

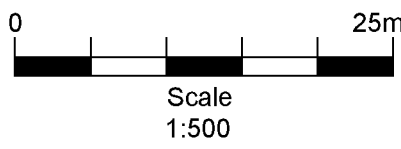
APPENDICIES

Appendix A - Architectural Proposals



- Red Line Boundary
- HA Rental Property
- HA Shared Ownership Property

Dapper's Lane, Angmering									
Market	Compliance	Units sqft	Total units	Total sqft	Beds	Storey	Type	Habitable	Rooms
ALL NEW PRIVATE									
HANBURY+		708	14	10752	2	2	2B3P	5	
DERVENT		909	7	6783	2	2	2B3P	5	
LOOKWOOD		999	11	10809	2	2	2B3P	5	
LONGTHORPE+		1171	4	4654	3	2	3B4P	6	
CONISTON		1222	4	4866	3	2	3B4P	7	
CONISTON+	M4(2)	1234	8	9872	3	2	3B4P	7	
WARWICK		1333	4	5332	4	2	4B5P	7	
HOLYWELL		1414	7	8898	4	2	4B5P	8	
Total:			58	63198					
HA 30% (75%R 25%SO)									
2B3P		803	2	1806	2	2	2B3P	4	
WP3520A+		1001	3	3003	3	2	3B5P	5	
2B3P		803	12	9636	2	2	2B3P	4	
WP3520A+		1001	6	6006	3	2	3B5P	5	
WP2 M4(3)	M4(3)	1120	2	2240	2	2	2B3P	4	
Total:			25	22491					
Overall Site Totals:			84	85689					



PERSIMMON

Together, we make a home

Persimmon Homes Thames Valley

Persimmon House, Knoll Road,

Camberley, Surrey GU15 3TQ

Tel: 01276 808080

Site:

Dapper's Lane

Angmering

Littlehampton

Date:

Nov 2019

Scale:

1:500 @A1

Org No:

A77-PL-01

Drawing Title:

Planning Layout - 84 Units

Drawing Status:

SUBMITTED

Drawing by:

VW

Checked by:

ME

Rev:

-

Appendix B - Southern Water Public Sewer Records

SEWER RECORDS PAGE 1 OF 2

105459



SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
0001X	18.41	16.59	150	VC	CIRC																		
0002X	19.64	17.68	150	VC	CIRC																		
0003X	18.63	16.91	150	VC	CIRC																		
0004X	20.18	18.92	150	VC	CIRC																		
0902X			100	PF	CIRC																		
0904X			100	VC	CIRC																		
0905X			100	VC	CIRC																		
1801X			UNK	UNK	CIRC																		
1802X			UNK	UNK	CIRC																		
1901X			UNK	UNK	CIRC																		
1902X			UNK	UNK	CIRC																		
190DX			UNK	UNK	CIRC																		
194DX			UNK	UNK	CIRC																		
2001X			UNK	UNK	CIRC																		
2002X			UNK	UNK	CIRC																		
200DX			UNK	UNK	CIRC																		
7001X	13.14	11.49	150	VC	CIRC																		
7002X	13.15	11.9	150	VC	CIRC																		
7003X	13.53	12.26	150	VC	CIRC																		
701DX			150	VC	CIRC																		
7101X	14	12.85	150	VC	CIRC																		
7901X	12.71	11.11	150	VC	CIRC																		
7902X	14.23	11.67	150	VC	CIRC																		
7903X	14.22	12.42	150	VC	CIRC																		
7904X	14.35	12.95	150	VC	CIRC																		
8802X	14.1	12	150	VC	CIRC																		
8805X	14.58	12.53	150	VC	CIRC																		
8901X	15.05	13.93	150	VC	CIRC																		
8902X	15.82	14.66	150	VC	CIRC																		
9001X	16.78	15.4	150	VC	CIRC																		
9002X	17.09	15.63	150	VC	CIRC																		
9003X	17.61	16.06	150	VC	CIRC																		
9806X			UNK	UNK	CIRC																		
9807X			UNK	UNK	CIRC																		
981DX			150	VC	CIRC																		
9902X	16.06	14.14	150	VC	CIRC																		

LINE STYLES / COLOURS		MATERIALS		LEGEND - SEWERS	
Brown	----- Foul	AK Alkaline	Manhole (SW)	Washout (SW)	Other (s)
	----- Foul Syphon Sewer	BAC Bonded Asbestos Cement	Manhole (F&C)	Washout (F&C)	Other
	----- Foul Vacuum Main	BRC Brick (Common)	Lamp hole (SW)	Rodding Eye (SW)	Change in sewer (s)
	----- Foul Rising Main	BRE Brick (Engineering)	Lamp hole (F&C)	Rodding Eye (F&C)	Change in sewer
Red	----- Combined	CC Concrete Box Culvert	Pumping Station (SW)	Gauging point (SW)	Reflux valve
	----- Combined Syphon Sewer	CI Cast Iron	Pumping Station (F&C)	Gauging point (F&C)	Flap valve
	----- Combined Rising Main	CO Concrete (In-Situ)	Side entry manhole (SW)	Intercept chamber (SW)	Cascade
	----- Lateral Drain	CP Concrete (Pre-Cast)	Side entry manhole (F&C)	Intercept chamber (F&C)	Anode
Orange	----- Building Over Agreement Area	CSU Concrete Segments (unbolted)	Blind shaft (SW)	Storm Tank (SW)	Valve
Dark Blue	----- Treated Effluent	DI Ductile Iron	Blind shaft (F&C)	Storm Tank (F&C)	Closed Valve
Purple	----- Sludge	GRG Glass Reinforced Concrete	Ejector station (SW)	Vortex chamber (SW)	Air Valve
	----- Sewer Catchment	GRP Glass Reinforced Plastic	Ejector station (F&C)	Vortex chamber (F&C)	Hatch box (SW)
	----- Section 104 Area	MAC Masonry in regular Courses	Watertight door (SW)	Label ellipse	Hatch box (F&C)
	----- Surface Water	MAR Masonry in random Courses	Watertight door (F&C)	Dummy/S24 manhole	Direction arrow
	----- Surface Water Rising Main	PE Polyethylene	Flushing ch. Min-s (SW)	Outfall	Emptying valve
Yellow	----- Private	PP Polypropylene	Flushing ch. Min-s (F&C)	Penstock chamber	Catchpit
	----- Access Shaft	PVC Polyvinyl Chloride	Flushing ch. No-s (SW)	Demboards	Soakaway
	----- Decommissioned	RPM Reinforced Plastic Matrix	Flushing ch. No-s (F&C)	Storm Overflow	Inlet
		SI Spun Iron	Demarcation Chamber	Backdrop manhole	Balancing Pond
		ST Steel			
		VC Vitified Clay			
		XXX Other			
		ZZZ Unknown			

Drawn by: yadavsava

Title: 254524_Dappers Lane, Angmering

Date: 31/07/2017



Appendix C - LEAP Environmental Geotechnical Investigation (Existing)

Phase I Desk Study, Site Reconnaissance & Phase II Site Investigation Report

at Land west of Dapper's
Lane, Angmering, West
Sussex, BN16 4NA. West
Sussex

for Persimmon Homes
Thames Valley

Report Reference: LP1877

Report Date: 14th May 2019

TABLE OF CONTENTS

A	INTRODUCTION.....	I
1	Authority	I
2	Objective	I
3	Scope of Works.....	I
3.1	Phase I Scope.....	2
3.2	Intrusive Investigation Scope	3
4	Limitations.....	4
B	PHASE I – Desk study.....	6
5	Environmental Setting.....	6
5.1	Site Location and Description.....	6
5.2	Geology.....	7
5.3	Hydrogeology.....	8
5.4	Hydrology.....	8
5.5	Flooding	9
5.6	Designated Environmentally Sensitive Sites	9
5.7	Ground Workings.....	9
5.8	Mining, Extraction and Natural Cavities	9
6	Site Usage.....	10
6.1	Current Land Use	10
6.2	Evidence of Onsite Contamination	10
6.3	Site History	10
6.4	Unexploded Ordnance (UXO).....	12
6.5	Waste Planning and Landfill Records.....	12
6.6	Radon	13
6.7	Adjacent Structural Survey	13
C	PRELIMINARY CONCEPTUAL SITE MODEL.....	14
7	Environmental Risk Assessment	14
7.1	Conceptual Site Model (CSM).....	14
7.2	Sources	14
7.3	Receptors.....	15
7.4	Pathways and Potential Contaminant Linkages	16
7.5	Qualitative Risk Assessment of Contaminant Linkages	16
7.6	Conclusions	16
8	Geotechnical Risk Assessment.....	17



8.1	Geotechnical Risk Register	17
8.2	Conclusions	17
D	PHASE II - Intrusive Investigation.....	19
9	Investigation Rationale.....	19
10	Site Work.....	20
10.1	Date and Weather Conditions	20
10.2	Site Work Methods	20
10.3	Field Tests	21
10.4	Groundwater Monitoring.....	22
10.5	Laboratory Analysis	22
11	Ground Conditions.....	23
E	GEOTECHNICAL INFORMATION.....	26
12	Strata Encountered	26
12.1	Topsoil	26
12.2	Clay – Head Deposits	26
12.3	Clay – London Clay	26
12.4	Mudstone – London Clay	27
F	GEOTECHNICAL APPRAISAL	28
13	Swelling and Shrinkage	28
14	Sulphates.....	29
15	Groundwater.....	29
16	Soakage Potential.....	30
16.1	Test Results	30
16.2	Recommendations.....	30
17	Bearing Capacity and Foundations	30
17.1	Shallow Foundations.....	30
18	Floor Slabs.....	31
19	Roads.....	31
20	Excavations.....	31
21	Slope Stability	32
22	Retaining Walls	33
23	Settlement.....	33
24	Heave and Uplift	34

G	GEO-ENVIRONMENTAL APPRAISAL	35
25	Conceptual Site Model	35
26	Testing Strategy	35
26.1	Soil Sampling	35
27	Assessment Criteria	35
27.1	Human Health Assessment Criteria	35
28	Analytical Test Results – Soils	37
28.1	Metals and Non Metals	37
28.2	Polyaromatic Hydrocarbons (PAH)	38
28.3	Asbestos	39
28.4	Pesticides and Herbicides	39
29	Risk Assessment	39
29.1	Human Health	39
29.2	Controlled Waters	39
30	Waste Disposal	40
31	Conclusions	40

APPENDIX A – Limitations

APPENDIX B – Figures

APPENDIX C – Historic Maps and Environmental Database Searches

APPENDIX D – Qualitative Risk Assessment Model

APPENDIX E – Site Photographs

APPENDIX F – Trial Hole and Borehole Logs

APPENDIX G – Geotechnical Laboratory Test Results

APPENDIX H – Chemical Laboratory Test Results

APPENDIX I – Water Monitoring Results

APPENDIX J - Soil Screening Table



EXECUTIVE SUMMARY

The site comprises an area of south westward sloping open grass land which is currently divided into seven fields used for grazing horses. The site covers an area of approximately 3.70Ha, situated on the to the west of Dapper's Lane, Angmering, West Sussex. It is proposed to redevelop the site with 88 No. 2 storey residential properties with private gardens and areas of publicly accessible open space.

The site has been mapped as open fields since the earliest available historical maps (1870s). The only on-site development since this period has been the installation of a well on the west of the site and a substation on the southern site boundary. The desk study has identified minor potential sources of contamination associated with the site's use. These include petroleum hydrocarbons from agricultural vehicle fuel spillages, PCBs from a nearby electrical substation and pesticides and heavy metals from potential arable farming activities on the site. The site is not affected by radon gas.

The site is mapped as being underlain by Head deposits (except for the north and north east of the site) over the London Clay Formation. Ground conditions comprise topsoil and subsoil to around 0.40m over firm to stiff slightly silty slightly sandy clay to between 3.35 and 5.00m over stiff slightly silty gravelly clay. Extremely weak mudstone was encountered below 3.35m in one trial hole. Relic shear surfaces were noted within several excavations at depths between 1.20m and 2.60mbgl. A groundwater seepage was encountered within TPI0 at 2.20mbgl.

Five of the six scheduled groundwater monitoring visits have been undertaken between the 1st of March and the 29th of April 2019. Monitoring identified water levels within 1.00m of the ground surface. It was however noted that the water levels were recorded after a period of prolonged heavy rainfall. Based on this observation it is considered possible that surface water seepage into the wells has occurred. Therefore, further monitoring is recommended to full assess the groundwater regime.

The site is not mapped within a river water flood risk zone by the Environment Agency, its western margin is however classified as being at low risk from surface water flooding.

An allowable bearing capacity of 100kPa is recommended for the stiff clays below about 1.00m. The London Clay and head deposits are both are classified as high VCP, and deepening will be required in proximity to trees. In such cases, piled foundations may be the preferred option. Suspended floor slabs are recommended due to the high VCP of the clays. Suspended floor slabs are also recommended with piled foundations.

The site is sloping at 2-3 degrees, and shear surfaces, possibly indicative of historical ground movements, have been encountered in some of the trial pits. Whilst global stability issues are considered unlikely on site in its current condition, there is the potential to destabilise the slope, particularly if significant cut and fill operations and/or retaining structures are proposed. Further assessment of global stability is recommended once the detailed design is available.

Soil sulphates in the clays fall within BRE design class DS-1 and the site conditions fall within the ACEC class AC-1s. However, due to the selenite crystals noted within several of the excavations further testing is recommended to ensure high sulphate concentrations do not occur on site, and a conservative classification of DS-2 may be more appropriate at this stage. A preliminary design CBR value of 2.0% is recommended for the clay soils. The soils are not considered frost susceptible based on the results of plasticity testing.

The soils on site are not suitable for soakaway drainage and provision should be in place to pipe surface water off site.

A geo-environmental risk assessment has been carried out. Contamination testing of the soils indicated none of the contaminants tested were above the generic assessment criteria for a residential development with private gardens. In addition, testing for the presence of organochlorine and organophosphorus pesticides and triazine herbicides recorded no pesticides or herbicides above the limit of detections. On that basis no remedial measures with respect to contaminated land are indicated at this stage.

As with any redevelopment site, there is always the risk of hitherto undetected contamination, and further investigations should be carried out prior to redevelopment.

Much of the soils on site will be expected to be classified as non-hazardous waste although additional WAC tasting may allow the classification of the soil as inert for landfill waste acceptance purposes.

D PHASE II - INTRUSIVE INVESTIGATION

9 Investigation Rationale

A total of 13 trial holes were excavated across the site. These included 9 No. machine excavated trial pits to a depth of 3.00m and 4 No. windowless sampler boreholes to a depth of 5.00m.

The trial holes were located to give general coverage, taking into consideration the proposed development and the potential geoenvironmental and geotechnical risks/hazards highlighted by the CSM in accordance with BS10175.

The trial hole spacing was consistent with the recommended density of 25 to 50m for an exploratory investigation after BS10175 Section 7.7.

The investigation rationale for the trial holes / test locations is summarised below:

Table 5 Rationale for Investigation Locations

Trial Hole/Test Location	Rationale	Proposed Depth (mbGL)	Notes
TP2-TP9	To give a general coverage of the site and assess the ground conditions as well as allow for both geotechnical and geoenvironmental sampling.	3.00	Perth Penetrometer tests undertaken in each trial pit at 1.00mbgl.
WS1, WS2, WS3 and WS5	To give a general coverage of the site and assess the ground conditions and allow the installation of groundwater monitoring wells.	5.00	Water monitoring wells installed in all WS boreholes.
HA1 -- HA2	To allow an assessment of the soakage potential of the soils on site.	1.00	Soakage tests undertaken in both excavations.

DCP1-DCP7	To assess the subgrade quality along the alignment of the proposed roads.	0.90	
-----------	---	------	--

The site investigation locations are shown on Figure 3, Appendix B.

10 Site Work

10.1 Date and Weather Conditions

The intrusive investigations were undertaken in two phases, the first on the 26th of February and the second on the 27th of March 2019. At the time of both the investigations, the weather was clear and bright.

Both December and February received broadly average rainfall for the time of year, however, January was a much drier month with 52% of the average rainfall recorded across the UK.

10.2 Site Work Methods

10.2.1 Borehole Drilling

Boreholes were drilled using a windowless sampler rig. Borehole logs are available in Appendix F.

10.2.2 Trial Pitting

Trial pits were dug by a backhoe excavator. The trial pits had a target depth of 3.00mbgl and were typically 0.60m wide by 2.00m long. Spoil was replaced in reverse order. Trial pits were left mounded to allow for future settlement. Trial pit are logs are available in Appendix F.

10.2.3 Soil Logging and Sampling

Soil samples were recovered from the boreholes and trial pits for field screening, logging and sampling.

Boreholes were logged in general accordance with the requirements of BS 5930:2015⁷ and BS EN ISO 14688⁸. Borehole logs are presented in Appendix F.

⁷ BS5930:2015 Code of Practice for Ground Investigation

⁸ BS EN ISO 14688 Parts 1-2 Geotechnical Investigation and Testing. Identification and classification of soil

Visual and olfactory evidence of contamination was noted if encountered. These observations were used to aid scheduling of samples for chemical laboratory analyses, and are included on the borehole logs in Appendix F.

Samples were collected by hand (using dedicated nitrile gloves for each sampling location). Samples were placed into laboratory supplied sampling containers, specific to the type of analyses required.

All sample containers were sealed and labelled with a unique location identity, depth and date of sampling.

10.2.4 Monitoring Well Installation

4 No. monitoring wells were installed during this investigation within the windowless sample boreholes. The monitoring wells were constructed of 63mm diameter HDPE pipe. The response zone was typically targeted to intercept the groundwater surface and was surrounded by washed filter gravel. The plain zone was surrounded with bentonite to provide a seal. The monitoring wells were finished with bungs with gas taps and flush mounted steel covers. Monitoring well installations are shown on the borehole logs and summarised in the following table.

Table 6: Borehole installation details

Borehole	Type G-gas W-water V-vapour	Plain Well Screen (mbgl) and ID (mm)	Slotted Well Screen (mbgl)	Bentonite Seal (mbgl)
WS1	W	0.00-1.00	1.00-5.00	0.20-1.00
WS2	W	0.00-1.00	1.00-5.00	0.20-1.00
WS3	W	0.00-1.00	1.00-5.00	0.20-1.00
WS5	W	0.00-1.00	1.00-5.00	0.20-1.00

10.3 Field Tests

10.3.1 Standard Penetration Tests

Standard penetration tests were undertaken in the boreholes at 1.00m centres in accordance with BS EN ISO 22476-3;2005. Uncorrected blow counts, 'N values', are recorded on the borehole logs in Appendix F.

10.3.2 Perth Penetrometer Tests

Perth penetration tests were undertaken in the trial pits at 1.00m depth. Uncorrected blow counts, 'N values', are recorded on the trial pit logs in Appendix F.

10.3.3 Hand Penetrometer Test

Hand Penetrometer tests were undertaken on cohesive soil arisings from both trial pits and windowless sampler boreholes. The results are recorded on the trial pits logs in Appendix F.

10.3.4 In-situ California Bearing Ratio Test – Dynamic Cone Penetrometer

7 No. in-situ CBR tests have been undertaken across the site using the Dynamic Cone Penetrometer (DCP), recording blow counts over 900mm of penetration from test level. The test method and interpretation of the results have been undertaken in accordance with DMRB HD 29/08⁹ using a modified DCP. The results are attached in Appendix F.

10.3.5 BRE365 Soakage Tests

2 No. modified soakage tests have been carried out in Hand auger excavations in accordance with BRE Digest 365¹⁰.

10.4 Groundwater Monitoring

Groundwater level monitoring was undertaken and comprised six fortnightly monitoring visits from the 4th of March with the intended completion date of the 13th of May 2019.

10.5 Laboratory Analysis

10.5.1 Chemical Soil Analysis

Selected samples of soil have been subjected to laboratory testing. Sampling techniques and storage have been undertaken as per BS 10175:2011+A1:2013 Code of Practice for Investigation of Potentially Contaminated Sites. The laboratory testing has been carried out by The Environmental Laboratory Ltd at its laboratories in East Sussex. Where available, the tests procedures are UKAS and MCERTS accredited.

The following analyses were completed on selected samples:-

- LEAP standard Soil suite (metals, speciated PAHs, asbestos)
- Pesticide Screens

The full laboratory test results are presented in Appendix H.

10.5.2 Geotechnical Laboratory Testing

Selected samples of the soils have been classified by laboratory analysis for geotechnical design purposes. The laboratory testing has been carried out by Geolabs Ltd at its laboratories in Watford, in accordance with BS1377¹¹ and BS EN ISO17892¹². The sampling technique, type,

⁹ HD22/08 Data for Pavement Assessment. Design Manual for Roads and Bridges; Volume 7 Pavement Design and Maintenance; Section 3 Pavement Maintenance Assessment Part 2

¹⁰ Building Research Establishment DG365 Digest Soakaway Design (2016)

¹¹ BS1377 Parts 1-9:1990 Methods of test for Soils for Civil Engineering Purposes

¹² BS EN ISO 17892 Parts 1-12 Geotechnical Investigation and Testing. Laboratory testing of soil

storage and transport and the number of laboratory tests have been undertaken where possible in accordance with BS EN 1997-2:2007 and BS EN ISO 22475¹³.

