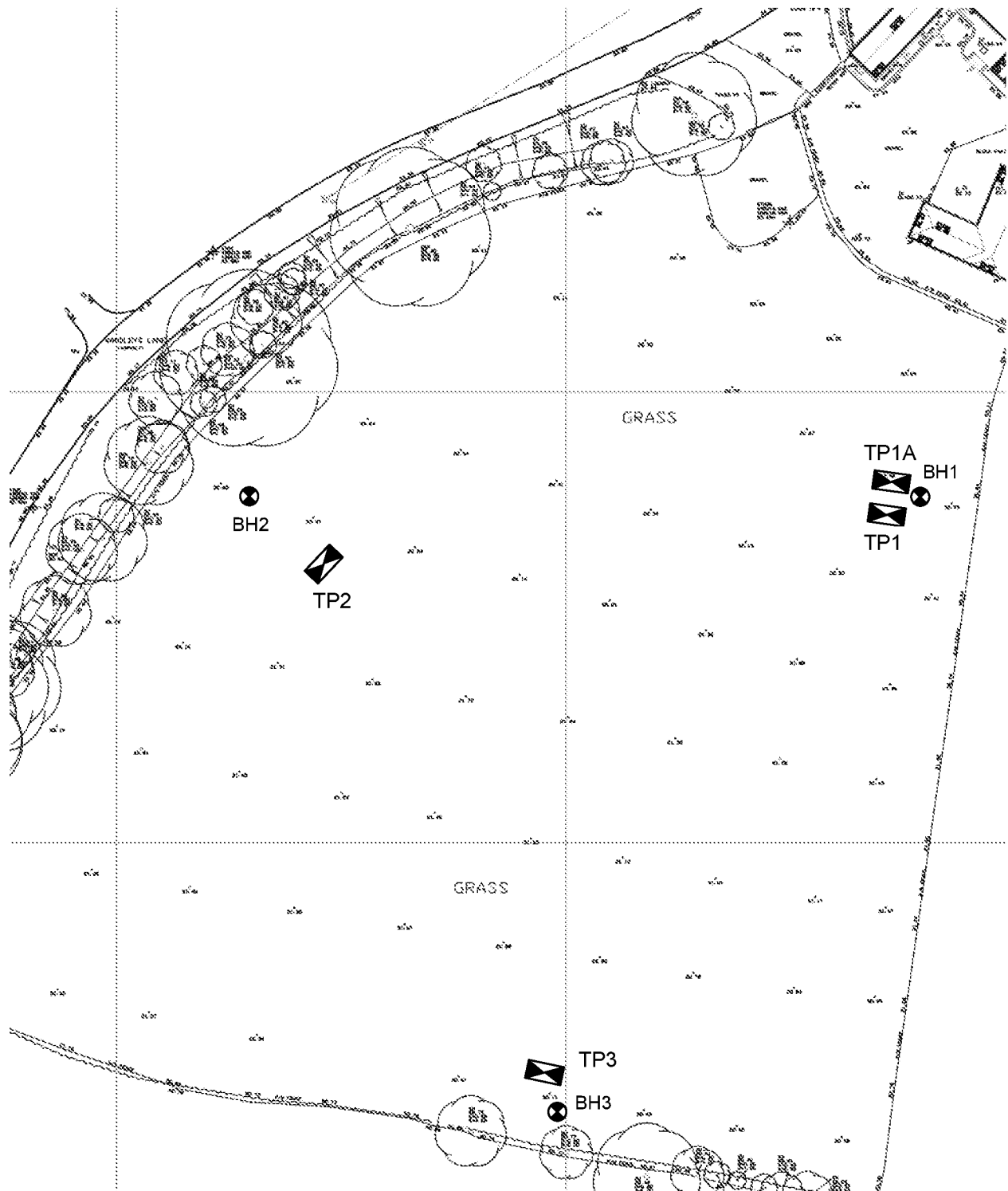
TITLE: Exploratory Hole Location Plan

DATE: Jul 2019

(HOLE LOCATIONS ARE INDICATIVE ONLY UNLESS DIMENSIONED)

North
(Approx)

Not to scale



Ground Management Ltd

Civil and Geotechnical Engineering Services

Robin Hill Farm, Clay Lane, Fishbourne
CHICHESTER West Sussex PO18 8AB
Phone/Fax: 01243 575073