The following laboratory tests have been undertaken:-

Table 7 Geotechnical Laboratory Testing

Test	Number of tests	
	London Clay	Head
Moisture Content	9	2
Atterberg Limit Test	9	2
BRE SD1 Suite B	2	2

11 Ground Conditions

The ground conditions are described in detail in the logs attached in Appendix F. In summary the soil conditions were as follows:

Table 8: Summary of soils encountered

Depth From (m)	Depth To (m)	Soil Type	Description
Ground Level	0.10 / 0.50	TOPSOIL	Dark brown slightly gravelly silty clayey TOPSOIL with frequent rootlets. Gravel is fine to coarse, sub angular to angular flint. Gravel of fine to coarse, sub rounded chalk was also observed in TPs 3, 4, 5 and 6.
0.10 / 0.15	0.23 / 0.45	SUBSOIL	Dark brown slightly gravelly silty clayey SUBSOIL. Gravel is fine to coarse sub angular to sub rounded flint.
0.23 – 0.50	1.00 – 1.40	CLAY	Firm to stiff orangish brown slightly silty slightly gravelly occasional slightly sandy CLAY Gravel is fine to coarse, sub-rounded to angular flint. (HEAD)
1.00 – 1.40	3.35 – 5.00*	CLAY	Stiff grey mottled orange slightly silty occasionally slightly sandy and slightly

¹³ BS EN ISO 22475 Parts 1-3 Geotechnical Investigation and Testing. Sampling methods and groundwater measurements

			gravelly CLAY. Gravel is fine to coarse sub angular to angular extremely weak mudstone. Sub horizontal slip surfaces were noted. (LONDON CLAY)
3.35	5.00*	MUDSTONE**	Extremely weak relic laminated dark brown mottled grey MUDSTONE with occasional partings of stiff clay. (LONDON CLAY)

*full depth of excavation

**Only encountered in WSI

The ground conditions were found to be relatively consistent across the site. Comprising topsoil and subsoil underlain by clays which become progressively stiffer with depth and contained gravel of weathered mudstone below ~2.5m. Extremely weak laminated mudstone was encountered within WSI only.

Relic sub-horizontal shear surfaces which may be indicative of historical slope movement were noted within the London Clay in six of the trial pits excavated. The surfaces were noted at depths between 1.20m and 2.60mbgl.

11.1.1 Groundwater

Groundwater was encountered as a slight seepage in TP 10 only, however evidence for groundwater was also encountered as recorded below:-

Table 9: Groundwater Strikes

Trial Hole	Date of water strike	Depth to Groundwater strike (mbGL)	Comments
WS1	-	-	Sampler was recovered wet from below 4.00mbgl
WS2	-	-	Sampler was recovered wet from below 4.00mbgl
WS3	-	-	Sampler was recovered wet from below 4.00mbgl
WS5	-	-	Sampler was recovered wet from below 4.00mbgl
TPI0	-	-	Slight groundwater seepage observed at 2.20mbgl

Groundwater monitoring results are summarised as follows:-

Table 10: Groundwater Monitoring Results

Monitoring well	Depth to groundwater (mbgl)					
	01/03/19	18/03/19	01/04/19	15/04/19	29/04/19	13/05/19
WS1	5.33	0.39	0.65	0.79	1.02	1.73
WS2	5.02	0.35	0.73	0.78	0.9	1.77
WS3	4.98	0.56	0.82	0.92	1.04	1.61
WS5	Dry	0.14	0.60	0.90	1.02	2.14

Groundwater monitoring recorded water levels between 0.14 and 1.04mbgl over the majority of the monitoring period. Water levels during the first monitoring visit however were significantly lower. The implication of this are discussed further in section 15 of the geotechnical appraisal.

16 Soakage Potential

16.1 Test Results

2 No. small scale soakage tests were undertaken on site in general accordance with BRE365¹⁵. The tests were undertaken in 1.00m deep hand auger boreholes one on the north and the second on the south of the site. The pits were filled to 0.10mbgl. Given the time restrictions, it was only possible to fill and test each pit once. The results are attached in Appendix F and are summarised below:

Table 13: Summary of soakage tests

Test Location	Soakage Rate (ml/s)	Comments
HA1	6.94E-08	Results are not compliant with BRE365 as level did not fall by the required 75%.
HA2	1.12E-07	Results are not compliant with BRE365 as level did not fall by the required 75%.

16.2 Recommendations

Based on the above results, the site is not suitable for conventional soakaways, and allowance should be made for surface water to be piped off site at this stage.

17 Bearing Capacity and Foundations

17.1 Shallow Foundations

All loads should be transferred beneath any topsoil, made ground, loose, soft, low strength, desiccated or disturbed soils and transferred onto the stiff clays at depth. For low rise housing, based on local experience and BS8103¹⁶ Table 8, an allowable bearing capacity of 100kPa is recommended for shallow foundations, on the stiff clays below about 1m. However, foundations will require deepening in the clay soils near trees to NHBC HIGH VCP precautions.

¹⁵ Building Research Establishment DG365: 2016. Digest Soakaway Design



-  Window sampler
-  DCP
-  Trial Pits
-  HA soakage tests
-  site boundary



Client: Persimmon Homes
Thames Valley

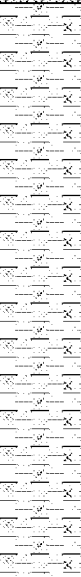
Project: Land west of Dappers
Lane, Angmering

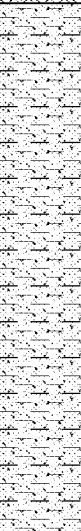
Title: Site Layout and
Exploratory Hole
Plan

Date: 26/04/19

Project ID: LP01877

Figure No. 03

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA					Borehole Log			Borehole No. HA1 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,					Project No. LP1877		Co-ords: -		Hole Type HA
Location: Dapper's Lane Angmering, West Sussex					Level:		Scale 1:10		
Client: Persimmon Homes Thames Valley					Dates: 27/03/2019 - 27/03/2019		Logged By MN		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			Grass over dark brown clayey TOPSOIL with frequent rootlets.	
					0.23			Dark brown sandy clayey SUBSOIL. Very rare fine flint gravel	
					1.00			Stiff to firm orangish red brown slightly silty CLAY. Occasional grey streaking with very rare fine angular flint gravel	
							End of borehole at 1.00 m		1
Remarks Dry and Stable. 22cm diameter									
									

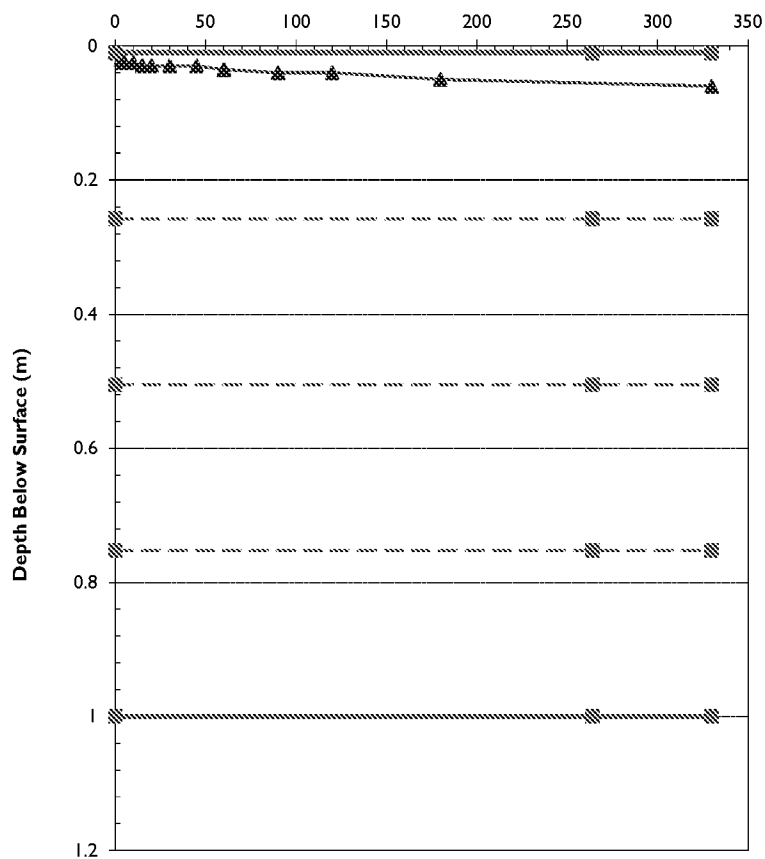
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA 		Borehole Log		Borehole No. HA2 Sheet 1 of 1					
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -					
Location: Dapper's Lane Angmering, West Sussex		Level:		Hole Type HA					
Client: Persimmon Homes Thames Valley		Dates: 27/03/2019 - 27/03/2019		Scale 1:10					
Client: Persimmon Homes Thames Valley		Dates: 27/03/2019 - 27/03/2019		Logged By MN					
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			Grass over dark brown clayey TOPSOIL with frequent rootlets.	
					0.30			Brown sandy slightly clayey gravelly SUBSOIL. Gravel is fine to coarse, rounded to sub rounded flint.	
					1.00			Orange red brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub angular flint.	
							End of borehole at 1.00 m		1
									2

Remarks
 Dry and Stable. 30cm diameter



BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: HA1
Test No: Test No 1



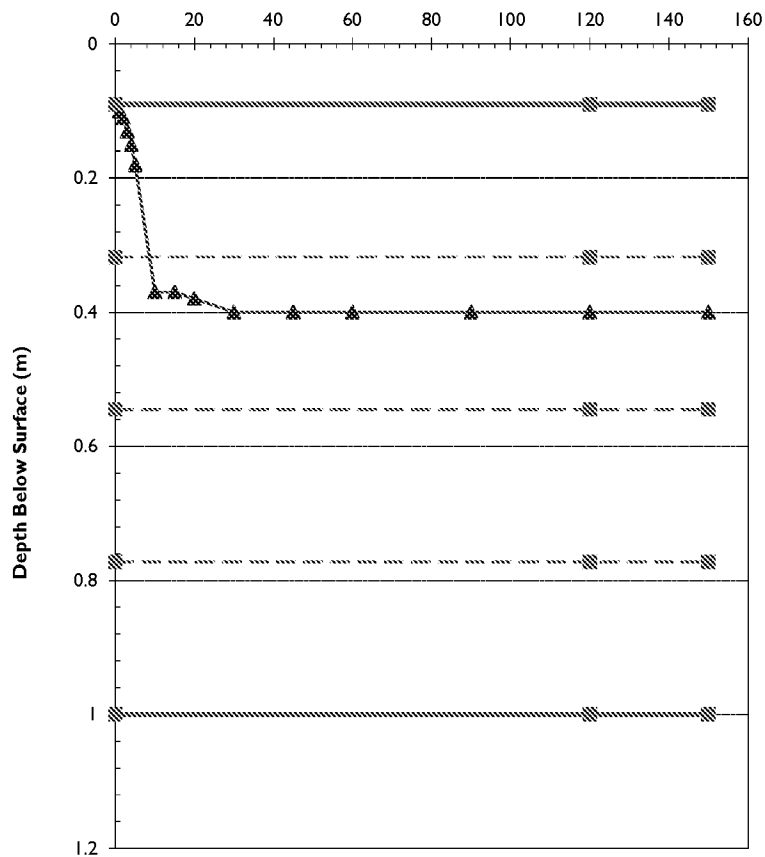
Diameter of Borehole (m)	0.22
Depth to End of Borehole Casing (m)	
Depth to Borehole Base (m)	1
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	
Voids Assumed within Borehole (%)	
Depth of Water at Start of Test (m)	0.01
Max Water Dropdown during Test (m)	0.05
Total Soakage Test Time (min)	330
Mean Internal Discharge Area (m ²)	0.692014
Discharge Rate (litre/min)	0.00288
Soakage Rate (litre/m ² /min)	0.004161
BRE Soil Infiltration Rate (m/sec)	6.94E-08

Comments: Water level did not fall to 75% max water depth, calculations were based on actual fall of water level
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client:
Site:
Tested By:
Test Date: 01/04/19

BRE Digest 365 - Soakage Test

Filling to Max Water Depth (min)



Test Hole No: HA2
Test No: Test No 1



Diameter of Borehole (m)	0.03
Depth to End of Borehole Casing (m)	
Depth to Borehole Base (m)	1
Depth to Top of Permeable Soils (m)	
Depth to Groundwater Surface (m)	
Depth to Top of Granular Fill (m)	
Voids Assumed within Borehole (%)	
Depth of Water at Start of Test (m)	0.09
Max Water Dropdown during Test (m)	0.31
Total Soakage Test Time (min)	150
Mean Internal Discharge Area (m2)	0.061143
Discharge Rate (litre/min)	0.000412
Soakage Rate (litre/m2/min)	0.006746
BRE Soil Infiltration Rate (m/sec)	1.12E-07

Comments: Water level fell to 75% -- 50% max water depth, calculations were based on actual fall of water level
Result not compliant with BRE365 requirement since water did not fall to 25% max water depth.

Client:
Site:
Tested By:
Test Date: 01/04/19

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA Trial Pit Log Trialpit No TP2 Sheet 1 of 1							
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex				Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley				Depth 3.00		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.05	ES	N=6	0.35			Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is medium to coarse, sub angular flint	
	0.20	ES					Firm to stiff light yellowish brown silty CLAY with occasional pockets of sandy clay.	
	0.70	D					Hand Pen at 0.7m = 135kPa	
							Evidence of sub horizontal slip surfaces at 1.2m	
							Hand Pen at 1.3m = 130kPa	
							Pockets of orange sandy clay at 1.6m	
	2.00	D					2.20	Stiff finely laminated grey mottled orangish brown slightly silty gravelly CLAY. Gravel is extremely weak fine to medium mudstone.
								Hand Pen at 2.2m = 210kPa
								pockets of slightly sandy clay at 2.5m
								Hand Pen at 2.6m = 260kPa
	3.00	D	3.00	End of pit at 3.00 m				

Remarks: Trial pit remained dry and stable	
Stability: Stable	

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA				Trial Pit Log				Trialpit No TP3 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley						Depth 3.00		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES	N=8	0.20			Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is medium to coarse, angular to sub angular flint and fine to coarse sub rounded chalk.	1
	0.30	ES					Firm light brown mottled grey silty CLAY.	
							Hand Pen at 0.6m = 150kPa	
							pockets of slightly sandy clay below 1.1m	
	1.00	D		1.30			Firm to stiff grey mottled orange slightly sandy CLAY.	2
							Hand Pen at 1.9m = 150kPa	
							fine selenite crystals noted at 2.2m	
							clay shows relic laminations below 2.6m	
	2.10	D		2.70			Stiff grey mottled orange slightly sandy CLAY.	3
							slip surfaces noted at 2.7m	
							Hand Pen at 2.8m = 165kPa	
							End of pit at 3.00 m	
	3.00	D		3.00				4
								5

Remarks: Trial pit remained dry and stable		
Stability: Stable		

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA				Trial Pit Log				Trialpit No TP4 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley						Depth 2.90		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.13			Grass over slightly gravelly clayey TOPSOIL. Gravel is medium to coarse, angular to sub angular flint and fine to coarse sub angular to sub rounded chalk. Brown slightly gravelly silty clayey SUBSOIL. Gravel is medium to coarse, angular to sub angular flint and fine to coarse sub angular to sub rounded chalk. <u>Hand Pen at 0.13m = 130kPa</u> Firm light brown silty CLAY with rare medium flint gravel.	
	0.20	ES		0.30				
	1.10	D	N=8	1.30			Stiff grey mottled orange silty CLAY. <u>Sub horizontal slip surfaces noted between 1.3-1.6m.</u> <u>Hand Pen at 1.5m = 160kPa</u>	1
	2.30	D					occasional pockets of sandy clay from 2.2m clay shows relict laminations below 2.5m	2
	2.90	D		2.90			End of pit at 2.90 m	3
								4
								5

Remarks: Trial pit remained dry and stable

Stability: Stable

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1YA				Trial Pit Log				Trialpit No TP5 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley						Depth 3.00		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Scale	
	Depth	Type	Results						
	0.10	ES	N=5	0.15		 Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is fine to medium, sub angular chalk and sub rounded flint.	1		
	0.25	ES		0.30				 Brown mottled light orange slightly gravelly silty clayey SUBSOIL. Gravel is fine to medium flint.	
									 Firm light brown silty CLAY with rare fine to medium, sub angular flint.
				1.00		 Firm to stiff bluish grey silty CLAY.	2		
	1.40	D			 Sub horizontal slip surfaces noted at 1.3m Pockets of orange sandy clay at 1.4m Hand Pen at 1.5m = 165kPa				
					 Below 2.0m clay is stiff grey mottled orange with abundant fine-medium extremely weak mudstone gravel.				
				2.60		 Stiff grey mottled orange slightly sandy gravelly CLAY. Sand is fine. Gravel is extremely weak finely laminated fine to coarse, sub angular mudstone.	3		
	3.00	D		3.00		 Hand Pen at 2.9m = 340kPa End of pit at 3.00 m			
									4
									5

Remarks: Trial pit remained dry and stable		
Stability: Stable		

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA				Trial Pit Log				Trialpit No TP6 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley						Depth 2.90		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES		0.10			Grass over brown slightly gravelly clayey TOPSOIL. Gravel is medium to coarse sub angular flint and fine to medium sub rounded chalk.	
	0.20	ES		0.30			Brown mottled orange slightly gravelly silty clayey SUBSOIL. Gravel is medium to coarse, sub angular flint and fine to medium sub rounded chalk Firm to stiff light brownish orange silty CLAY.	
							Hand Pen at 0.7m = 200kPa	
	1.10	D	N=5	1.00			Firm to stiff grey mottled orange slightly silty CLAY with pockets of orange sandy clay. clay is laminated below 1.2m	1
							Hand Pen at 1.7m = 170kPa	
							occasional selenite crystals below 1.8m	
	2.10	D					Hand Pen at 2.2m = 250kPa	2
				2.70				
	3.00	D		2.90			Stiff grey mottled orange slightly silty slightly gravelly CLAY. Gravel is extremely weak fine to medium extremely weak mudstone. End of pit at 2.90 m	3
								4
								5

Remarks: Trial pit remained dry and stable

Stability: Stable

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA				Trial Pit Log				Trialpit No TP9 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): 0.5 2		Scale 1:25	
Client: Persimmon Homes Thames Valley						Depth 3.00		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES	N=12	0.15			Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is medium to coarse, sub angular flint.	
	0.30	ES		0.30			Orangish brown slightly gravelly silty clayey SUBSOIL.	
							Firm light brown slightly gravelly slightly silty CLAY.	
							Land drain at the south end of the pit between 0.4 and 0.55m comprising clayey gravel. Gravel is coarse angular flint brick. 0.4-0.55m	
							Hand Pen at 0.7m = 150kPa	
							mottled grey below 1.2m	
	1.50	D					Sub horizontal slip surface at 1.5m	
							Sub horizontal slip planes noted at 1.6m	
							Hand Pen at 1.7m = 260kPa	
							Hand Pen at 2.4m = 245kPa	
	2.50	D					relict laminations below 2.8m	
	3.00	D		3.00		End of pit at 3.00 m		

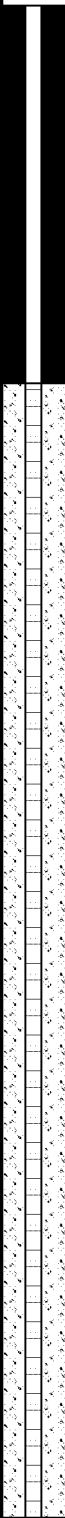
Remarks: Trial pit remained dry and stable	
Stability: Stable	

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA				Trial Pit Log				Trialpit No TP10 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley						Depth 3.00		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Scale
	Depth	Type	Results					
	0.10	ES	N=12	0.15			Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is medium to coarse, sub angular flint.	1
	0.30	ES					Firm to stiff light yellowish brown slightly silty CLAY.	
	1.00	D					Hand Pen at 0.9m = 100kPa	2
					colour changes to grey mottled orange below 1.5m. Slightly gravelly. Gravel is angular fine selenite crystals		Hand Pen at 1.7m = 160kPa	
	2.00	D		2.00			Stiff bluish grey slightly gravelly slightly silty CLAY.	3
					Hand Pen at 2.1m = 190kPa seepage at 2.2m		Hand Pen at 2.4m = 210kPa	
	3.00	D		3.00			Firm to stiff bluish grey slightly silty slightly gravelly CLAY. Gravel is extremely weak finely laminated grey mudstone.	4
					Hand Pen at 2.8m = 195kPa End of pit at 3.00 m			
								5

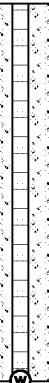
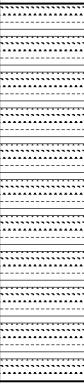
Remarks: Very slight seepage observed at 2.2m depth	
Stability: Stable	

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA www.leapenvironmental.com		Borehole Log		Borehole No. WS1 Sheet 1 of 2	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -	
Location: Dapper's Lane Angmering, West Sussex		Level:		Hole Type WS	
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC	

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.18	ES		0.20		Grass over dark brown silty clayey TOPSOIL.		
					0.45		Dark brown silty slightly gravelly clayey SUBSOIL. Gravel is fine sub-rounded to rounded, chalk and coarse, sub-angular to sub-rounded flint.		
							Firm orange brown slightly silty CLAY with rare coarse, sub-angular to sub-rounded flint.		
		0.90	D				Hand Pen at 0.8m =170kPa		
							Frequent roots to 0.1m		
		1.20		N=9 (1,1/1,2,2,4)			Becomes stiff below 1.2m		
		1.50	D						
		2.00		N=11 (1,2/2,2,3,4)			Becomes grey below 1.9m		
							Hand Pen at 2.1m =270kPa		
		2.50	D						
	3.00		N=11 (1,2/2,2,3,4)			Hand Pen at 2.9m =350kPa			
						Hand Pen at 3.3m =380kPa			
	3.50	D			3.35		Extremely weak dark brown mottled grey relicly laminated MUDSTONE with occasional partings of stiff clay.		
							Hand Pen at 3.8m =390kPa		
	4.00		N=13 (2,2/3,3,3,4)						
Continued on next sheet									

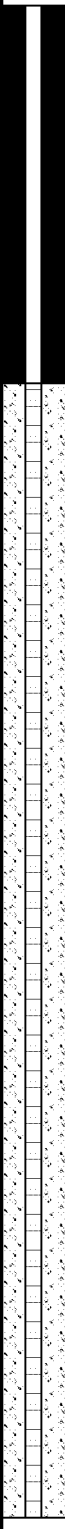
Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.	
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 Leap Environmental Ltd The Atrium, Curtis Road 		Borehole Log		Borehole No. WS1 Sheet 2 of 2	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -	
Location: Dapper's Lane Angmering, West Sussex		Level:		Hole Type WS	
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC	

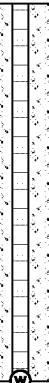
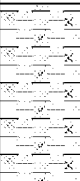
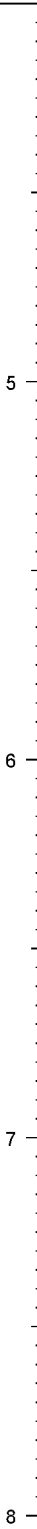
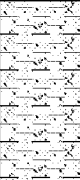
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		4.70 - 5.00	D						
		5.00		N=13 (1,3/2,3,4,4)	5.00		 Hand Pen at 4.5m exceeds 500kPa ----- End of borehole at 5.00 m	5	
									6
									7
									8

Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.	
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 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA		Borehole Log		Borehole No. WS2 Sheet 1 of 2	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -	
Location: Dapper's Lane Angmering, West Sussex		Level:		Hole Type WS	
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Scale 1:20	
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC	

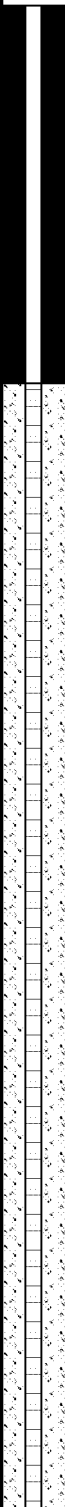
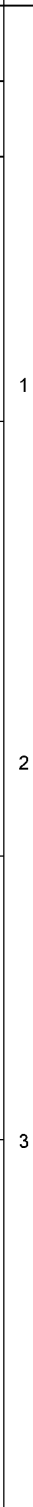
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.40		Grass over slightly gravelly silty clayey TOPSOIL. Gravel is fine to coarse sub-angular flint. <i>Rootlets to 0.15m</i>		
		0.60	ES				Firm pale orange brown slightly silty CLAY.		
		0.87	D		1.00		<i>Hand Pen at 0.8m =150kPa</i>		
		1.20		N=12 (1,2/3,3,3,3)			Firm to stiff orange pale brown mottled grey slightly silty slightly sandy CLAY. Sand is fine grained. <i>Hand Pen at 1.3m =130kPa</i> <i>Rare fine angular mudstone gravel.</i>	1	
		1.60	D		1.60		Stiff orange brown slightly silty CLAY. <i>Becomes stiff below 1.6m</i> <i>Hand Pen at 1.8m =240kPa</i>		
		2.00		N=10 (1,1/2,2,3,3)			<i>Hand Pen at 2.2m =240kPa</i>	2	
		2.50	D				<i>Hand Pen at 2.85m =350kPa</i>		
		3.00		N=12 (1,2/2,3,3,4)			<i>Hand Pen at 3.1m =310kPa</i>	3	
		3.50	D				<i>Hand Pen at 3.8m =340kPa</i>		
		4.00		N=13 (1,2/2,3,4,4)			Continued on next sheet	4	

Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.	
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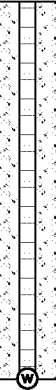
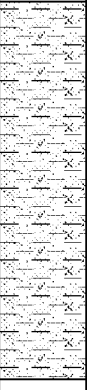
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA		Borehole Log			Borehole No. WS2 Sheet 2 of 2				
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -		Hole Type WS			
Location: Dapper's Lane Angmering, West Sussex				Level:		Scale 1:20			
Client: Persimmon Homes Thames Valley				Dates: 26/02/2019 - 26/02/2019		Logged By ADC			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					4.50			<u>Hand Pen at 4.2m =410kPa</u>	
		4.80	D					Stiff grey slightly silty gravelly CLAY. Gravel is fine to coarse sub-angular to angular mudstone.	
		5.00		N=15 (2,2/3,3,4,5)	5.00			<u>Hand Pen at 4.8m =410kPa</u> End of borehole at 5.00 m	
Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.									



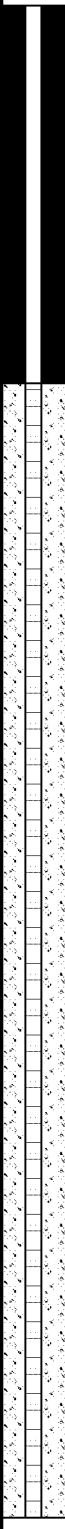
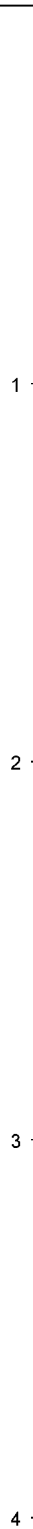
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA		Borehole Log		Borehole No. WS3 Sheet 1 of 2	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -	
Location: Dapper's Lane Angmering, West Sussex		Level:		Scale 1:20	
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC	

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15	ES		0.20		Grass over brown silty clay TOPSOIL. <i>Frequent rootlets to 0.1m</i>		
		0.30	ES						Pale brown pale orange slightly gravelly silty clayey SUBSOIL. Gravel is fine angular flint.
					0.40		Firm orange brown slightly silty very gravelly CLAY. Gravel is fine to coarse sub-rounded to angular flint. <i>Hand Pen at 0.6m =290kPa</i>		
		1.00	D						
		1.20		N=13 (1,1/3,3,3,4)	1.10		Stiff orange mottled grey slightly silty slightly sandy CLAY. Sand is fine to medium grained. <i>Hand Pen at 1.2m =320kPa</i>		
		1.70	D				<i>Hand Pen at 1.5m =280kPa</i>		
		2.00		N=24 (2,2/4,6,7,7)			<i>Hand Pen at 1.9m =290kPa</i>		
					2.25		<i>Hand Pen at 2.1m =380kPa</i>		
		2.60	D						Stiff brown orange very gravelly CLAY. Gravel is fine to coarse angular flint.
	3.00		N=14 (1,2/2,3,4,5)	3.00		Stiff grey mottled orange brown slightly silty slightly sandy CLAY. Sand is fine grained. <i>Hand Pen at 3.3m =400kPa</i>			
	3.50	D				<i>Hand Pen at 3.8m =340kPa</i>			
	4.00		N=12 (1,2/3,2,3,4)			Continued on next sheet			

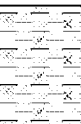
Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.	
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 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA Tel: [REDACTED] W: [REDACTED]		Borehole Log		Borehole No. WS3 Sheet 2 of 2					
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -					
Location: Dapper's Lane Angmering, West Sussex		Level:		Hole Type WS					
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC					
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		5.00		N=14 (2,2/3,3,3,5)	5.00			Hand Pen at 4.05m =380kPa Rare mudstone gravel below 4.6m Hand Pen at 4.9m =410kPa End of borehole at 5.00 m	5
									6
									7
									8
Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.									

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1YA		Borehole Log		Borehole No. WS5 Sheet 1 of 2	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -	
Location: Dapper's Lane Angmering, West Sussex		Level:		Hole Type WS	
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC	

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.50		Grass over dark brown mottled pale orange slightly silty very clayey TOPSOIL with occasional fine to coarse, sub-angular to angular, flint.		
		0.60	D				Firm pale orange brown mottled grey slightly silty CLAY with rare fine angular flint gravel. <u>Hand Pen at 0.7m =170kPa</u>		
		0.80	ES		<u>Hand Pen at 1m =140kPa</u>				
		1.10	D		<u>Becomes stiff below 1.2m</u> <u>Coarse angular flint gravel between 1.25 and 1.35m</u>				
		1.20		N=7 (3,2/1,2,1,3)					
		1.40 - 1.60	B		Firm to stiff brown orange slightly silty slightly sandy CLAY. Sand if fine grained. Occasional medium to coarse, angular flint gravel. <u>Hand Pen at 1.4m =170kPa</u> <u>Hand Pen at 1.75m =240kPa</u>				
		2.00		N=14 (2,2/4,4,3,3)	1.40				
		2.50	D			<u>Relict lamination visible below 2.5m</u> <u>Hand Pen at 2.85m =230kPa</u>			
		3.00		N=13 (1,3/2,3,4,4)		3.00	Stiff dark orange brown mottled grey slightly silty CLAY. <u>Partings of dark orange coarse sandy clay.</u> <u>Hand Pen at 3.2m =250kPa</u> <u>Colour becomes grey below 3.3m</u>		
			3.50	D			<u>Hand Pen at 3.8m =270kPa</u>		
		4.00		N=13 (3,3/3,3,3,4)			Continued on next sheet		

Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.	
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 Leap Environmental Ltd The Atrium, Curtis Road 		Borehole Log		Borehole No. WS5 Sheet 2 of 2					
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -					
Location: Dapper's Lane Angmering, West Sussex		Level:		Hole Type WS					
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC					
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		4.10	D				 Sampler was recovered wet below 4m Very stiff below 4m along with rare fine gravel of extremely weak mudstone. Parting of clayey sand between 4 and 4.15m Slightly sandy below 4.2m		
		4.50	D						
		5.00		N=17 (2,3/4,4,4,5)	5.00			End of borehole at 5.00 m	5
									6
									7
									8
Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.									

Appendix D - LEAP Environmental Geotechnical Investigation (Additional)

Robert Clark
Persimmon Homes Thames Valley
Persimmon House
Knoll Road
Camberley
GU15 3TQ

24th January 2020

Our ref MW/20/LP1877

Dear Robert,

Re: Groundwater Winter Monitoring, Land off Dappers Lane, Angmering.

1. Introduction

Leap Environmental Ltd (hereafter referred to as LEAP) has been appointed by Persimmon Homes Thames Valley (the Client) to undertake further ground investigation and groundwater level monitoring during the winter months at the above-named site. This is as per instruction by Robert Clark of Persimmon Homes Thames Valley dated 21st November 2019.

The agreed scope of works comprised:

- Installation of two new groundwater monitoring wells to 3.0 m bgl at locations specified by Arun District Council;
- Inspection of existing monitoring well surface seals to confirm integrity and repair, if necessary;
- Winter groundwater monitoring comprising one monitoring visit per month November to December 2019 and twice monthly from January to March 2020; and
- Production of a factual letter report.

2. Fieldwork

The intrusive works were completed on 22nd November 2019 by contractors who have been scrutinised and are on LEAP's approved contractor list. The windowless sampling was carried out by Oaklands Site Investigation Ltd and supervised by LEAP.

WS101 was located in a central location in the western half of the site and WS102 was located in the location of a proposed new retention pond. An exploratory hole plan and borehole logs are provided as Appendix B and C, respectively.

On completion of the two new windowless sampler positions the surface seals at WS1, WS2 and WS3 were inspected. Remedial works were required on all positions, which comprised: the removal of the

cover and cement seal; over digging to 0.50 m and replacement of materials with new bentonite pellets, which were saturated with clean water to create a good seal around the standpipe; and re-cementing in the headworks/surface cover.

It was not possible to locate WS5, due to high grass limiting the visibility of the flush cover.

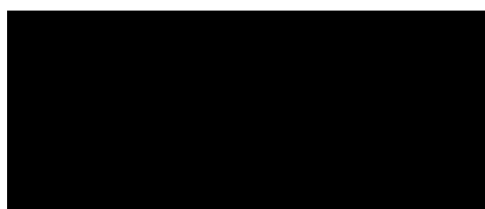
3. Winter Groundwater Monitoring

Groundwater level monitoring comprised three additional monitoring visits on 29th November 2019, 17th December 2019 and 6th January 2020. On completion of the January 2020 monitoring visit a provisional set of results were issued to the Client's representative (Stuart Burnett of Bright Plan Civils), who following liaison with Arun District Council instructed LEAP that no further works were required.

A summary of all groundwater level monitoring visits is provided as Appendix D.

We trust that the information provided within this factual report is to your satisfaction. Should you have any queries please do not hesitate to contact the undersigned.

Yours sincerely



Martin Weil

For Leap Environmental Ltd

Appendix A – Limitations

Appendix B - Figures

Appendix C – Borehole Logs

Appendix D – Groundwater Levels

APPENDIX A – Limitations

Limitations

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Unless explicitly agreed otherwise in writing, this report has been prepared under LEAP's standard terms and conditions, as included in the quotation for this works.

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed. LEAP cannot be held responsible for any disclosures or changes in regulation that are provided post production of this report, and will not automatically update the report.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development and site usage, timescales or clients specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an overall assessment of ground conditions on site. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode7¹, although this is subject to the restrictions imposed on the investigation as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this report will not meet the requirements of a Geotechnical Design Report (GDR), and should therefore be used for preliminary guidance only.

¹ BS EN 1997 Eurocode 7- Geotechnical Design - Part 1: General Rules (2004) and Part 2: Ground Investigation and Testing (2007)

The presence of asbestos may be noted during the site walkover survey, intrusive investigations and/or from the results of contamination testing. However, this report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

APPENDIX B – Figures

Figures



	Client:	Persimmon Homes Thames Valley	Date:	02/04/19	Project ID:	LP1877
	Project:	Dapper's Lane Angmering	Title:	Site location	Fig. No.	I



-  New monitoring wells (install to ~3.0 m bgl)
-  Window sampler (Feb 2019)
-  DCP (Feb 2019)
-  Trial Pit (Feb 2019)



Client:	Persimmon Homes Thames Valley	Title:	Site Layout and Exploratory Hole Plan	Project ID:	LP01877
Project:	Land west of Dappers Lane, Angmering	Date:	24/01/20	Figure No.	002

APPENDIX C – Borehole Logs

Borehole Logs

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA T [REDACTED] W [REDACTED]				Borehole Log				Borehole No. HA1 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: -		Hole Type HA	
Location: Dapper's Lane Angmering, West Sussex				Level:		Scale 1:10			
Client: Persimmon Homes Thames Valley				Dates: 27/03/2019 - 27/03/2019		Logged By MN			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			Grass over dark brown clayey TOPSOIL with frequent rootlets.	
					0.23			Dark brown sandy clayey SUBSOIL. Very rare fine flint gravel	
					1.00			Stiff to firm orangish red brown slightly silty CLAY. Occasional grey streaking with very rare fine angular flint gravel	
							End of borehole at 1.00 m		
Remarks									
Dry and Stable. 22cm diameter									

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1YA T: 01323 812121 W: www.leapenv.co.uk		Borehole Log			Borehole No. HA2 Sheet 1 of 1				
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -		Hole Type HA			
Location: Dapper's Lane Angmering, West Sussex				Level:		Scale 1:10			
Client: Persimmon Homes Thames Valley				Dates: 27/03/2019 - 27/03/2019		Logged By MN			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			Grass over dark brown clayey TOPSOIL with frequent rootlets.	
					0.30			Brown sandy slightly clayey gravelly SUBSOIL. Gravel is fine to coarse, rounded to sub rounded flint.	
					1.00			Orange red brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub angular flint.	
							End of borehole at 1.00 m		1
									2

Remarks
 Dry and Stable. 30cm diameter



Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA				Trial Pit Log				Trialpit No TP10 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley						Depth 3.00		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES	N=12	0.15			Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is medium to coarse, sub angular flint.	1
	0.30	ES					Firm to stiff light yellowish brown slightly silty CLAY.	
	1.00	D					Hand Pen at 0.9m = 100kPa	2
					colour changes to grey mottled orange below 1.5m. Slightly gravelly. Gravel is angular fine selenite crystals			
					Hand Pen at 1.7m = 160kPa			
	2.00	D		2.00			Stiff bluish grey slightly gravelly slightly silty CLAY.	3
					Hand Pen at 2.1m = 190kPa			
					seepage at 2.2m			
					Hand Pen at 2.4m = 210kPa			
	3.00	D		3.00			Firm to stiff bluish grey slightly silty slightly gravelly CLAY. Gravel is extremely weak finely laminated grey mudstone.	4
					Hand Pen at 2.8m = 195kPa			
End of pit at 3.00 m								5

Remarks: Very slight seepage observed at 2.2m depth	
Stability: Stable	

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1YA				Trial Pit Log				Trialpit No TP2 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley						Depth 3.00		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.05	ES	N=6	0.35			Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is medium to coarse, sub angular flint	
	0.20	ES					Firm to stiff light yellowish brown silty CLAY with occasional pockets of sandy clay.	
	0.70	D					Hand Pen at 0.7m = 135kPa	
							Evidence of sub horizontal slip surfaces at 1.2m	
							Hand Pen at 1.3m = 130kPa	
							Pockets of orange sandy clay at 1.6m	
	2.00	D					2.20	Stiff finely laminated grey mottled orangish brown slightly silty gravelly CLAY. Gravel is extremely weak fine to medium mudstone.
								Hand Pen at 2.2m = 210kPa
								pockets of slightly sandy clay at 2.5m
								Hand Pen at 2.6m = 260kPa
	3.00	D	3.00	End of pit at 3.00 m				

Remarks: Trial pit remained dry and stable		
Stability: Stable		

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1YA				Trial Pit Log				Trialpit No TP3 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley						Depth 3.00		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	1	2	3	4	5
	Depth	Type	Results									
	0.10	ES	N=8	0.20			Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is medium to coarse, angular to sub angular flint and fine to coarse sub rounded chalk.					
	0.30	ES					Firm light brown mottled grey silty CLAY.					
							Hand Pen at 0.6m = 150kPa					
	1.00	D	N=8	1.30			pockets of slightly sandy clay below 1.1m					
	2.10	D	N=8	2.70			Firm to stiff grey mottled orange slightly sandy CLAY.					
	3.00	D	N=8	3.00			Stiff grey mottled orange slightly sandy CLAY.					
							End of pit at 3.00 m					

Remarks: Trial pit remained dry and stable

Stability: Stable

Trial Pit Log

Trialpit No

TP4

Sheet 1 of 1

Project Name: Dapper's Lane, Angmering,

Project No.
LP1877

Co-ords:	-
Level:	

Date
27/03/2019

Location: Dapper's Lane Angmering, West Sussex

Dimensions

2Scale
1:25

Client: Persimmon Homes Thames Valley

Depth
2.90

0.6

Logged
ADC

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES	N=8	0.13			Grass over slightly gravelly clayey TOPSOIL. Gravel is medium to coarse, angular to sub angular flint and fine to coarse sub angular to sub rounded chalk.
	0.20	ES		0.30			Brown slightly gravelly silty clayey SUBSOIL. Gravel is medium to coarse, angular to sub angular flint and fine to coarse sub angular to sub rounded chalk. <u>Hand Pen at 0.13m = 130kPa</u> Firm light brown silty CLAY with rare medium flint gravel.
	1.10	D		1.30			<u>Stiff grey mottled orange silty CLAY.</u> <u>Sub horizontal slip surfaces noted between 1.3-1.6m.</u> <u>Hand Pen at 1.5m = 160kPa</u>
	2.30	D					<u>occasional pockets of sandy clay from 2.2m</u>
							<u>clay shows relict laminations below 2.5m</u>
	2.90	D		2.90			End of pit at 2.90 m