PROJECT NO: G6386

FIGURE REF: Figure 5

PROJECT: Wandleys Farm, Wandleys Lane, Fontwell

PREPARED: AJHT

SECTION: Further Ground Investigation

CHECKED: AJHT

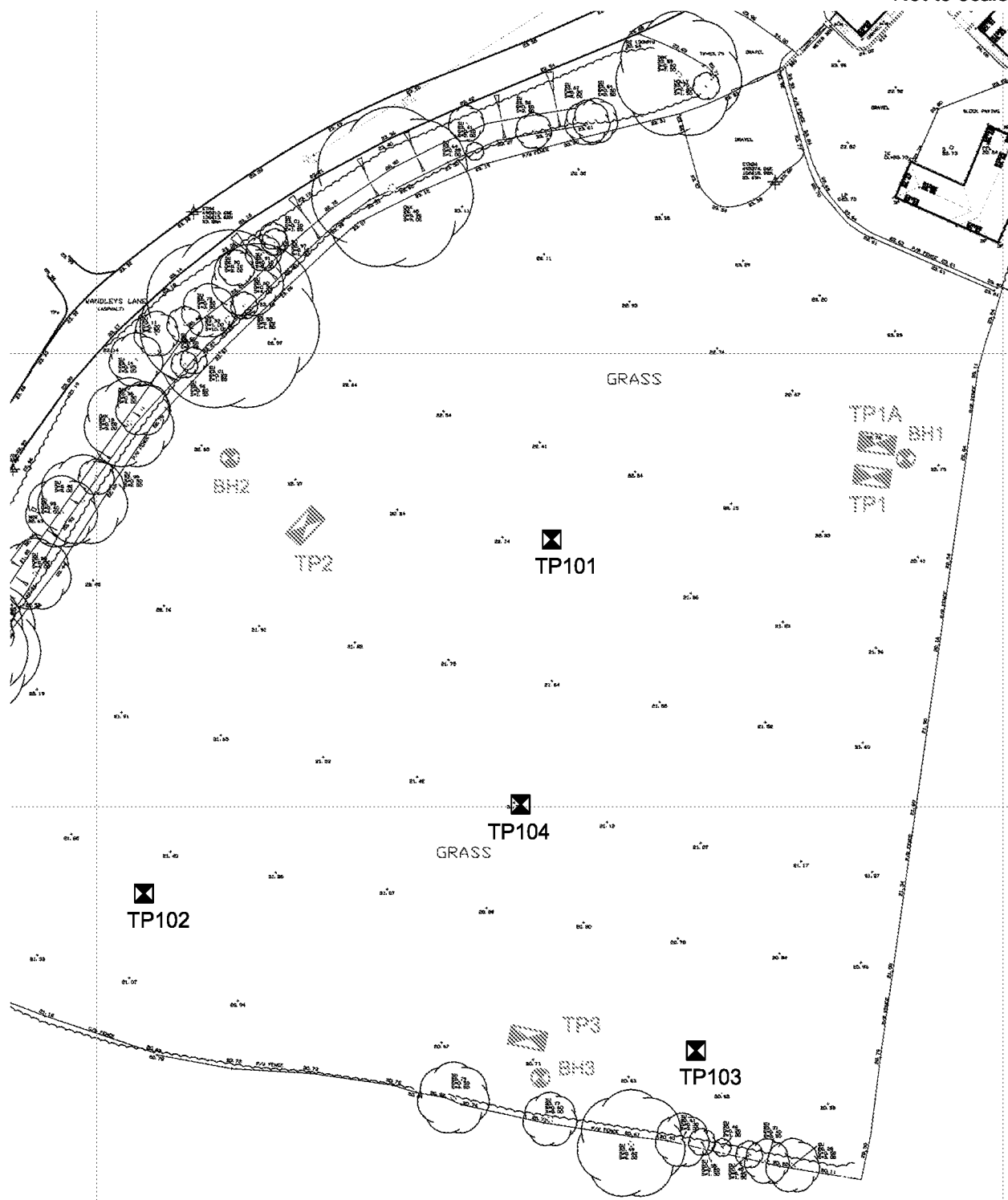
TITLE: Exploratory Hole Location Plan

DATE: March 2020

(HOLE LOCATIONS ARE INDICATIVE ONLY UNLESS DIMENSIONED)

North
(Approx)

Not to scale



Based on topographic survey by Shaw Colegate Oct 2016

G6386 Wandleys Farm, Fontwell
Soakage Testing (Second Round)

TP101 Test 1

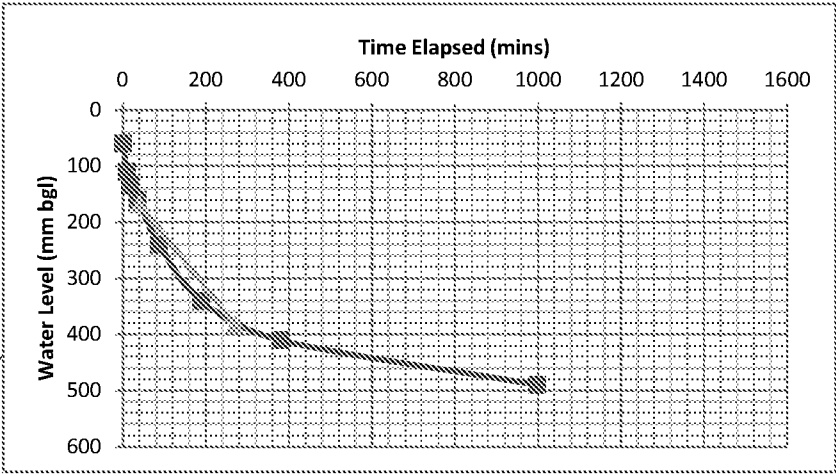
Test Start Date: 03-Mar-20

Dimensions (m): width = 0.30 length = 0.30 depth = 0.50

Date	Time	Date and time	Elapsed	Dip
03/03/2020	14:50	03/03/2020 14:50	start	490
03/03/2020	14:51	03/03/2020 14:51	0	60
03/03/2020	15:01	03/03/2020 15:01	10	110
03/03/2020	15:09	03/03/2020 15:09	18	135
03/03/2020	15:27	03/03/2020 15:27	36	160
03/03/2020	16:18	03/03/2020 16:18	87	240
03/03/2020	18:00	03/03/2020 18:00	189	340
03/03/2020	21:10	03/03/2020 21:10	379	410
04/03/2020	07:30	04/03/2020 07:30	999	490
04/03/2020	15:00	04/03/2020 15:00	1449	490

End Fit

hole dry
rain, hole dr



Time (mins)	
t0	60
t25	167.5 40
t50	275
t75	382.5 270
t100	490
fall	0.43
t25 - t75	0.215
Area t50	0.36

Infiltration Coefficient = 3.89E-06 m/s

G6386 Wandleys Farm, Fontwell
Soakage Testing (Second Round)

TP102 Test 1

Test Start Date: 03-Mar-20

Dimensions (m):