Remarks:	Trial pit remained dry and stable
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Stability: Stable



Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA T: [REDACTED] W: [REDACTED] Trial Pit Log Trialpit No TP5 Sheet 1 of 1							
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: - Level:			
Location: Dapper's Lane Angmering, West Sussex				Dimensions (m): 2 0.6		Scale 1:25 Logged ADC	
Client: Persimmon Homes Thames Valley				Depth 3.00			

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES	N=5	0.15		Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is fine to medium, sub angular chalk and sub rounded flint. Brown mottled light orange slightly gravelly silty clayey SUBSOIL. Gravel is fine to medium flint. Firm light brown silty CLAY with rare fine to medium, sub angular flint. Hand Pen at 0.8m = 155kPa		
	0.25	ES		0.30				
				1.00			Firm to stiff bluish grey silty CLAY. Sub horizontal slip surfaces noted at 1.3m Pockets of orange sandy clay at 1.4m Hand Pen at 1.5m = 165kPa	1
	1.40	D						
				2.20		Below 2.0m clay is stiff grey mottled orange with abundant fine-medium extremely weak mudstone gravel.		2
				2.60		Stiff grey mottled orange slightly sandy gravelly CLAY. Sand is fine. Gravel is extremely weak finely laminated fine to coarse, sub angular mudstone. Hand Pen at 2.9m = 340kPa		
	3.00	D		3.00		End of pit at 3.00 m		3
								4
								5

Remarks: Trial pit remained dry and stable	
Stability: Stable	

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA Trial Pit Log Trialpit No TP6 Sheet 1 of 1							
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex				Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley				Depth 2.90		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	Scale
	Depth	Type	Results					
	0.10	ES		0.10			Grass over brown slightly gravelly clayey TOPSOIL. Gravel is medium to coarse sub angular flint and fine to medium sub rounded chalk.	
	0.20	ES		0.30			Brown mottled orange slightly gravelly silty clayey SUBSOIL. Gravel is medium to coarse, sub angular flint and fine to medium sub rounded chalk Firm to stiff light brownish orange silty CLAY.	
							Hand Pen at 0.7m = 200kPa	
	1.10	D	N=5	1.00			Firm to stiff grey mottled orange slightly silty CLAY with pockets of orange sandy clay. clay is laminated below 1.2m	1
							Hand Pen at 1.7m = 170kPa	
							occasional selenite crystals below 1.8m	
	2.10	D					Hand Pen at 2.2m = 250kPa	2
				2.70				
	3.00	D		2.90			Stiff grey mottled orange slightly silty slightly gravelly CLAY. Gravel is extremely weak fine to medium extremely weak mudstone. End of pit at 2.90 m	3
								4
								5

Remarks: Trial pit remained dry and stable	
Stability: Stable	

Leap Environmental Ltd The Atrium, Curtis Road [Redacted Address]		Trial Pit Log			Trialpit No TP7 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: - Level:		Date 27/03/2019
Location: Dapper's Lane Angmering, West Sussex				Dimensions (m): 2 0.6		Scale 1:25
Client: Persimmon Homes Thames Valley				Depth 3.10		Logged ADC

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES	N=11	0.25		Grass over slightly gravelly silty clayey TOPSOIL with frequent roots. Gravel is fine to coarse, sub angular flint.	1	
	0.30	ES			Firm light orangish brown silty CLAY with rare coarse flint. <u>Hand Pen at 0.6m = 130kPa</u>			
	1.40	D		1.30	Stiff grey mottled orange silty CLAY with pockets of sandy clay. Sand is fine grained. <u>Hand Pen at 1.8m = 240kPa</u>	2		
	2.30	D			2.10		Stiff finely laminated bluish grey slightly gravelly silty CLAY. Gravel is extremely weak grey mudstone. <u>slip surfaces observed at 2.3m</u> <u>Hand Pen at 2.5m = 345kPa</u> <u>selenite crystals observed below 2.7m</u>	
	3.00	D	3.10	<u>Hand Pen at 3m = 305kPa</u>		3		
					End of pit at 3.10 m			
							4	
							5	

Remarks: Trial pit remained dry and stable		
Stability: Stable		

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA				Trial Pit Log				Trialpit No TP8 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): Depth 3.00 0.6 2		Scale 1:25	
Client: Persimmon Homes Thames Valley								Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES	N=11	0.30			Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is medium to coarse, angular flint.	1
	0.25	ES					Firm light brown silty CLAY with rare medium coarse flint gravel. Hand Pen at 0.6m = 120kPa	
	1.10	D					Firm to stiff grey mottled orange silty CLAY with occasional selenite crystals. Hand Pen at 1.3m = 210kPa	
	2.10	D					Below 1.9m, occasional pockets of slightly sandy silty clay Hand Pen at 2.2m = 250kPa	
	3.00	D	Stiff finely laminated grey mottled orange gravelly silty CLAY. Gravel is extremely weak mudstone. Hand Pen at 2.8m = 300kPa End of pit at 3.00 m	3				
								5

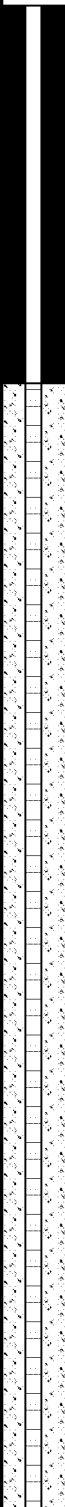
Remarks: Trial pit remained dry and stable	
Stability: Stable	

Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA 				Trial Pit Log				Trialpit No TP9 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: - Level:		Date 27/03/2019	
Location: Dapper's Lane Angmering, West Sussex						Dimensions (m): 2		Scale 1:25	
Client: Persimmon Homes Thames Valley						Depth 3.00		Logged ADC	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES	N=12	0.15			Grass over brown slightly gravelly silty clayey TOPSOIL. Gravel is medium to coarse, sub angular flint.	
	0.30	ES		0.30			Orangish brown slightly gravelly silty clayey SUBSOIL.	
							Firm light brown slightly gravelly slightly silty CLAY.	
							Land drain at the south end of the pit between 0.4 and 0.55m comprising clayey gravel. Gravel is coarse angular flint brick. 0.4-0.55m	
							Hand Pen at 0.7m = 150kPa	
							mottled grey below 1.2m	
	1.50	D					Sub horizontal slip surface at 1.5m	
							Sub horizontal slip planes noted at 1.6m	
							Hand Pen at 1.7m = 260kPa	
							Hand Pen at 2.4m = 245kPa	
	2.50	D					relict laminations below 2.8m	
	3.00	D		3.00		End of pit at 3.00 m		

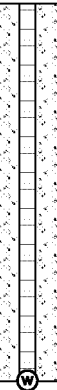
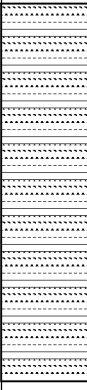
Remarks: Trial pit remained dry and stable	
Stability: Stable	

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA		Borehole Log		Borehole No. WS1 Sheet 1 of 2	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -	
Location: Dapper's Lane Angmering, West Sussex		Level:		Hole Type WS	
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC	

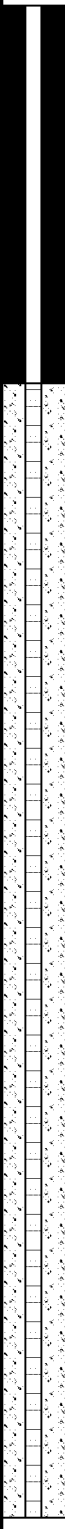
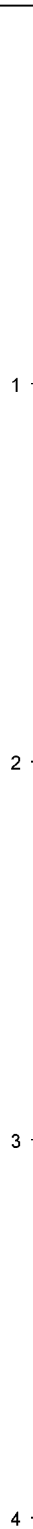
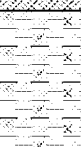
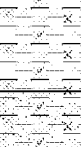
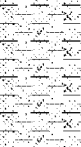
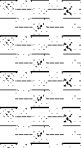
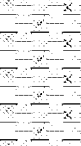
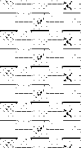
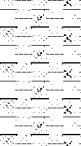
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.18	ES		0.20		Grass over dark brown silty clayey TOPSOIL.		
					0.45		Dark brown silty slightly gravelly clayey SUBSOIL. Gravel is fine sub-rounded to rounded, chalk and coarse, sub-angular to sub-rounded flint.		
							Firm orange brown slightly silty CLAY with rare coarse, sub-angular to sub-rounded flint.		
		0.90	D				Hand Pen at 0.8m =170kPa		
							Frequent roots to 0.1m		
		1.20		N=9 (1,1/1,2,2,4)			Becomes stiff below 1.2m	1	
		1.50	D						
		2.00		N=11 (1,2/2,2,3,4)			Becomes grey below 1.9m	2	
							Hand Pen at 2.1m =270kPa		
		2.50	D						
	3.00		N=11 (1,2/2,2,3,4)			Hand Pen at 2.9m =350kPa	3		
					3.35		Hand Pen at 3.3m =380kPa		
		3.50	D				Extremely weak dark brown mottled grey relicly laminated MUDSTONE with occasional partings of stiff clay.		
							Hand Pen at 3.8m =390kPa		
	4.00		N=13 (2,2/3,3,3,4)					4	

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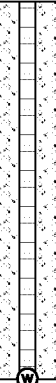
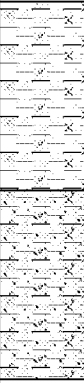
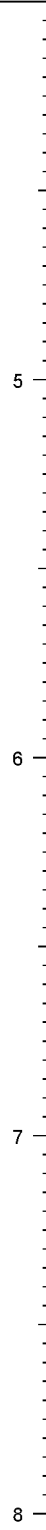
Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.		
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 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA 		Borehole Log			Borehole No. WS1 Sheet 2 of 2				
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -		Hole Type WS			
Location: Dapper's Lane Angmering, West Sussex		Level:		Scale 1:20					
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC					
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		4.70 - 5.00	D				 Hand Pen at 4.5m exceeds 500kPa		5
		5.00		N=13 (1,3/2,3,4,4)	5.00				
									6
									7
									8
Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.									

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA		Borehole Log		Borehole No. WS2 Sheet 1 of 2	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -	
Location: Dapper's Lane Angmering, West Sussex		Level:		Scale 1:20	
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC	

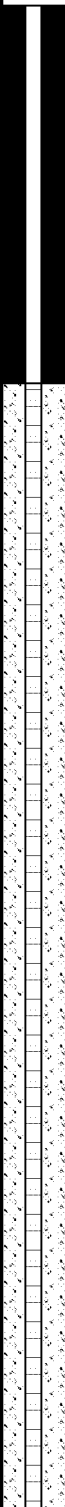
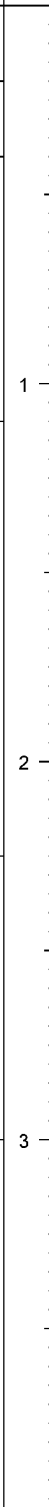
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.40		Grass over slightly gravelly silty clayey TOPSOIL. Gravel is fine to coarse sub-angular flint. Rootlets to 0.15m		
		0.60	ES						Firm pale orange brown slightly silty CLAY.
		0.87	D		1.00				Hand Pen at 0.8m =150kPa
		1.20		N=12 (1,2/3,3,3,3)					Hand Pen at 1.3m =130kPa Rare fine angular mudstone gravel.
		1.60	D		1.60				Stiff orange brown slightly silty CLAY. Becomes stiff below 1.6m Hand Pen at 1.8m =240kPa
		2.00		N=10 (1,1/2,2,3,3)					Hand Pen at 2.2m =240kPa
		2.50	D						Hand Pen at 2.85m =350kPa
		3.00		N=12 (1,2/2,3,3,4)					Hand Pen at 3.1m =310kPa
		3.50	D						Hand Pen at 3.8m =340kPa
		4.00		N=13 (1,2/2,3,4,4)			Continued on next sheet		

Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.	
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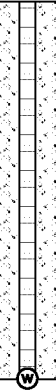
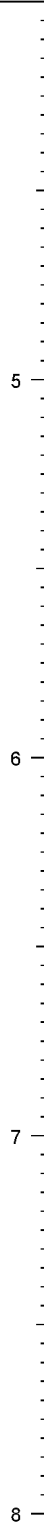
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA				Borehole Log				Borehole No. WS2 Sheet 2 of 2	
Project Name: Dapper's Lane, Angmering,				Project No. LP1877		Co-ords: -		Hole Type WS	
Location: Dapper's Lane Angmering, West Sussex						Level:		Scale 1:20	
Client: Persimmon Homes Thames Valley						Dates: 26/02/2019 - 26/02/2019		Logged By ADC	
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
			D		4.50		<i>Hand Pen at 4.2m =410kPa</i>		
		4.80			Stiff grey slightly silty gravelly CLAY. Gravel is fine to coarse sub-angular to angular mudstone.				
		5.00		N=15 (2,2/3,3,4,5)	5.00		<i>Hand Pen at 4.8m =410kPa</i>		
End of borehole at 5.00 m									
Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.									



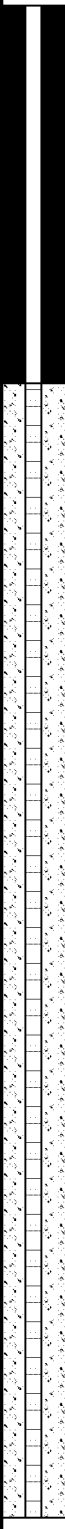
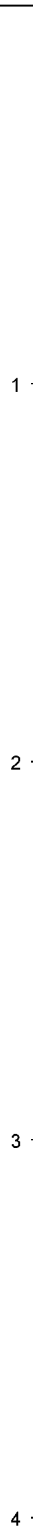
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1YA		Borehole Log		Borehole No. WS3 Sheet 1 of 2	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -	
Location: Dapper's Lane Angmering, West Sussex		Level:		Hole Type WS	
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC	

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15	ES		0.20		Grass over brown silty clay TOPSOIL. <i>Frequent rootlets to 0.1m</i>		
		0.30	ES				0.40		
							Firm orange brown slightly silty very gravelly CLAY. Gravel is fine to coarse sub-rounded to angular flint. <i>Hand Pen at 0.6m =290kPa</i>		
	1.00	D		1.10		Stiff orange mottled grey slightly silty slightly sandy CLAY. Sand is fine to medium grained. <i>Hand Pen at 1.2m =320kPa</i>			
	1.20		N=13 (1,1/3,3,3,4)				<i>Hand Pen at 1.5m =280kPa</i>		
	1.70	D		2.25		<i>Hand Pen at 1.9m =290kPa</i>			
	2.00		N=24 (2,2/4,6,7,7)			<i>Hand Pen at 2.1m =380kPa</i>			
	2.60	D			Stiff brown orange very gravelly CLAY. Gravel is fine to coarse angular flint.				
	3.00		N=14 (1,2/2,3,4,5)	3.00		Stiff grey mottled orange brown slightly silty slightly sandy CLAY. Sand is fine grained. <i>Hand Pen at 3.3m =400kPa</i>			
	3.50	D				<i>Hand Pen at 3.8m =340kPa</i>			
4.00		N=12 (1,2/3,2,3,4)		Continued on next sheet					

Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.	
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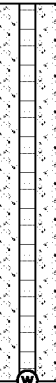
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA		Borehole Log			Borehole No. WS3 Sheet 2 of 2				
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -		Hole Type WS			
Location: Dapper's Lane Angmering, West Sussex				Level:		Scale 1:20			
Client: Persimmon Homes Thames Valley				Dates: 26/02/2019 - 26/02/2019		Logged By ADC			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		5.00		N=14 (2,2/3,3,3,5)	5.00			Hand Pen at 4.05m =380kPa	
								Rare mudstone gravel below 4.6m	
								Hand Pen at 4.9m =410kPa ----- End of borehole at 5.00 m	
Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.									
									

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA Tel: 01323 819519 W: [REDACTED]		Borehole Log		Borehole No. WS5 Sheet 1 of 2	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -	
Location: Dapper's Lane Angmering, West Sussex		Level:		Hole Type WS	
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC	

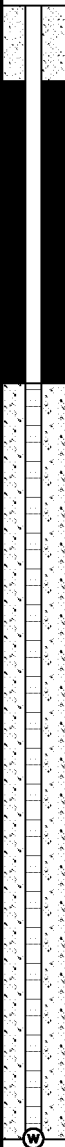
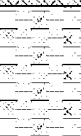
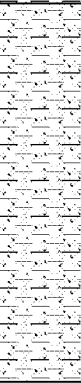
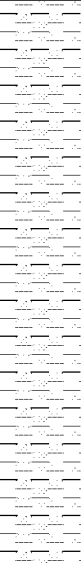
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.50		Grass over dark brown mottled pale orange slightly silty very clayey TOPSOIL with occasional fine to coarse, sub-angular to angular, flint.		
		0.60	D				Firm pale orange brown mottled grey slightly silty CLAY with rare fine angular flint gravel. <u>Hand Pen at 0.7m =170kPa</u>		
		0.80	ES		<u>Hand Pen at 1m =140kPa</u>				
		1.10	D		<u>Becomes stiff below 1.2m</u> <u>Coarse angular flint gravel between 1.25 and 1.35m</u>				
		1.20		N=7 (3,2/1,2,1,3)					
		1.40 - 1.60	B		Firm to stiff brown orange slightly silty slightly sandy CLAY. Sand if fine grained. Occasional medium to coarse, angular flint gravel. <u>Hand Pen at 1.4m =170kPa</u> <u>Hand Pen at 1.75m =240kPa</u>				
		2.00		N=14 (2,2/4,4,3,3)	1.40				
		2.50	D			<u>Relict lamination visible below 2.5m</u> <u>Hand Pen at 2.85m =230kPa</u>			
		3.00		N=13 (1,3/2,3,4,4)		3.00	Stiff dark orange brown mottled grey slightly silty CLAY. <u>Partings of dark orange coarse sandy clay.</u> <u>Hand Pen at 3.2m =250kPa</u> <u>Colour becomes grey below 3.3m</u>		
			3.50	D			<u>Hand Pen at 3.8m =270kPa</u>		
		4.00		N=13 (3,3/3,3,3,4)				Continued on next sheet	

Remarks
 Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.



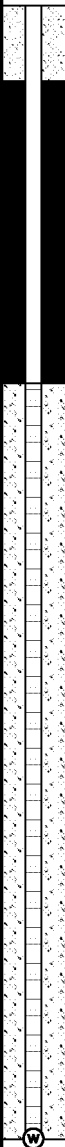
 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA		Borehole Log			Borehole No. WS5 Sheet 2 of 2				
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -		Hole Type WS			
Location: Dapper's Lane Angmering, West Sussex		Level:		Scale 1:20					
Client: Persimmon Homes Thames Valley		Dates: 26/02/2019 - 26/02/2019		Logged By ADC					
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		4.10	D					<i>Sampler was recovered wet below 4m</i> <i>Very stiff below 4m along with rare fine gravel of extremely weak mudstone.</i> <i>Parting of clayey sand between 4 and 4.15m</i> <i>Slightly sandy below 4.2m</i>	
		4.50	D						
		5.00		N=17 (2,3/4,4,4,5)	5.00				End of borehole at 5.00 m
									6
									7
									8
Remarks Stable. Sampler was recovered wet below 4m. Water monitoring well installed. The install comprised slotted pipe from 5mbgl to 1mbgl and plane pipe from 1mbgl to ground level. The borehole was backfilled with gravel from 5mbgl to 1mbgl and bentonite from 1mbgl to the ground surface. The installation was capped with a metal cover which was flush to ground level.									