width = 0.30

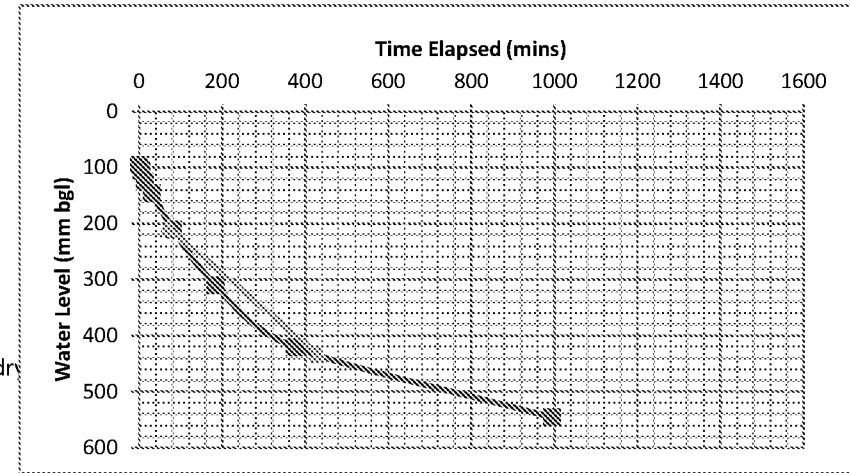
length = 0.30

depth = 0.50

Date	Time	Date and time	Elapsed	Dip
03/03/2020	14:50	03/03/2020 14:50	start	530
03/03/2020	14:56	03/03/2020 14:56	0	95
03/03/2020	15:01	03/03/2020 15:01	5	105
03/03/2020	15:09	03/03/2020 15:09	13	125
03/03/2020	15:27	03/03/2020 15:27	31	145
03/03/2020	16:18	03/03/2020 16:18	82	210
03/03/2020	18:00	03/03/2020 18:00	184	310
03/03/2020	21:10	03/03/2020 21:10	374	420
04/03/2020	07:30	04/03/2020 07:30	994	545
04/03/2020	15:00	04/03/2020 15:00	1444	545

End Fit

hole dry
rain, hole dry



	Time (mins)	
t0	95	
t25	207.5	70
t50	320	
t75	432.5	430
t100	545	
fall		0.45
t25 - t75		0.225
Area t50		0.306

Infiltration Coefficient = 3.06E-06 m/s

G6386 Wandleys Farm, Fontwell
Soakage Testing (Second Round)

TP103 Test 1

Test Start Date: 03-Mar-20

Dimensions (m): width = 0.30 length = 0.30 depth = 0.50

Date	Time	Date and time	Elapsed	Dip
03/03/2020	00:00	06/07/2020 00:00	start	500
03/03/2020	15:01	03/03/2020 15:01	0	115
03/03/2020	15:09	03/03/2020 15:09	8	150
03/03/2020	15:27	03/03/2020 15:27	26	185
03/03/2020	16:18	03/03/2020 16:18	77	245
03/03/2020	18:00	03/03/2020 18:00	179	330
03/03/2020	21:10	03/03/2020 21:10	369	420
04/03/2020	07:30	04/03/2020 07:30	989	510
04/03/2020	15:00	04/03/2020 15:00	1439	510

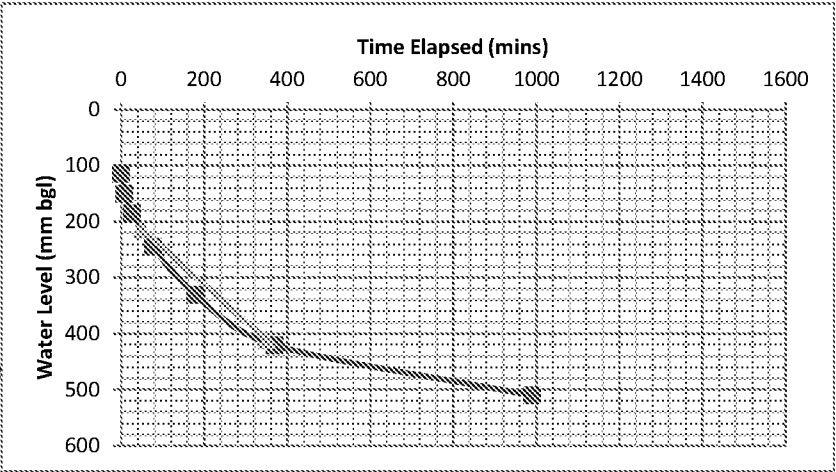
End Fit

pit dry

hole dry

hole dry

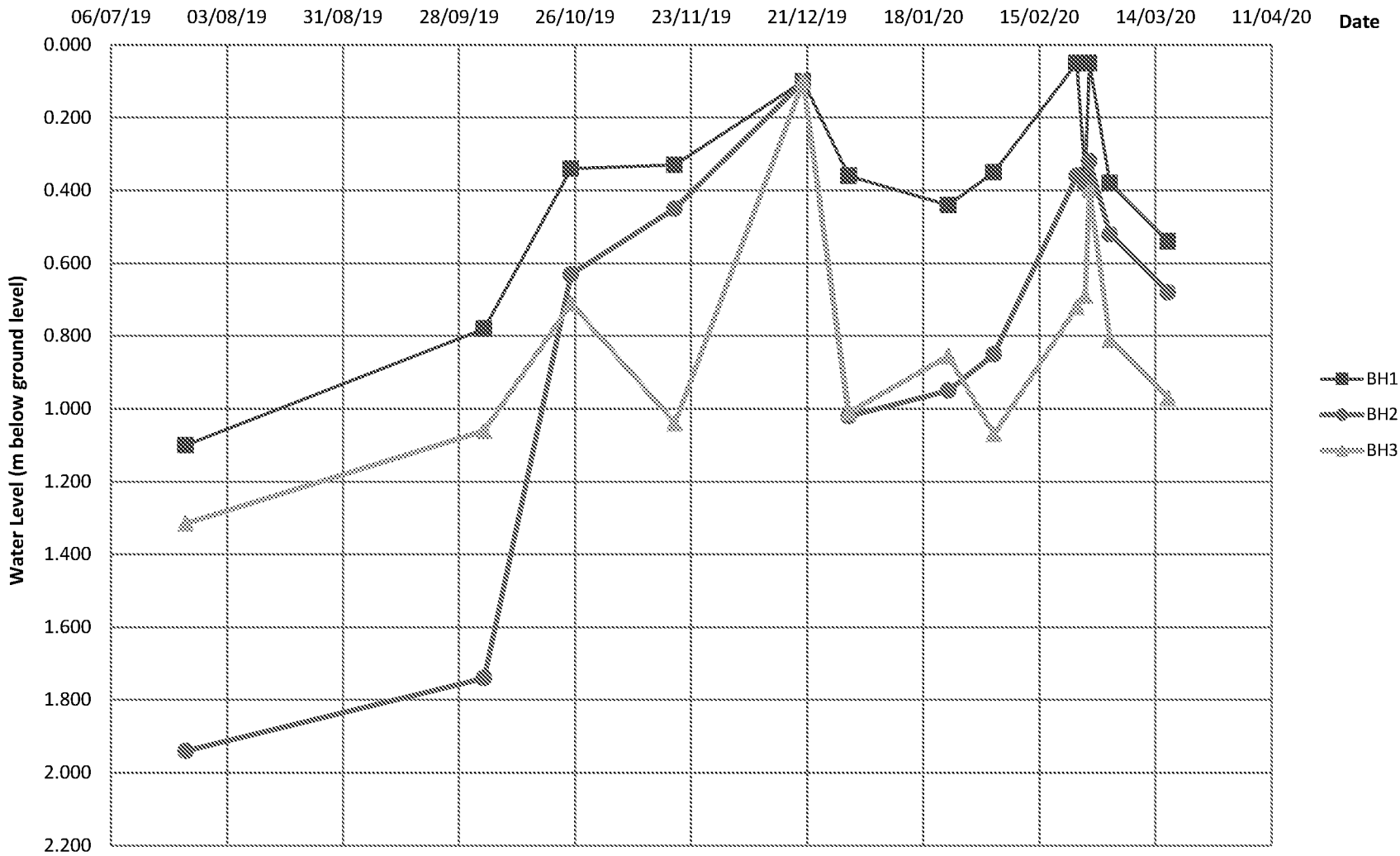
rain,hole dry



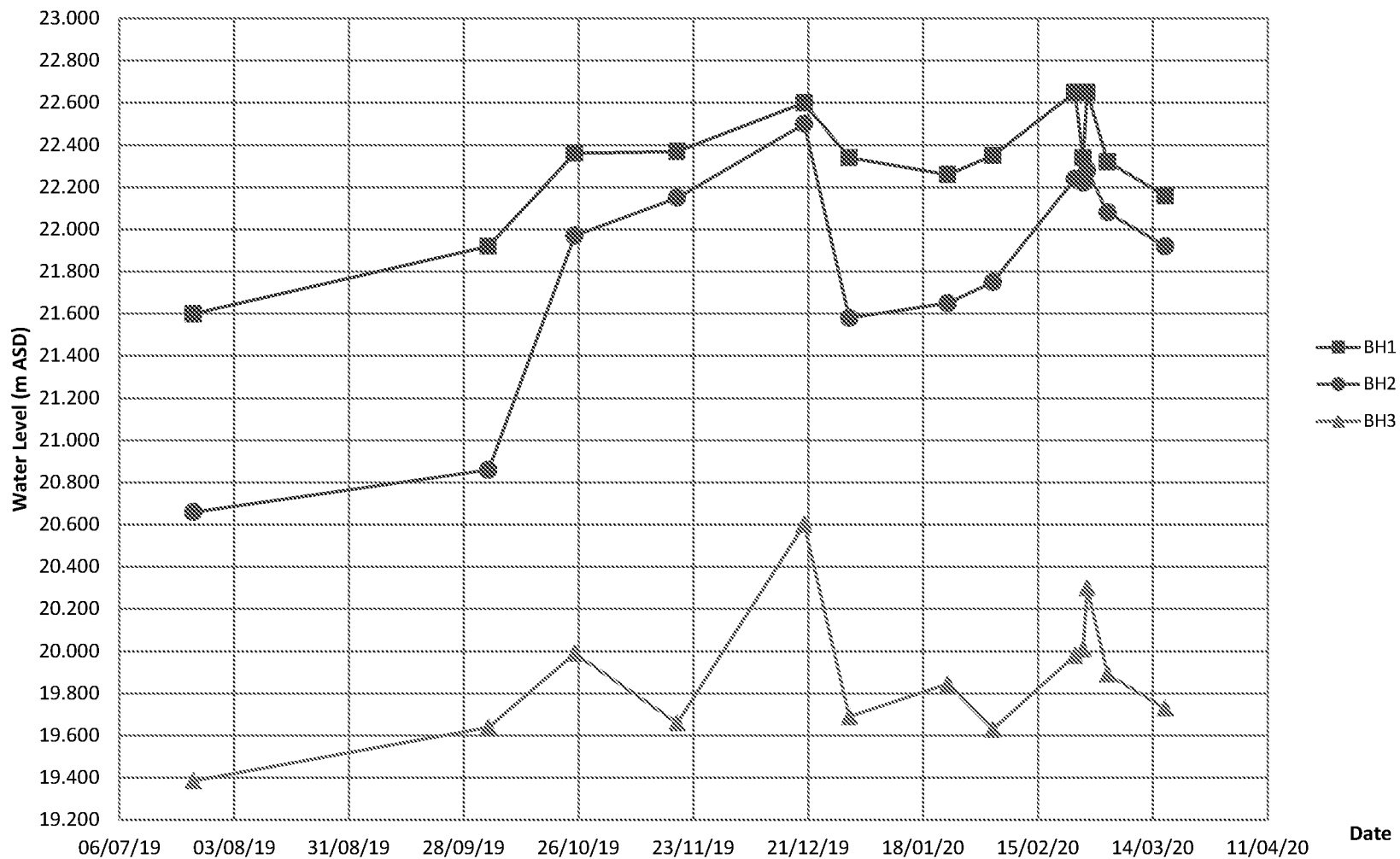
Time (mins)		
t0	115	
t25	213.75	50
t50	312.5	
t75	411.25	350
t100	510	
fall		0.395
t25 - t75		0.1975
Area t50		0.315

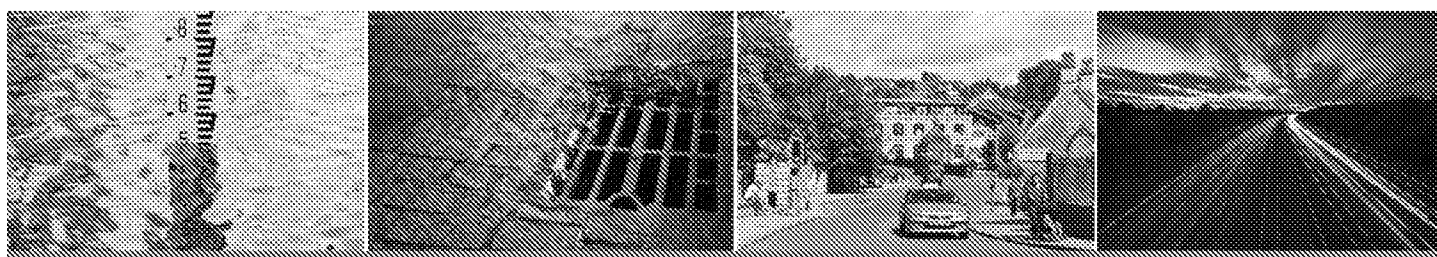
Infiltration Coefficient = 3.13E-06 m/s

G6386 Wandleys Farm Fontwell Water Level Monitoring



G6386 Wandleys Farm Fontwell Water Level Monitoring





Civil Engineering - Transport Planning - Flood Risk

GTA Civils & Transport, Gloucester House, 66a Church Walk, Burgess Hill, West Sussex, RH15 9AS

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