 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA		Borehole Log			Borehole No. WS101 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -		Hole Type WLS
Location: Dapper's Lane Angmering, West Sussex				Level:		Scale 1:20
Client: Persimmon Homes Thames Valley				Dates: 22/11/2019 - 22/11/2019		Logged By MW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.15		 Grass over grey brown clayey TOPSOIL.		
					0.50		 Soft becoming firm yellowish brown slightly gravelly silty CLAY.		
	1.00		N=6 (0,2/1,2,1,2)		1.50		 Firm brown yellowish orange slightly gravelly CLAY. Gravel is fine chalk and occasional fine to coarse sub-angular flint. <i>Hand Pen at 0.5m =140kPa</i> <i>Hand Pen at 1m =130kPa</i>	1	
	2.00		N=10 (1,2/2,2,2,4)				 Firm becoming stiff grey mottled brown CLAY with occasional relict rootlets. <i>Hand Pen at 1.5m =190kPa</i> <i>Hand Pen at 2m =260kPa</i> <i>Hand Pen at 2.5m =210kPa</i>	2	
		3.00		N=9 (1,2/2,2,2,3)	3.00		End of borehole at 3.00 m	3	
								4	

Remarks Borehole remained dry and stable.	
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 Leap Environmental Ltd The Atrium, Curtis Road Dorking, Surrey RH4 1XA		Borehole Log			Borehole No. WS102 Sheet 1 of 1	
Project Name: Dapper's Lane, Angmering,		Project No. LP1877		Co-ords: -		Hole Type WLS
Location: Dapper's Lane Angmering, West Sussex				Level:		Scale 1:20
Client: Persimmon Homes Thames Valley				Dates: 22/11/2019 - 22/11/2019		Logged By MW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40		Grass over grey brown clayey TOPSOIL.		
							Firm becoming stiff orange mottled brown gravelly CLAY. Gravel is sub-angular to rounded flint. <i>Hand Pen at 0.5m =100kPa</i>		
							<i>More gravelly between 0.8m - 1.6m</i> <i>Hand Pen at 1m =150kPa</i>	1	
							<i>Too gravelly for Hand Pen.</i> <i>Slightly sandy between 1.6m - 2.0m. Sand is Medium to coarse.</i>		
		1.00		N=11 (2,2/2,3,3,3)					
					2.00		Stiff grey mottled orange brown slightly gravelly silty CLAY. Gravel is sub-angular to rounded flint. <i>Hand Pen at 2m =210kPa</i>	2	
							<i>Hand Pen at 2.5m =150kPa</i>		
		2.00		N=8 (1,2/2,2,2,2)	2.00				
							<i>Hand Pen at 3m =230kPa</i> <i>Becomes more gravelly below 3.0m</i>	3	
		3.00		N=37 (5,2/6,8,12,11)					
					3.45		End of borehole at 3.45 m	4	

Remarks Borehole remained stable. Slight seepage noted at 1.0mbgl	
--	---

APPENDIX D – Groundwater Levels

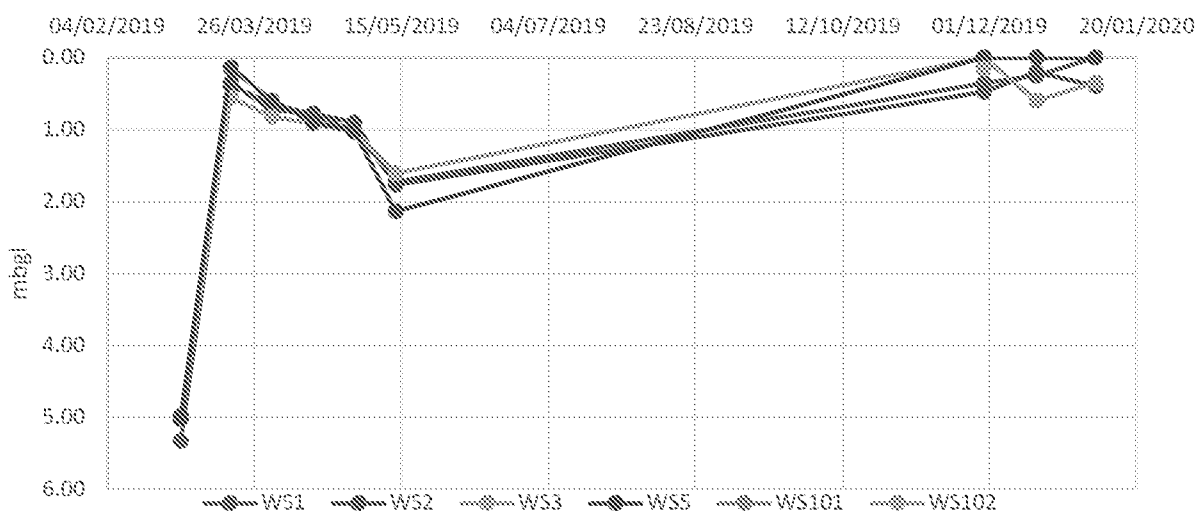
Groundwater Levels

		01/03/19	18/03/19	01/04/19	15/04/19	29/04/19	13/05/19	29/11/19	17/12/19	06/01/20
Well Depth	Well No.	mbgl	mbgl	mbgl	mbgl	mbgl	mbgl	mbgl	mbgl	mbgl
5	WS1	5.33	0.39	0.65	0.79	1.02	1.73	0.36	0.25	0.00
5	WS2	5.02	0.35	0.73	0.78	0.9	1.77	0.48	0.20	0.40
5	WS3	4.98	0.56	0.82	0.92	1.04	1.61	2.24^	0.60	0.35
5	WS5	5	0.14	0.6	0.9	1.02	2.14	n/a	n/a	n/a
3	WS101	-	-	-	-	-	-	0.15	0.2	0.15
3	WS102	-	-	-	-	-	-	0.15	0.2	0.15

n/a = not accessible / located due to high grass

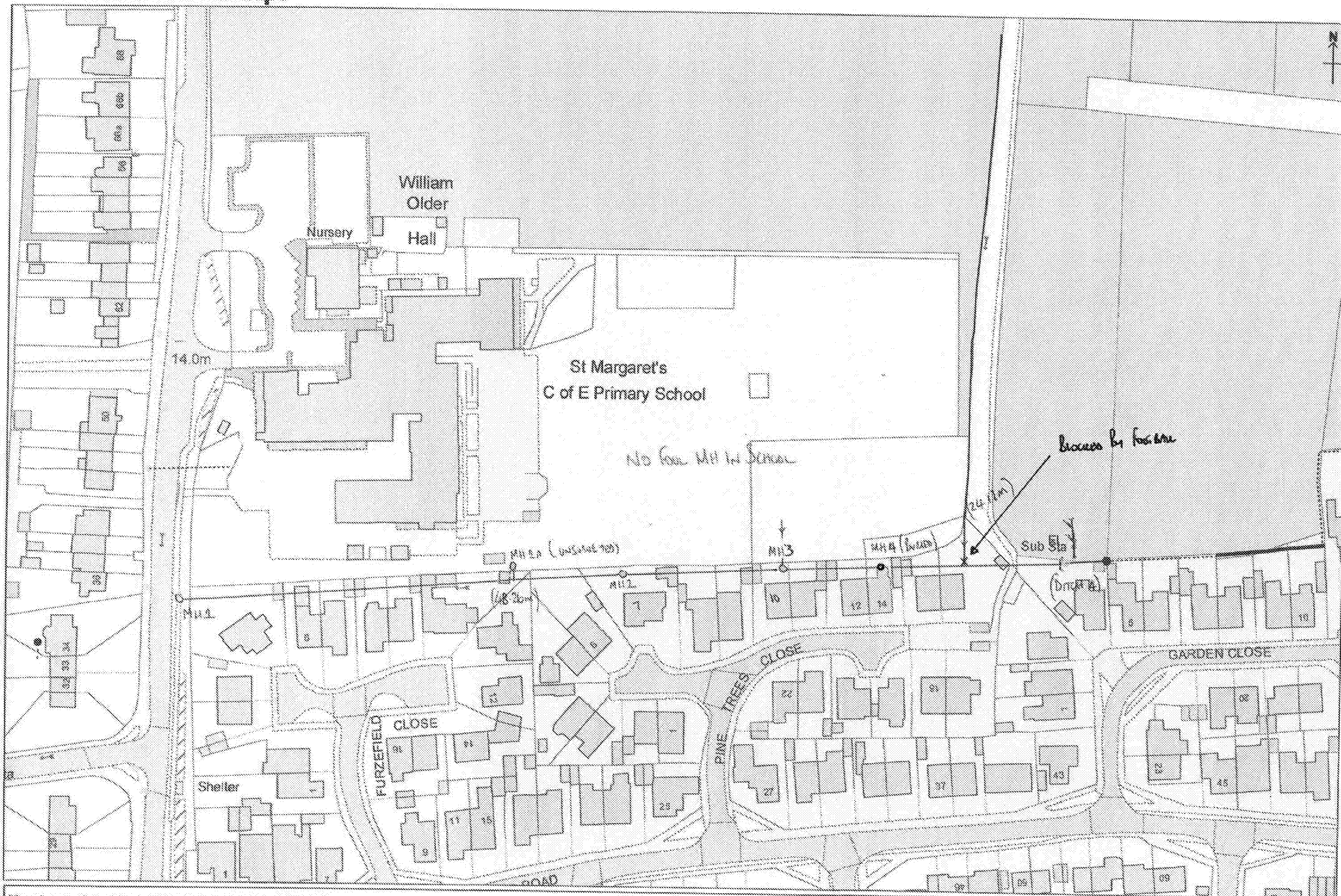
^ = Position baled dry on 22/11/19

Groundwater Levels: Land off Dappers Lane, Angmering



Appendix E - EEG (Ultraflow) Drainage Investigation

Arun District Council Maps



Mapping produced by Arun District Council (1:1000@A3)

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Production Date: 02 September 2019

ARUN DISTRICT COUNCIL/170201PL

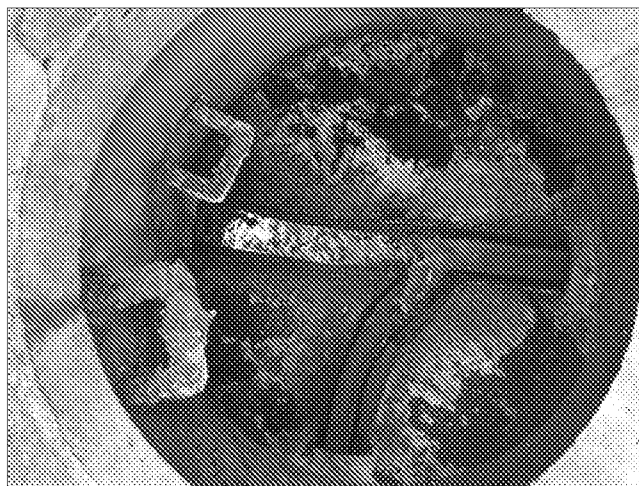
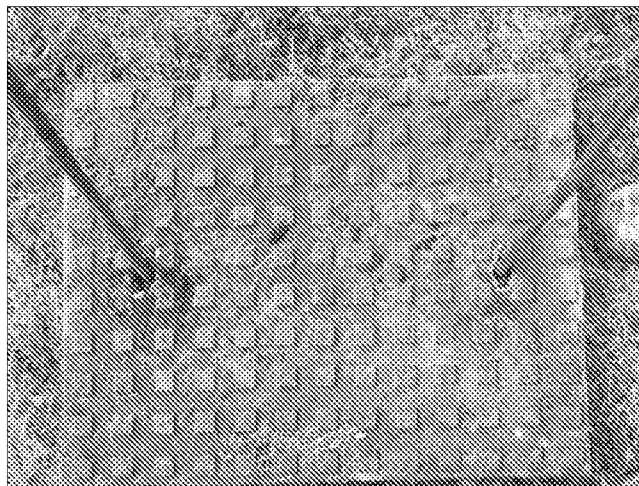
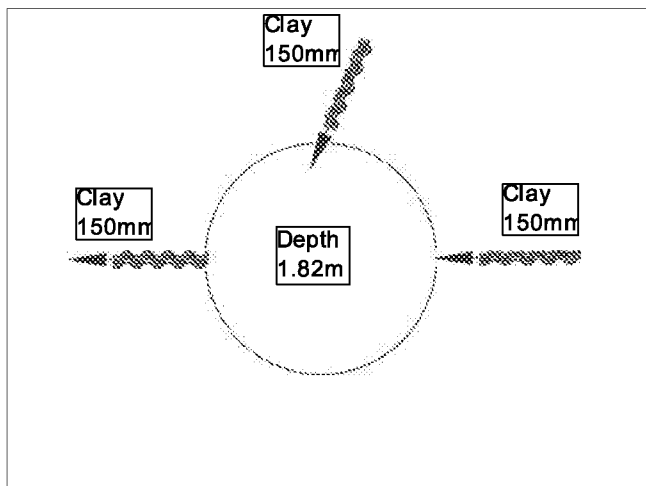
www.arun.gov.uk



Manhole Details

Item Type	Manhole	System Type	Foul	Owner	Public	Date of Survey	24/09/2019	
Downstream Watercourse		Origin of Data		Other Source				
Easting (m)	507029.912	Northing (m)	105012.021	Identifier		Asset Reference		
Ladder	No	Step Irons	2	Side Entry	No	Manhole Construction	Precast Concrete	
Cover Level (m AOD)	18.367	Cover Shape	Rectangle	Other Shape			Cover Duty	Heavy
Cover Width (m)	0.53	Cover Length (m)	0.68	Manufacturer			Grating	No
Shaft Width (m)	0.45	Shaft Length (m)	0.61	Chamber Width (m)	1.05	Chamber Length (m)	0	
Flap Valve	No	Orifice	No	Sluice Gate	No	Weir	No	
Screens	No	Penstock	No	Flume	No	Headwall	☒	

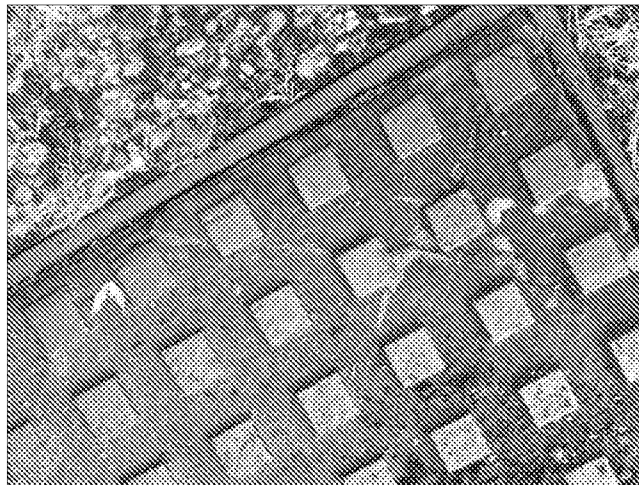
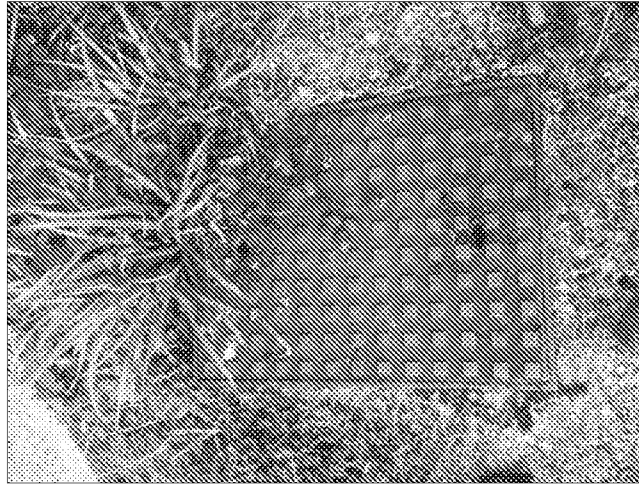
Video Ref.	Photo Ref.	Dist (m)	Cont. defect	Letters				Numbers				Remarks	
				Code	Joint	Material	Band	Dimension		%	Clock		
								1	2		At/ From		To
		0.0											
				</									



Manhole Details										
Item Type	Manhole		System Type	Foul		Owner	Public		Date of Survey	524/09/201
Downstream Watercourse				Origin of Data			Other Source			
Easting (m)	507027.902		Northing (m)	105058.948		Identifier			Asset Reference	
									Manhole	0002
Ladder			Step Irons			Side Entry			Manhole Construction	
									Number of Landings	0
Cover Level (m AOD)	19.571		Cover Shape	Rectangle		Other Shape			Cover Duty	Medium
Cover Width (m)	0		Cover Length (m)	0		Manufacturer	Lid damaged		Grating	No
Shaft Width (m)	0		Shaft Length (m)	0		Chamber Width (m)	0		Chamber Length (m)	0
Flap Valve			Orifice			Sluice Gate			Weir	
									Screens	
									Penstock	
									Flume	
									Headwall	

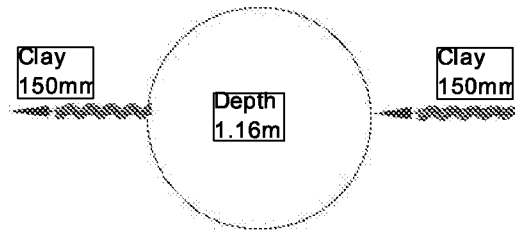
[illegible]

Lid damaged so
unable to lift



Manhole Details															
Item Type	Manhole		System Type	Foul		Owner	Public		Date of Survey	24/09/2019					
Downstream Watercourse				Origin of Data	Internal Survey		Other Source								
Easting (m)	507104.834		Northing (m)	105065.439		Identifier		Asset Reference			Manhole	0004			
Ladder	No	Step Irons	1	Side Entry	No	Manhole Construction	Precast Concrete		Number of Landings	0					
Cover Level (m AOD)	20.304		Cover Shape	Rectangle		Other Shape			Cover Duty	Medium					
Cover Width (m)	0.54		Cover Length (m)	0.68		Manufacturer			Grating	No					
Shaft Width (m)	0.47		Shaft Length (m)	0.6		Chamber Width (m)	1.05		Chamber Length (m)	0					
Flap Valve	No	Orifice	No	Sluice Gate	No	Weir	No	Screens	No	Penstock	No	Flume	No	Headwall	☒

[illegible]



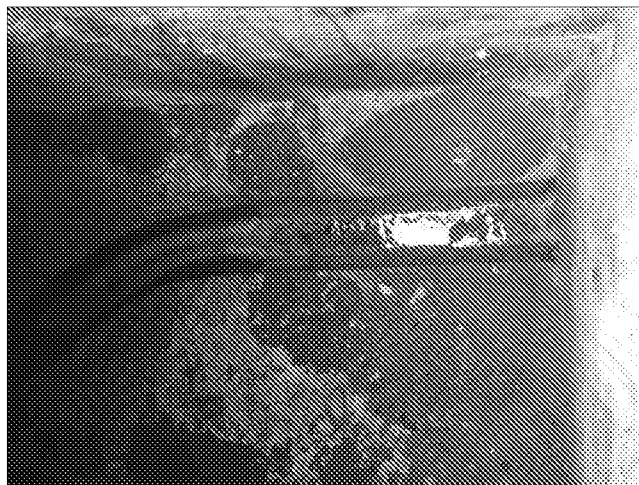
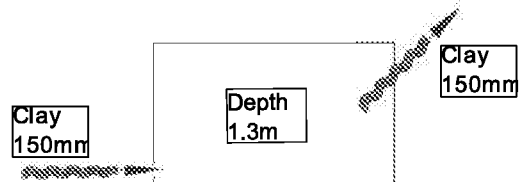
Manhole Details

Item Type	Manhole	System Type	Foul	Owner	Public	Date of Survey	26/09/2019
Downstream Watercourse		Origin of Data	Internal Survey	Other Source			
Easting (m)	0	Northing (m)	0	Identifier		Asset Reference	
Ladder	No	Step Irons		Side Entry	No	Manhole Construction	
						Number of Landings	0
Cover Level (m AOD)	0	Cover Shape		Other Shape		Cover Duty	Heavy
Cover Width (m)	0	Cover Length (m)	0	Manufacturer		Grating	No
Shaft Width (m)	0	Shaft Length (m)	0	Chamber Width (m)	0	Chamber Length (m)	0
Flap Valve	No	Orifice	No	Sluice Gate	No	Weir	No
						Screens	No
						Penstock	No
						Flume	No
						Headwall	☒

Video Ref.	Photo Ref.	Dist (m)	Cont. defect	Letters				Numbers				Remarks	
				Code	Joint	Material	Band	Dimension		%	Clock		
								1	2		At/ From		To
		0.0											

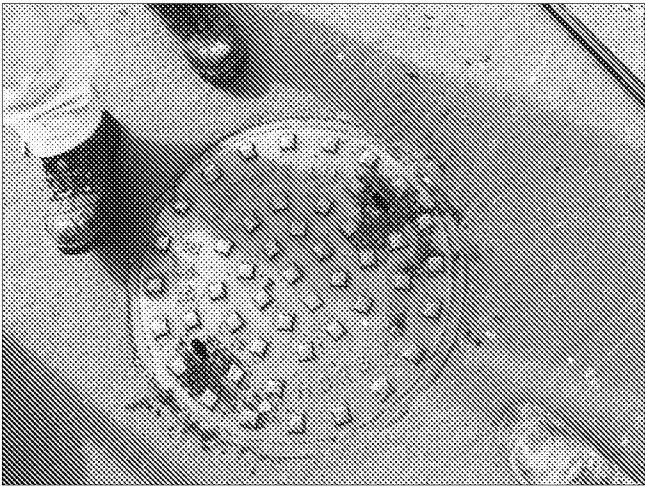
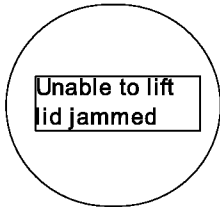
Manhole Details												
Item Type	Manhole		System Type	Foul		Owner	Public		Date of Survey	24/09/2019		
Downstream Watercourse				Origin of Data	Internal Survey		Other Source					
Easting (m)	506744.696		Northing (m)	105029.49		Identifier		Asset Reference				
									Manhole	7002		
Ladder	No	Step Irons	No	Side Entry	No	Manhole Construction	Precast Concrete		Number of Landings	0		
Cover Level (m AOD)	13.17		Cover Shape				Other Shape			Cover Duty	Heavy	
Cover Width (m)	0.58		Cover Length (m)	0.6		Manufacturer			Grating	No		
Shaft Width (m)	0.55		Shaft Length (m)	0.6			Chamber Width (m)	0.76		Chamber Length (m)	1.34	
Flap Valve	No	Orifice	No	Sluice Gate	No	Weir	No	Screens	No	Penstock	No	
									Flume	No	Headwall	

[illegible]



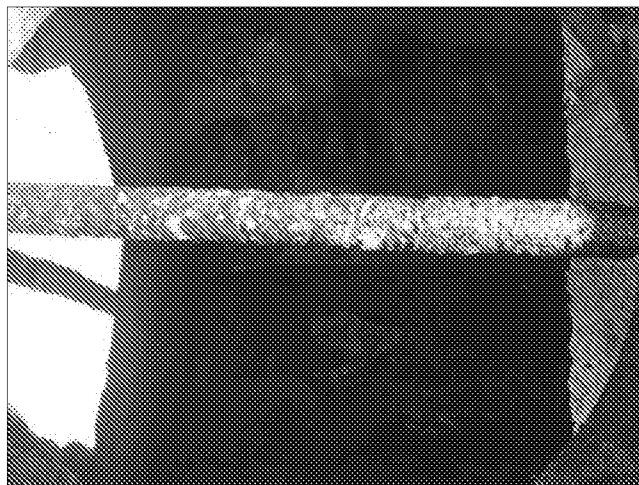
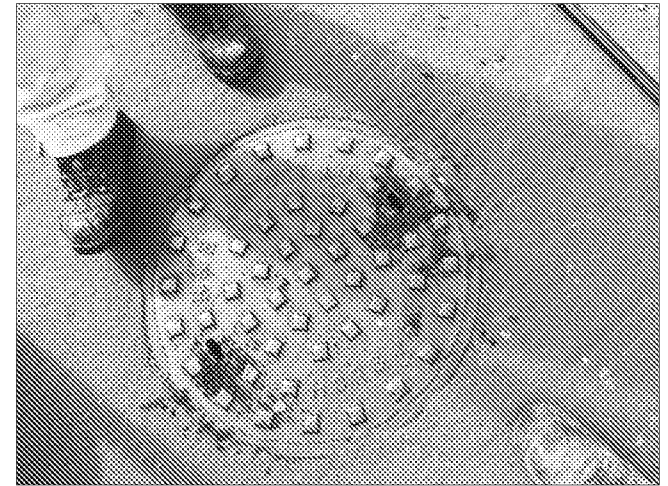
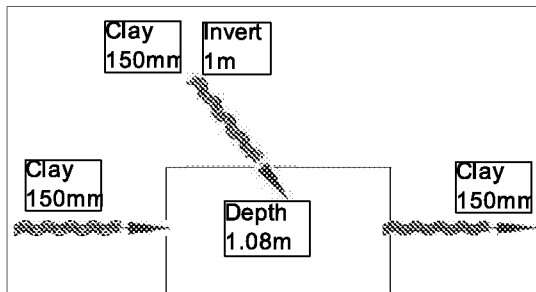
Manhole Details															
Item Type	Manhole		System Type	Surface Water		Owner	Public		Date of Survey	24/09/2019					
Downstream Watercourse				Origin of Data			Other Source								
Easting (m)	506745.143		Northing (m)	105068.964		Identifier			Asset Reference	Manhole	7003				
Ladder		Step Irons		Side Entry		Manhole Construction			Number of Landings	0					
Cover Level (m AOD)	13.486		Cover Shape	Circular		Other Shape			Cover Duty	Heavy					
Cover Width (m)	0.56		Cover Length (m)	0		Manufacturer			Grating	No					
Shaft Width (m)	0		Shaft Length (m)	0		Chamber Width (m)	0		Chamber Length (m)	0					
Flap Valve		Orifice		Sluice Gate		Weir		Screens		Penstock		Flume		Headwall	

[illegible]



Manhole Details															
Item Type	Manhole		System Type	Foul		Owner	Public		Date of Survey	24/09/2019					
Downstream Watercourse				Origin of Data	Internal Survey		Other Source								
Easting (m)	0		Northing (m)	0		Identifier		Asset Reference		Manhole	7101				
Ladder	No	Step Irons	No	Side Entry	No	Manhole Construction	Precast Concrete		Number of Landings	0					
Cover Level (m AOD)	0		Cover Shape	Circular		Other Shape			Cover Duty	Heavy					
Cover Width (m)	0.56		Cover Length (m)	0		Manufacturer			Grating	No					
Shaft Width (m)	0		Shaft Length (m)	0		Chamber Width (m)	0.87		Chamber Length (m)	1.08					
Flap Valve	No	Orifice	No	Sluice Gate	No	Weir	No	Screens	No	Penstock	No	Flume	No	Headwall	☒

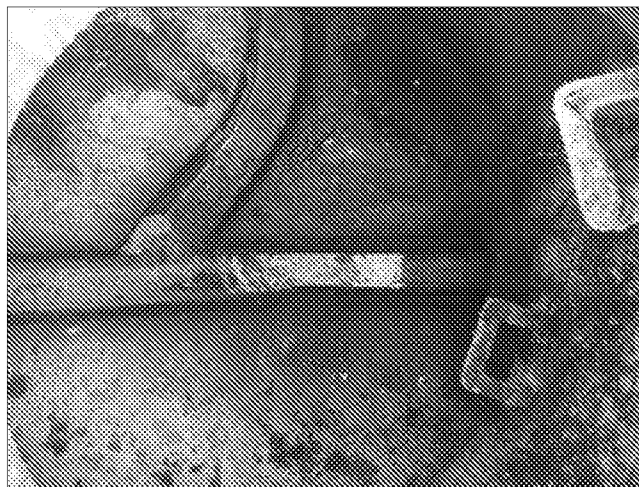
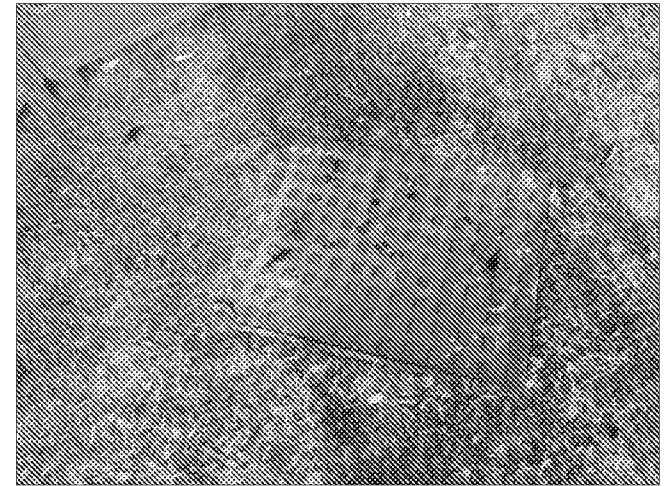
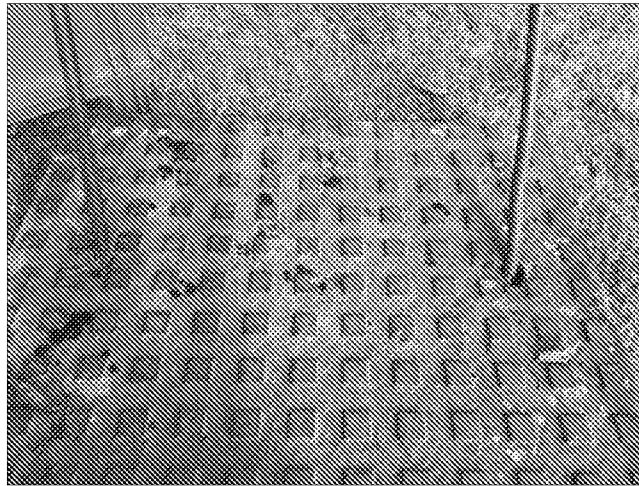
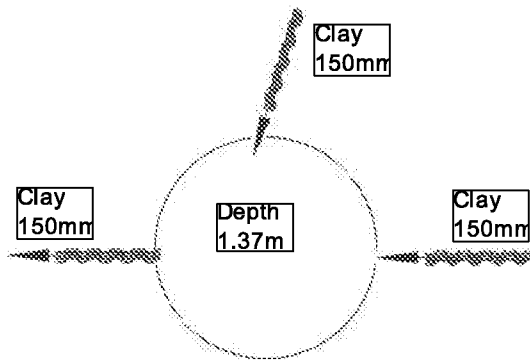
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Manhole Details

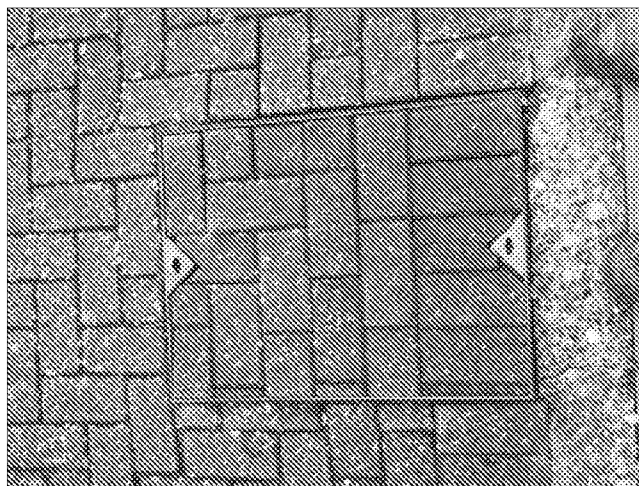
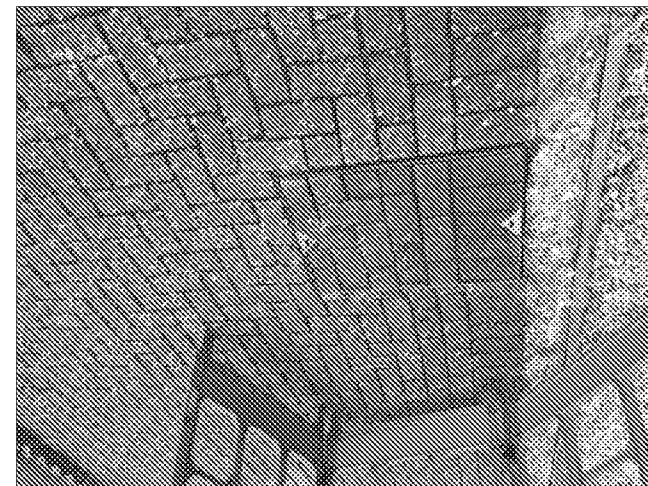
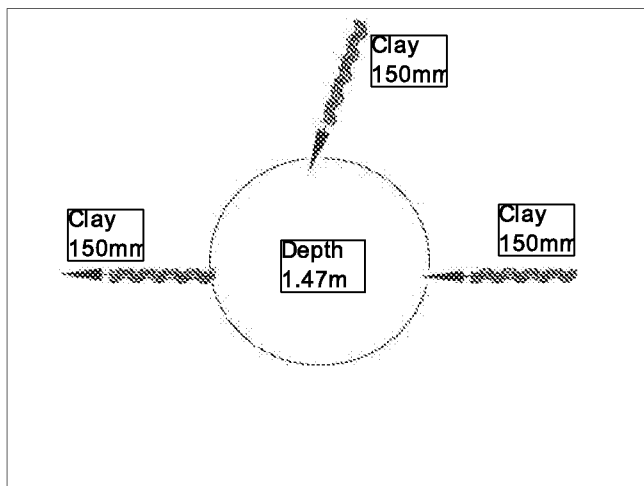
Item Type	Manhole	System Type	Foul	Owner	Public	Date of Survey	24/09/2019
Downstream Watercourse		Origin of Data	Internal Survey	Other Source			
Easting (m)	506914.042	Northing (m)	105002.254	Identifier		Asset Reference	
Ladder	No	Step Irons	2	Side Entry		Manhole Construction	
						Number of Landings	0
Cover Level (m AOD)	16.741	Cover Shape	Rectangle	Other Shape		Cover Duty	Heavy
Cover Width (m)	0.53	Cover Length (m)	0.68	Manufacturer		Grating	No
Shaft Width (m)	0.54	Shaft Length (m)	0	Chamber Width (m)	1.05	Chamber Length (m)	0
Flap Valve	No	Orifice	No	Sluice Gate	No	Weir	No
				Screens	No	Penstock	No
				Flume	No	Headwall	☒

Video Ref.	Photo Ref.	Dist (m)	Cont. defect	Letters				Numbers				Remarks	
				Code	Joint	Material	Band	Dimension		%	Clock		
								1	2		At/ From		To
		0.0											



Manhole Details															
Item Type	Manhole		System Type	Foul		Owner	Public		Date of Survey	24/09/2019					
Downstream Watercourse				Origin of Data	Internal Survey		Other Source								
Easting (m)	506940.172		Northing (m)	105003.064		Identifier		Asset Reference							
Ladder	No	Step Irons	1	Side Entry	No	Manhole Construction	Precast Concrete		Number of Landings	0					
Cover Level (m AOD)	17.022		Cover Shape	Rectangle		Other Shape			Cover Duty	Medium					
Cover Width (m)	0.53		Cover Length (m)	0.68		Manufacturer			Grating	No					
Shaft Width (m)	0.45		Shaft Length (m)	0.58		Chamber Width (m)	1.05		Chamber Length (m)	0					
Flap Valve	No	Orifice	No	Sluice Gate	No	Weir	No	Screens	No	Penstock	No	Flume	No	Headwall	☒

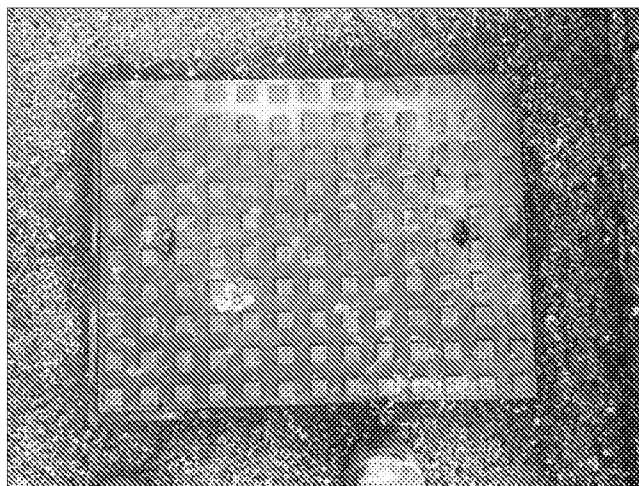
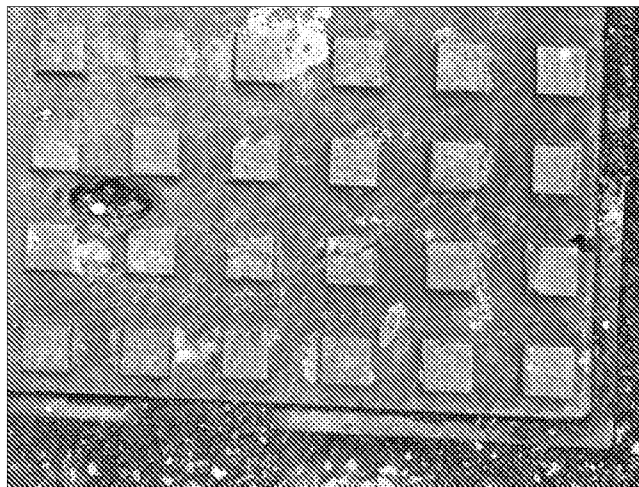
[illegible]



Manhole Details										
Item Type	Manhole		System Type	Foul		Owner	Public		Date of Survey	24/09/2019
Downstream Watercourse				Origin of Data			Other Source			
Easting (m)	506979.157		Northing (m)	105007.517		Identifier			Asset Reference	
									Manhole	9003
Ladder			Step Irons			Side Entry			Manhole Construction	
									Number of Landings	0
Cover Level (m AOD)	17.563		Cover Shape	Rectangle		Other Shape			Cover Duty	Medium
Cover Width (m)	0.53		Cover Length (m)	0.68		Manufacturer	Manhole lid damaged		Grating	No
Shaft Width (m)	0		Shaft Length (m)	0		Chamber Width (m)	0		Chamber Length (m)	0
Flap Valve			Orifice			Sluice Gate			Weir	
									Screens	
									Penstock	
									Flume	
									Headwall	

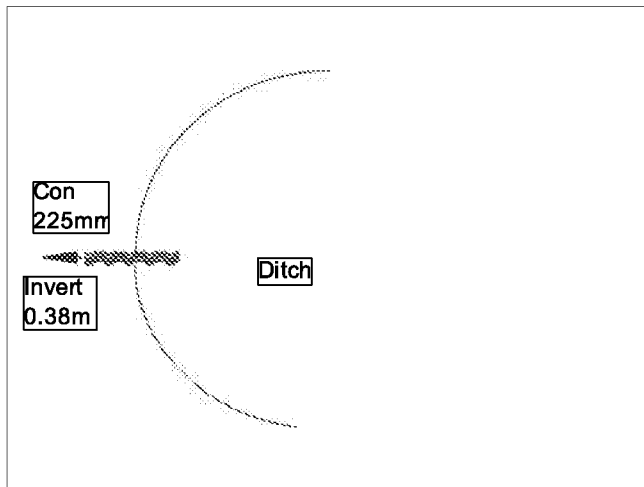
[illegible]

Lid damaged
unable to lift



Outfall Details											
Item Type	Outfall		System Type			Owner	Public		Date of Survey	24/09/2019	
Downstream Watercourse				Origin of Data	External Survey		Other Source				
Easting (m)	507017.801		Northing (m)	105081.513		Identifier			Asset Reference		
Ladder		Step Irons		Side Entry		Manhole Construction			Number of Landings		
Cover Level (m AOD)	19.103		Cover Shape			Other Shape			Cover Duty		
Cover Width (m)			Cover Length (m)			Manufacturer			Grating		
Shaft Width (m)			Shaft Length (m)			Chamber Width (m)			Chamber Length (m)		
Flap Valve			Orifice			Sluice Gate			Weir		
Screens			Penstock			Flume			Headwall		

[illegible]

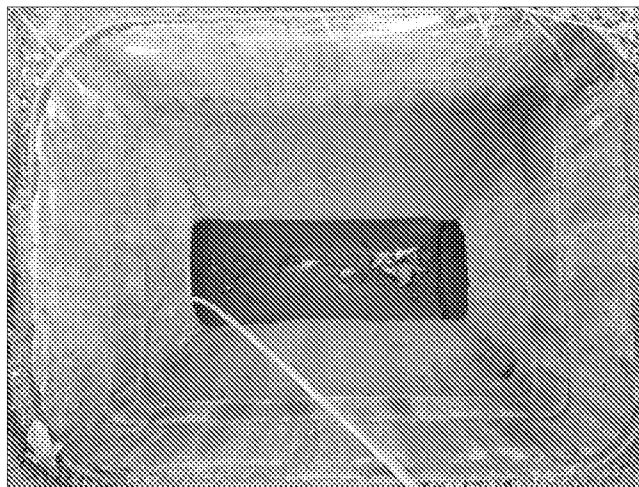
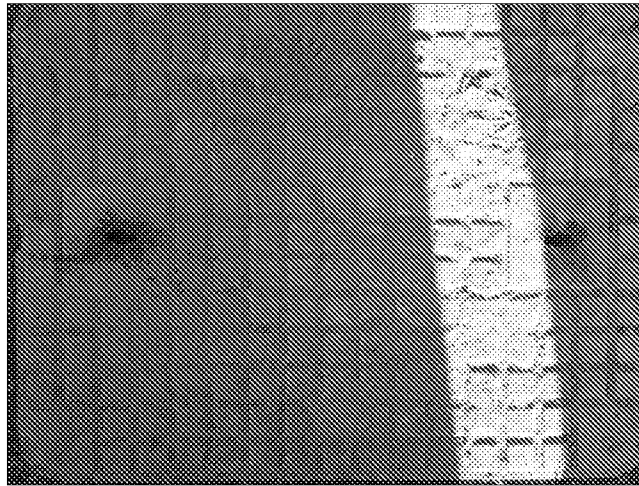
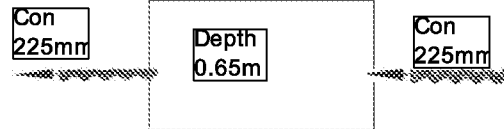


Details											
Item Type		System Type		Owner		Date of Survey	24/09/2019				
Downstream Watercourse			Origin of Data			Other Source					
Easting (m)	0	Northing (m)	0	Identifier		Asset Reference			Manhole	Ditch(4)	
Ladder		Step Irons		Side Entry		Manhole Construction			Number of Landings	0	
Cover Level (m AOD)	0	Cover Shape			Other Shape			Cover Duty			
Cover Width (m)	0	Cover Length (m)	0	Manufacturer				Grating			
Shaft Width (m)	0	Shaft Length (m)	0	Chamber Width (m)	0	Chamber Length (m)	0				
Flap Valve		Orifice		Sluice Gate		Weir		Screens		Penstock	
								Flume		Headwall	

[illegible]

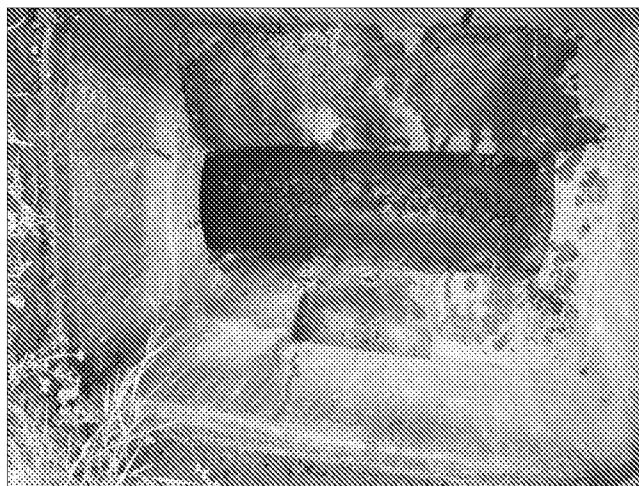
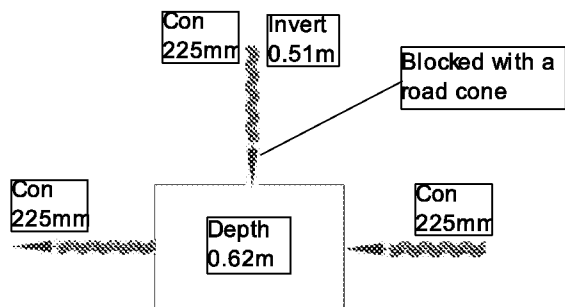
Manhole Details																							
Item Type	Manhole		System Type	Surface Water		Owner	Public		Date of Survey	24/09/2019													
Downstream Watercourse					Origin of Data	Internal Survey		Other Source															
Easting (m)	506888.605		Northing (m)	105077.678		Identifier			Asset Reference		Manhole	MH 2											
Ladder	No		Step Irons	No		Side Entry	No		Manhole Construction	Precast Concrete		Number of Landings	0										
Cover Level (m AOD)	16.79		Cover Shape	Rectangle		Other Shape			Cover Duty	Low													
Cover Width (m)	0.64		Cover Length (m)	0.49		Manufacturer				Grating	No												
Shaft Width (m)	0		Shaft Length (m)	0			Chamber Width (m)	0.62		Chamber Length (m)	0.46												
Flap Valve	No		Orifice	No		Sluice Gate	No		Weir	No		Screens	No		Penstock	No		Flume	No		Headwall	☐	

[illegible]



Manhole Details															
Item Type	Manhole		System Type	Surface Water		Owner	Public		Date of Survey	24/09/2019					
Downstream Watercourse				Origin of Data	Internal Survey		Other Source								
Easting (m)	506936.794		Northing (m)	105079.24		Identifier		Asset Reference							
								Manhole	MH 3						
Ladder	No	Step Irons	No	Side Entry	No	Manhole Construction	Precast Concrete		Number of Landings	0					
Cover Level (m AOD)	17.7		Cover Shape	Rectangle		Other Shape			Cover Duty	Medium					
Cover Width (m)	0.67		Cover Length (m)	0.51		Manufacturer			Grating	No					
Shaft Width (m)	0		Shaft Length (m)	0		Chamber Width (m)	0.6		Chamber Length (m)	0.4					
Flap Valve	No	Orifice	No	Sluice Gate	No	Weir	No	Screens	No	Penstock	No	Flume	No	Headwall	☒

[illegible]



Manhole Details															
Item Type	Manhole		System Type	Surface Water		Owner	Public		Date of Survey	24/09/2019					
Downstream Watercourse				Origin of Data			Other Source								
Easting (m)	0		Northing (m)	0		Identifier		Asset Reference		Manhole	MH 4				
Ladder		Step Irons		Side Entry		Manhole Construction			Number of Landings	0					
Cover Level (m AOD)	0		Cover Shape				Other Shape			Cover Duty					
Cover Width (m)	0		Cover Length (m)	0		Manufacturer			Grating						
Shaft Width (m)	0		Shaft Length (m)	0			Chamber Width (m)	0		Chamber Length (m)	0				
Flap Valve		Orifice		Sluice Gate		Weir		Screens		Penstock		Flume		Headwall	☒

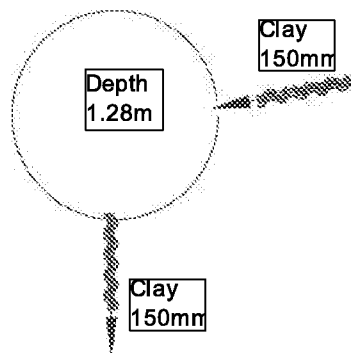
[illegible]

MH 4

Unable to gain
access to garden

Manhole Details															
Item Type	Manhole		System Type	Foul		Owner	Public		Date of Survey	24/09/2019					
Downstream Watercourse				Origin of Data	Internal Survey		Other Source								
Easting (m)	506909.976		Northing (m)	105049.627		Identifier		Asset Reference							
Manhole	PT001														
Ladder	No	Step Irons	1	Side Entry	No	Manhole Construction	Brick		Number of Landings	0					
Cover Level (m AOD)	17.125		Cover Shape	Rectangle		Other Shape			Cover Duty	Medium					
Cover Width (m)	0.53		Cover Length (m)	0.68		Manufacturer			Grating	No					
Shaft Width (m)	0.55		Shaft Length (m)	0		Chamber Width (m)	1.05		Chamber Length (m)	0					
Flap Valve	No	Orifice	No	Sluice Gate	No	Weir	No	Screens	No	Penstock	No	Flume	No	Headwall	☒

[illegible]



Appendix F - Arun District Council Correspondence

From: Paul Cann
Sent: 05 November 2019 15:43
To: Stuart Burnett
Subject: RE: D1260 Dappers Lane, Angmering

Hi Stuart

In terms of the culvert, we need to ensure that it is fit for purpose now and for the foreseeable future, before allowing any formal discharge from the new development to it. We are more than happy to work with Persimmons in terms of getting the identified issues resolved.

Whilst, we work on behalf of WSCC (the lead local flood authority) in terms of undertaking enforcement in respect to land drainage, you are no doubt aware, that we are significantly understaffed at present and therefore formal enforcement against landowners could be a long process and therefore not in alignment with the developments timescales. Also, not all of the identified issues are enforceable.

I have summarised below the main issues identified by the CCTV survey that need resolving;

MH1 to MH2 (225mm dia)

4.5m JDM/OJM
14.7m JDM/OJM
23.2m JDM/OJM
41.4m Brick through side & multiple fractures (Could possibly be repaired internally/remotely ie. cutting/patch lining?) (Survey abandoned)

MH2 to MH1 (225mm dia)

30.4m Top of pipe has been previously cut out, but then fixed back in position – ok
47.35m JDM
55.6m Multiple fractures & hole (Suggest patch lining repair)
57.5m JDM/OJM
58.2m Small hole & fractures in invert (Suggest patch lining repair)
72.5m JDM
74.2m JDM
82.0m Hole in top of pipe but appears plugged - ok
91.0m JDM (Survey abandoned)

MH1 to MH2 will require full CCTV after remedial works to check remainder of pipeline not surveyed. Any issues found to be discussed.

MH2 to MH3 (225mm dia)

25.4m Hole in top of pipe but appears plugged - ok

MH3 to MH4 (225mm dia)

1.9m JDM & soil deposits
4.3m Hole in top of pipe and fractures (Suggest patch lining repair)
13.26m JDM & debris deposits

27.6m Encrustation at joint (Suggest remote cutting due to no access to immediately adjacent manhole)

MH4 to MH5? (225mm dia)

20.1m Length of guttering pipeline (Survey abandoned)

Ditch to MH4 (225mm dia)

6.05m On verge of collapse (under building?)

10.7m Metallic spike from fence post/fractures

24.0m Intruding poor connection and football obstruction (Survey abandoned)

MH4 to Ditch will require full CCTV after remedial works to check remainder of pipeline not surveyed. Any issues found to be discussed.

In terms of way forward, may I suggest that you obtain prices for undertaking the necessary repair works (some repairs can be done internally rather than open excavation). All the above works need to be considered unless there is an 'ok'. Once you have this information, we can discuss the matter further.

If the culvert were diverted into the school land (ensuring any existing connections are reconnected to the new pipe and the existing pipe filled with concrete to abandon it), then legally the school would become responsible for it as landowner. The other landowners would also have to agree to it.

An alternative would be to lay a private surface water pipe on that same school route and connect into manhole 1, therefore bypassing the issues. This pipe would need to be maintained by Persimmons management company unless you offer it for adoption to Southern Water or requisition it from Southern Water.

I await to hear from you once you have considered the above.

Regards

Paul Cann

Senior Engineer (Drainage & Coastal)

Paul Cann | Senior Engineer (Drainage & Coastal), Engineering Services, Arun District Council |

Location: First Floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF

Internal: 37819 | External: +44 (0) 1903 737819 | Fax: +44 (0) 1903 716019 | E-mail:

Paul.Cann@arun.gov.uk

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Visit Arun's web site at <http://www.arun.gov.uk/> and www.chichester.gov.uk

P Save the environment - think before you print.

Arun District Council Enquiry

Hi Mark

Comments below;

1. I am sure Kevin will comment in respect to the flood zones.
2. There are known existing watercourses (open and culverted) on the southern and western boundaries of the site. These are believed to drain to Station Road to the west. There are historical known problems with this system, especially where it is culverted through Furzefield Close.
3. There is a fragmented land drainage system in Dappers Lane. Overland/overspill flows that use the lane as a conduit have contributed to the historical flooding in Angmering Village. Angmering Parish Council have undertaken works in Dappers Lane (operation watershed?) but more work is needed to bring the drainage system back into full working order. The main source of the flooding in Angmering Village is the Black ditch (main river).
4. The EA are currently looking at flood alleviation schemes for Angmering Village and have commissioned a study. WSCC/ADC have been involved to some degree in this respect and a further meeting is planned soon.
5. The most current SFRA is on the ADC website.
6. Guidance notes enclosed in respect to SUDS on new development.
7. Our land drainage records are enclosed. The information will need to be verified. A site survey will be required to ascertain the presence of any other culverts, etc, that we may not be aware of.

Regards

Paul Cann
Senior Engineer (Drainage & Coastal)

Paul Cann | Senior Engineer (Drainage & Coastal), Engineering Services, [Arun District Council](#) | Location: First Floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF
Internal: 37819 | External: +44 (0) 1903 737819 | Fax: +44 (0) 1903 716019 | E-mail: Paul.Cann@arun.gov.uk
Arun is Working in Partnership with Chichester District Council
Visit Arun's web site at <http://www.arun.gov.uk/> and www.chichester.gov.uk
 Save the environment - think before you print.

From: Mark Akmenkalns [REDACTED]
Sent: 24 July 2017 12:26
To: Kevin Macknay; Paul Cann
Subject: D1260 - Dapper's Lane, Angmering, BN16 4EW - FRA & DS Enquiry 17-07-24

Dear Kevin/Paul,

We are preparing a drainage strategy for the above site and would be grateful if you could provide us with any relevant information you have as per our drainage checklist below:

Flood Zones

- Please confirm the Flood Zones for this area.
- Please confirm surface water, reservoir flooding, sewer flooding. Please provide plans and depth data from your GIS UFMSW for 30yr, 100yr & 1000yr as applicable (OS Datum).
- Please confirm mapping and records for any surface water assets owned or maintained.

Arun District Council Enquiry

- Please confirm if there are any future drainage improvements proposed for this area.
- Please confirm details of existing or planned flood alleviation and defences in this area.
- Please confirm if you are aware of any historic flooding within the confines of the site.
- Please confirm if you are aware of any historic flooding in close vicinity and/or on the public highway.

Groundwater

- Please confirm details of any groundwater flooding issues in the area, including flood levels, flood extents and any available anecdotal information.

Assets

- Please confirm mapping and records for any surface water assets owned or maintained.
- Please confirm if there are any historic culverted watercourses within or in close vicinity to the site. Please provide map records where available.
- Please can you provide any map records denoting the highway drainage network. Is this a piped system or soakaways?

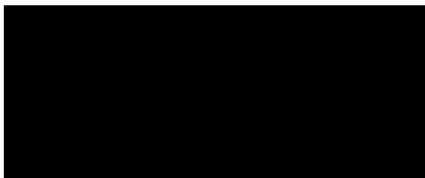
Policy/Future

- Please confirm the most recent Strategic Flood Risk Assessment (SFRA).
- Please confirm if there are any future drainage improvements proposed for this area.
- Please confirm if any drainage studies and/or SWMP have/are being assess for this area.

We look forward to hearing from you in due course.

Regards,

Mark Akmenkains
Director



Transport Planning and Infrastructure Design Consultants

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Arun District Council Maps



Appendix G - Environment Agency Correspondence

Mr M Akmenkalns
rgp design

Your ref: D1260

Our ref: SSD54738

28 July 2017

Dear Mark,

Thank you for your request of 24 July 2017 to use Environment Agency Product 4 data, for the site at Dapper's lane Angmering, BN16 4EW

The Environment Agency's records indicate that the above site is located in Flood Zone 1 (land assessed as having less than 0.1% (1 in 1,000) chance of flooding in any given year from rivers or the sea). Therefore the likelihood of flooding in this area is estimated as 'very low'.

The above site is approximately 500m away from Flood Zone 2/3.

We are therefore unable to provide data from our detailed fluvial or tidal models which is relevant to your site.

Please be aware that in February 2016 the Environment Agency updated its guidance on climate change allowances. The standard allowance of adding 20% to peak flows – as per previous guidance in the National Planning Policy Framework, may not be applicable for the purposes of informing development proposals. It is possible that our current modelling has under estimated flood risk when taking climate change into consideration. This does not however have an effect on Flood Zone 2 or 3. For further information please visit:

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Further details about the Environment Agency information supplied can be found on the GOV.UK website:

<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

<https://www.gov.uk/planning-applications-assessing-flood-risk>

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Please get in touch if you have any further queries or contact us within two months if you would like us to review the information we have sent. Please send any future correspondence to our team email account at ssdenquiries@environment-agency.gov.uk

For information on what you can expect from us and our full service commitment to you, please click on this link;

<https://www.gov.uk/government/publications/environment-agency-customer-service-commitment-2/environment-agency-customer-service-commitment>

Kind regards,

Customers & Engagement | Environmental Planning and Engagement | Solent and South Downs Area | **Environment Agency** | Guildbourne House, Chatsworth Road, Worthing, BN11 1LD

SSDEnquiries@environment-agency.gov.uk

National Contact Call Centre: 03708 506506



Appendix H - West Sussex County Council Correspondence (Lead Local Flood Authority)

West Sussex County Council Enquiry

Mark,

Further to your recent enquiry. Please see reply below:

Flood Zones

- Please confirm the Flood Zones for this area.
Based on current EA mapping the proposed site is within Flood Zone 1.
- Please confirm surface water, reservoir flooding, sewer flooding. Please provide plans and depth data from your GIS UFMSW for 30yr, 100yr & 1000yr as applicable (OS Datum).
Please see attached mapping. The proposed development site is not shown to be at risk from surface water flooding. However, it should be noted that we are aware that Dapper's Lane is an area at risk from surface water flooding and does act as a natural flow route for surface water from the field to the north east of the proposed development.
- Please confirm mapping and records for any surface water assets owned or maintained.
Please see attached mapping.
- Please confirm if there are any future drainage improvements proposed for this area.
No future drainage improvements proposed for this area. We are aware that the local flood action group have carried out improvements to the local surface water drainage system along Drappers Lane in the past few years.
- Please confirm details of existing or planned flood alleviation and defences in this area.
None that we are aware of for the proposed development site. However, we are aware that the EA are currently looking at the local flood risk posed by the Black Ditch to the village of Angmering.
- Please confirm if you are aware of any historic flooding within the confines of the site.
None that we are aware of.
- Please confirm if you are aware of any historic flooding in close vicinity and/or on the public highway.
We are aware that Drappers Lane has flooded a number of times in the past 10 years. This uncontrolled flow of surface water has flowed south into Water Lane and ended up in Angmering village square.

Groundwater

- Please confirm details of any groundwater flooding issues in the area, including flood levels, flood extents and any available anecdotal information.
Based on current JBA ground water risk maps the site is shown to be at negligible risk of ground water flooding.

Assets

- Please confirm mapping and records for any surface water assets owned or maintained.
Please see attached mapping.
- Please confirm if there are any historic culverted watercourses within or in close vicinity to the site. Please provide map records where available.
None that we are aware of. The site boundaries may have once been ditches / watercourses, this should be investigated further.

West Sussex County Council Enquiry

- Please can you provide any map records denoting the highway drainage network. Is this a piped system or soakaways?

See attached mapping. Drappers Lane has a combination of ditches and positive drainage system running south along the eastern verge.

Policy/Future

- Please confirm the most recent Strategic Flood Risk Assessment (SFRA).
WSSCC – SFRA dated January 2010.
- Please confirm if there are any future drainage improvements proposed for this area.
None planned.
- Please confirm if any drainage studies and/or SWMP have/are being assess for this area.
The Black Ditch is part of a current EA study looking at historic flood in Angmering.

Kevin Macknay
Flood Risk Management – Team Leader
Economy, Infrastructure and Environment
Highways and Transport
West Sussex County Council

 CALL  IM  EMAIL

Location: Western Area Office, Drayton Lane, Nr. Chichester, West Sussex, PO20 2AJ.

Contact: Internal: 26429 | External: +44 (0)330 222 6429 | Mobile: +44 (0)7540 641819

E-mail: kevin.macknay@westsussex.gov.uk

[Report a problem with a road or pavement or raise a highways related enquiry](#)

Follow us at  @WSHighways

From: Mark Akmenkalns [redacted]
Sent: 24 July 2017 12:26
To: Kevin Macknay; Paul Cann
Subject: D1260 - Dapper's Lane, Angmering, BN16 4EW - FRA & DS Enquiry 17-07-24

Dear Kevin/Paul,

We are preparing a drainage strategy for the above site and would be grateful if you could provide us with any relevant information you have as per our drainage checklist below:

Flood Zones

- Please confirm the Flood Zones for this area.
- Please confirm surface water, reservoir flooding, sewer flooding. Please provide plans and depth data from your GIS UFMSW for 30yr, 100yr & 1000yr as applicable (OS Datum).
- Please confirm mapping and records for any surface water assets owned or maintained.
- Please confirm if there are any future drainage improvements proposed for this area.
- Please confirm details of existing or planned flood alleviation and defences in this area.
- Please confirm if you are aware of any historic flooding within the confines of the site.
- Please confirm if you are aware of any historic flooding in close vicinity and/or on the public highway.

Groundwater

West Sussex County Council Enquiry

- Please confirm details of any groundwater flooding issues in the area, including flood levels, flood extents and any available anecdotal information.

Assets

- Please confirm mapping and records for any surface water assets owned or maintained.
- Please confirm if there are any historic culverted watercourses within or in close vicinity to the site. Please provide map records where available.
- Please can you provide any map records denoting the highway drainage network. Is this a piped system or soakaways?

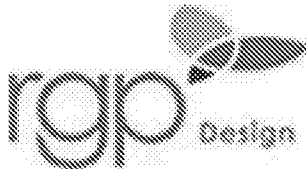
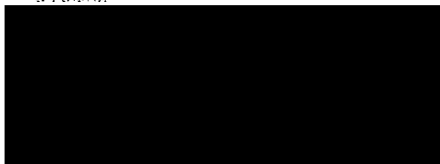
Policy/Future

- Please confirm the most recent Strategic Flood Risk Assessment (SFRA).
- Please confirm if there are any future drainage improvements proposed for this area.
- Please confirm if any drainage studies and/or SWMP have/are being assess for this area.

We look forward to hearing from you in due course.

Regards,

Mark Akmenkains
Director



Transport Planning and Infrastructure Design Consultants

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Appendix I - Microdrainage Calculations

RGP Design Limited		Page 1
2 West Barn Norton Lane Chichester PO20 3AF	Land at Dappers Lane Angmering Greenfield Run-Off	
Date 20/11/2019 File	Designed by SPB Checked by MJA	
Innovyze Source Control 2018.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	3.700	Urban	0.000
SAAR (mm)	747	Region Number	Region 7

Results l/s

QBAR Rural	13.6
QBAR Urban	13.6
Q100 years	43.3
Q1 year	11.5
Q30 years	30.8
Q100 years	43.3

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RGP Design Limited		Page 1
2 West Barn Norton Lane Chichester PO20 3AF	Land at Dappers Lane Angmering Greenfield Volume	
Date 20/11/2019 File	Designed by SPB Checked by MJA	
Innovyze Source Control 2018.1		

Greenfield Runoff Volume

FSR Data

Return Period (years)	100
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	19.500
Ratio R	0.350
Areal Reduction Factor	1.00
Area (ha)	3.700
SAAR (mm)	743
CWI	110.548
Urban	0.000
SPR	37.000

Results

Percentage Runoff (%)	37.60
Greenfield Runoff Volume (m ³)	896.636

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Appendix J - Causeway Flow Hydraulic Calculations



RGP Design Limited
2 West Barn
Norton Lane
Chichester

File: D1260 SW 84 Unit Scheme 2C
Network: Surface Water
Mark Akmenkalns/Stuart Burnett
21/11/2019

Page 1
Land at Dappers Lane
Angmering

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	8	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	19.700	Minimum Backdrop Height (m)	0.200
Ratio-R	0.350	Preferred Cover Depth (m)	0.900
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
37	0.000	5.00	21.000	1200	507067.618	105094.935	1.200
36	0.000		21.000	1200	507061.272	105087.207	1.300
35	0.037	5.00	21.600	450	507021.498	105135.498	0.600
34	0.003	5.00	22.100	450	507017.340	105182.030	0.600
33	0.022	5.00	23.000	450	507011.892	105223.146	1.050
32	0.113	5.00	22.834	1200	507012.208	105212.885	1.000
31	0.015	5.00	22.500	1200	507012.208	105189.126	0.934
30	0.022	5.00	22.450	1200	507014.413	105170.320	1.098
29	0.061	5.00	22.350	1200	507014.413	105155.930	1.160
28	0.008	5.00	22.000	1200	507010.285	105133.240	1.070
27	0.000		21.750	1200	507004.325	105126.064	0.925
26	0.066	5.00	21.500	1200	507004.325	105105.538	0.907
25	0.000		21.000	1200	507051.191	105095.167	1.042
24	0.058	5.00	22.000	450	507063.179	105136.295	1.050
23	0.048	5.00	22.800	450	507074.835	105179.393	1.050
22	0.008	5.00	23.000	450	507042.066	105204.036	1.050
21	0.070	5.00	23.250	1200	507044.411	105208.011	1.346
20	0.080	5.00	23.550	450	507085.843	105222.635	1.050
19	0.004	5.00	24.950	450	507118.205	105206.679	1.050
18	0.038	5.00	24.350	450	507148.168	105194.097	1.050
17	0.008	5.00	24.250	450	507160.468	105181.210	1.050
16	0.037	5.00	23.600	450	507174.586	105157.594	1.050
15	0.005	5.00	24.000	450	507195.841	105172.966	1.050
14	0.021	5.00	23.700	450	507230.413	105161.466	1.050
13	0.042	5.00	24.000	450	507223.633	105180.530	1.050
12	0.090	5.00	23.750	1200	507226.259	105167.217	1.246
11	0.026	5.00	23.750	1200	507202.626	105164.313	1.387
10	0.087	5.00	23.650	1200	507174.770	105167.217	1.527
9	0.023	5.00	24.000	1200	507159.368	105173.494	1.945
8	0.079	5.00	24.300	1200	507141.384	105182.749	2.328
7	0.105	5.00	24.750	1350	507102.428	105206.604	3.040
6	0.187	5.00	23.500	1350	507086.186	105210.484	1.842
5	0.062	5.00	23.500	1350	507064.404	105207.495	2.095
4	0.012	5.00	23.500	1350	507065.699	105186.887	2.146
3	0.036	5.00	22.750	1350	507070.829	105170.166	1.439
2	0.090	5.00	22.000	1350	507067.107	105139.084	1.350
1	0.000		21.000	1350	507082.115	105122.997	1.042

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.011	2	1	22.001	0.600	20.650	20.050	0.600	36.7	450	8.79	50.0
11.000	24	2	4.817	0.600	20.950	20.902	0.048	100.4	150	5.08	50.0
1.010	3	2	31.304	0.600	21.311	20.650	0.661	47.4	450	8.68	50.0
10.000	23	3	10.059	0.600	21.750	21.611	0.139	72.4	150	5.14	50.0
1.009	4	3	17.490	0.600	21.354	21.311	0.043	406.7	450	8.51	50.0
1.008	5	4	20.649	0.600	21.405	21.354	0.051	404.9	450	8.22	50.0
9.001	21	5	20.000	0.600	21.904	21.705	0.199	100.5	150	5.41	50.0
1.007	6	5	21.986	0.600	21.658	21.480	0.178	123.5	375	7.87	50.0
8.000	20	6	12.156	0.600	22.500	22.379	0.121	100.5	150	5.20	50.0
1.006	7	6	16.699	0.600	21.710	21.658	0.052	321.1	375	7.65	50.0
7.000	19	7	15.777	0.600	22.900	22.700	0.200	78.9	150	5.23	50.0
1.005	8	7	45.680	0.600	21.972	21.785	0.187	244.3	300	7.37	50.0
6.000	18	8	13.221	0.600	22.300	22.168	0.132	100.2	150	5.22	50.0
1.004	9	8	20.226	0.600	22.055	21.972	0.083	243.7	300	6.61	50.0
1.003	10	9	16.636	0.600	22.123	22.055	0.068	244.7	300	6.27	50.0
5.000	17	9	7.794	0.600	22.200	22.950	0.250	31.2	150	5.07	50.0
1.002	11	10	28.012	0.600	22.363	22.198	0.165	169.8	225	6.00	50.0
4.000	16	10	9.625	0.600	22.550	22.273	0.277	34.7	150	5.09	50.0
3.000	15	11	10.996	0.600	22.950	22.700	0.250	44.0	150	5.12	50.0
1.001	12	11	23.811	0.600	22.504	22.363	0.141	163.9	225	5.53	50.0
2.000	14	12	7.094	0.600	22.650	22.579	0.071	99.9	150	5.12	50.0
1.000	13	12	13.570	0.600	22.950	22.579	0.371	36.6	150	5.14	50.0
9.000	22	21	4.615	0.600	21.950	21.904	0.046	100.3	150	5.08	50.0
12.007	26	25	48.000	0.600	20.593	20.293	0.300	160.0	300	7.09	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.011	3.365	535.2	178.0	0.900	0.500	1.216	0.0	178	3.037
11.000	1.003	17.7	8.5	0.900	0.948	0.058	0.0	73	0.991
1.010	2.960	470.7	156.3	0.989	0.900	1.068	0.0	178	2.671
10.000	1.183	20.9	7.0	0.900	0.989	0.048	0.0	60	1.070
1.009	1.002	159.3	144.0	1.696	0.989	0.984	0.0	337	1.128
1.008	1.004	159.7	142.3	1.645	1.696	0.972	0.0	333	1.128
9.001	1.002	17.7	11.4	1.196	1.645	0.078	0.0	88	1.063
1.007	1.629	179.9	121.8	1.467	1.645	0.832	0.0	227	1.745
8.000	1.002	17.7	11.7	0.900	0.971	0.080	0.0	89	1.071
1.006	1.005	111.0	82.7	2.665	1.467	0.565	0.0	242	1.098
7.000	1.133	20.0	0.6	0.900	0.900	0.004	0.0	18	0.504
1.005	1.001	70.8	66.7	2.028	2.665	0.456	0.0	233	1.133
6.000	1.004	17.7	5.6	0.900	0.982	0.038	0.0	58	0.890
1.004	1.003	70.9	49.6	1.645	2.028	0.339	0.0	185	1.082
1.003	1.000	70.7	45.1	1.227	1.645	0.308	0.0	174	1.059
5.000	1.809	32.0	1.2	0.900	0.900	0.008	0.0	20	0.859
1.002	1.000	39.8	26.9	1.162	1.227	0.184	0.0	136	1.072
4.000	1.713	30.3	5.4	0.900	1.227	0.037	0.0	43	1.303
3.000	1.521	26.9	0.7	0.900	0.900	0.005	0.0	17	0.665
1.001	1.003	39.9	22.4	1.021	1.162	0.153	0.0	121	1.032
2.000	1.005	17.8	3.1	0.900	1.021	0.021	0.0	42	0.752
1.000	1.669	29.5	6.1	0.900	1.021	0.042	0.0	47	1.325
9.000	1.003	17.7	1.2	0.900	1.196	0.008	0.0	26	0.567
12.007	1.240	87.7	50.8	0.607	0.407	0.347	0.0	164	1.283

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
12.006	27	26	20.526	0.600	20.825	20.593	0.232	88.5	300	6.44	50.0
12.005	28	27	9.328	0.600	20.930	20.825	0.105	88.8	300	6.24	50.0
14.000	35	28	11.438	0.600	21.000	20.930	0.070	163.4	150	5.24	50.0
12.004	29	28	23.062	0.600	21.190	21.030	0.160	144.1	300	6.15	50.0
12.003	30	29	14.390	0.600	21.352	21.252	0.100	143.9	300	5.85	50.0
13.000	34	30	12.070	0.600	21.500	21.352	0.148	81.6	150	5.18	50.0
12.002	31	30	18.935	0.600	21.566	21.452	0.114	166.1	300	5.67	50.0
12.001	32	31	23.759	0.600	21.834	21.666	0.168	141.4	300	5.41	50.0
12.000	33	32	10.266	0.600	21.950	21.850	0.100	102.7	300	5.11	50.0
15.000	37	36	10.000	0.600	19.800	19.700	0.100	100.0	150	5.17	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
12.006	1.672	118.2	41.1	0.625	0.607	0.281	0.0	122	1.524
12.005	1.669	117.9	41.1	0.770	0.625	0.281	0.0	122	1.524
14.000	0.783	13.8	5.4	0.450	0.920	0.037	0.0	65	0.737
12.004	1.307	92.4	34.5	0.860	0.670	0.236	0.0	127	1.215
12.003	1.308	92.5	25.6	0.798	0.798	0.175	0.0	108	1.123
13.000	1.114	19.7	0.4	0.450	0.948	0.003	0.0	16	0.452
12.002	1.217	86.0	22.0	0.634	0.698	0.150	0.0	103	1.021
12.001	1.320	93.3	19.8	0.700	0.534	0.135	0.0	93	1.054
12.000	1.551	109.7	3.2	0.750	0.684	0.022	0.0	35	0.696
15.000	1.005	17.8	0.0	1.050	1.150	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.011	22.001	36.7	450	Circular	22.000	20.650	0.900	21.000	20.050	0.500
11.000	4.817	100.4	150	Circular	22.000	20.950	0.900	22.000	20.902	0.948
1.010	31.304	47.4	450	Circular	22.750	21.311	0.989	22.000	20.650	0.900
10.000	10.059	72.4	150	Circular	22.800	21.750	0.900	22.750	21.611	0.989
1.009	17.490	406.7	450	Circular	23.500	21.354	1.696	22.750	21.311	0.989
1.008	20.649	404.9	450	Circular	23.500	21.405	1.645	23.500	21.354	1.696
9.001	20.000	100.5	150	Circular	23.250	21.904	1.196	23.500	21.705	1.645
1.007	21.986	123.5	375	Circular	23.500	21.658	1.467	23.500	21.480	1.645
8.000	12.156	100.5	150	Circular	23.550	22.500	0.900	23.500	22.379	0.971
1.006	16.699	321.1	375	Circular	24.750	21.710	2.665	23.500	21.658	1.467

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.011	2	1350	Manhole	Adoptable	1	1350	Manhole	Adoptable
11.000	24	450	Manhole	Adoptable	2	1350	Manhole	Adoptable
1.010	3	1350	Manhole	Adoptable	2	1350	Manhole	Adoptable
10.000	23	450	Manhole	Adoptable	3	1350	Manhole	Adoptable
1.009	4	1350	Manhole	Adoptable	3	1350	Manhole	Adoptable
1.008	5	1350	Manhole	Adoptable	4	1350	Manhole	Adoptable
9.001	21	1200	Manhole	Adoptable	5	1350	Manhole	Adoptable
1.007	6	1350	Manhole	Adoptable	5	1350	Manhole	Adoptable
8.000	20	450	Manhole	Adoptable	6	1350	Manhole	Adoptable
1.006	7	1350	Manhole	Adoptable	6	1350	Manhole	Adoptable

Pipeline Schedule

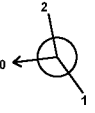
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
7.000	15.777	78.9	150	Circular	24.950	23.900	0.900	24.750	23.700	0.900
1.005	45.680	244.3	300	Circular	24.300	21.972	2.028	24.750	21.785	2.665
6.000	13.221	100.2	150	Circular	24.350	23.300	0.900	24.300	23.168	0.982
1.004	20.226	243.7	300	Circular	24.000	22.055	1.645	24.300	21.972	2.028
1.003	16.636	244.7	300	Circular	23.650	22.123	1.227	24.000	22.055	1.645
5.000	7.794	31.2	150	Circular	24.250	23.200	0.900	24.000	22.950	0.900
1.002	28.012	169.8	225	Circular	23.750	22.363	1.162	23.650	22.198	1.227
4.000	9.625	34.7	150	Circular	23.600	22.550	0.900	23.650	22.273	1.227
3.000	10.996	44.0	150	Circular	24.000	22.950	0.900	23.750	22.700	0.900
1.001	23.811	168.9	225	Circular	23.750	22.504	1.021	23.750	22.363	1.162
2.000	7.094	99.9	150	Circular	23.700	22.650	0.900	23.750	22.579	1.021
1.000	13.570	36.6	150	Circular	24.000	22.950	0.900	23.750	22.579	1.021
9.000	4.615	100.3	150	Circular	23.000	21.950	0.900	23.250	21.904	1.196
12.007	48.000	160.0	300	Circular	21.500	20.593	0.607	21.000	20.293	0.407
12.006	20.526	88.5	300	Circular	21.750	20.825	0.625	21.500	20.593	0.607
12.005	9.328	88.8	300	Circular	22.000	20.930	0.770	21.750	20.825	0.625
14.000	11.438	163.4	150	Circular	21.600	21.000	0.450	22.000	20.930	0.920
12.004	23.062	144.1	300	Circular	22.350	21.190	0.660	22.000	21.030	0.670
12.003	14.390	143.9	300	Circular	22.450	21.352	0.798	22.350	21.252	0.798
13.000	12.070	81.6	150	Circular	22.100	21.500	0.450	22.450	21.352	0.948
12.002	18.935	166.1	300	Circular	22.500	21.566	0.634	22.450	21.452	0.698
12.001	23.759	141.4	300	Circular	22.834	21.834	0.700	22.500	21.666	0.534
12.000	10.266	102.7	300	Circular	23.000	21.950	0.750	22.834	21.850	0.684
15.000	10.000	100.0	150	Circular	21.000	19.800	1.050	21.000	19.700	1.150

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
7.000	19	450	Manhole	Adoptable	7	1350	Manhole	Adoptable
1.005	8	1200	Manhole	Adoptable	7	1350	Manhole	Adoptable
6.000	18	450	Manhole	Adoptable	8	1200	Manhole	Adoptable
1.004	9	1200	Manhole	Adoptable	8	1200	Manhole	Adoptable
1.003	10	1200	Manhole	Adoptable	9	1200	Manhole	Adoptable
5.000	17	450	Manhole	Adoptable	9	1200	Manhole	Adoptable
1.002	11	1200	Manhole	Adoptable	10	1200	Manhole	Adoptable
4.000	16	450	Manhole	Adoptable	10	1200	Manhole	Adoptable
3.000	15	450	Manhole	Adoptable	11	1200	Manhole	Adoptable
1.001	12	1200	Manhole	Adoptable	11	1200	Manhole	Adoptable
2.000	14	450	Manhole	Adoptable	12	1200	Manhole	Adoptable
1.000	13	450	Manhole	Adoptable	12	1200	Manhole	Adoptable
9.000	22	450	Manhole	Adoptable	21	1200	Manhole	Adoptable
12.007	26	1200	Manhole	Adoptable	25	1200	Manhole	Adoptable
12.006	27	1200	Manhole	Adoptable	26	1200	Manhole	Adoptable
12.005	28	1200	Manhole	Adoptable	27	1200	Manhole	Adoptable
14.000	35	450	Manhole	Adoptable	28	1200	Manhole	Adoptable
12.004	29	1200	Manhole	Adoptable	28	1200	Manhole	Adoptable
12.003	30	1200	Manhole	Adoptable	29	1200	Manhole	Adoptable
13.000	34	450	Manhole	Adoptable	30	1200	Manhole	Adoptable
12.002	31	1200	Manhole	Adoptable	30	1200	Manhole	Adoptable
12.001	32	1200	Manhole	Adoptable	31	1200	Manhole	Adoptable
12.000	33	450	Manhole	Adoptable	32	1200	Manhole	Adoptable
15.000	37	1200	Manhole	Adoptable	36	1200	Manhole	Adoptable

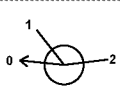
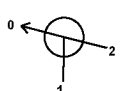
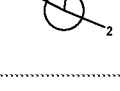
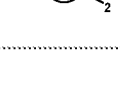
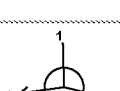
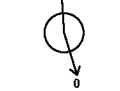
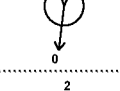
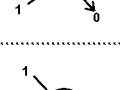
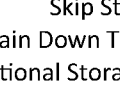
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
37	507067.618	105094.935	21.000	1.200	1200		0	15.000	150
36	507061.272	105087.207	21.000	1.300	1200		1	15.000	150
35	507021.498	105135.498	21.600	0.600	450		0	14.000	150
34	507017.340	105182.030	22.100	0.600	450		0	13.000	150
33	507011.892	105223.146	23.000	1.050	450		0	12.000	300
32	507012.208	105212.885	22.834	1.000	1200		1	12.000	300
31	507012.208	105189.126	22.500	0.934	1200		0	12.001	300
30	507014.413	105170.320	22.450	1.098	1200		1	12.002	300
29	507014.413	105155.930	22.350	1.160	1200		0	12.003	300
28	507010.285	105133.240	22.000	1.070	1200		1	12.004	300
27	507004.325	105126.064	21.750	0.925	1200		0	12.005	300
26	507004.325	105105.538	21.500	0.907	1200		1	12.006	300
25	507051.191	105095.167	21.000	1.042	1200		0	12.007	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
24	507063.179	105136.295	22.000	1.050	450		0	11.000	20.950	150
23	507074.835	105179.393	22.800	1.050	450		0	10.000	21.750	150
22	507042.066	105204.036	23.000	1.050	450		0	9.000	21.950	150
21	507044.411	105208.011	23.250	1.346	1200		1	9.000	21.904	150
20	507085.843	105222.635	23.550	1.050	450		0	9.001	21.904	150
19	507118.205	105206.679	24.950	1.050	450		0	8.000	22.500	150
18	507148.168	105194.097	24.350	1.050	450		0	7.000	23.900	150
17	507160.468	105181.210	24.250	1.050	450		0	6.000	23.300	150
16	507174.586	105157.594	23.600	1.050	450		0	5.000	23.200	150
15	507195.841	105172.966	24.000	1.050	450		0	4.000	22.550	150
14	507230.413	105161.466	23.700	1.050	450		0	3.000	22.950	150
13	507223.633	105180.530	24.000	1.050	450		0	2.000	22.650	150
12	507226.259	105167.217	23.750	1.246	1200		0	1.000	22.950	150
							1 2 0	2.000 1.000 1.001	22.579 22.579 22.504	150 150 225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
11	507202.626	105164.313	23.750	1.387	1200		1 3.000 2 1.001	22.700 22.363	150 225
10	507174.770	105167.217	23.650	1.527	1200		0 1.002 1 4.000 2 1.002	22.363 22.273 22.198	225 150 225
9	507159.368	105173.494	24.000	1.945	1200		0 1.003 1 5.000 2 1.003	22.123 22.950 22.055	300 150 300
8	507141.384	105182.749	24.300	2.328	1200		0 1.004 1 6.000 2 1.004	22.055 23.168 21.972	300 150 300
7	507102.428	105206.604	24.750	3.040	1350		0 1.005 1 7.000 2 1.005	21.972 23.700 21.785	300 150 300
6	507086.186	105210.484	23.500	1.842	1350		0 1.006 1 8.000 2 1.006	21.710 22.379 21.658	375 150 375
5	507064.404	105207.495	23.500	2.095	1350		0 1.007 1 9.001 2 1.007	21.658 21.705 21.480	375 150 375
4	507065.699	105186.887	23.500	2.146	1350		0 1.008 1 1.008	21.405 21.354	450 450
3	507070.829	105170.166	22.750	1.439	1350		0 1.009 1 10.000 2 1.009	21.354 21.611 21.311	450 150 450
2	507067.107	105139.084	22.000	1.350	1350		0 1.010 1 11.000 2 1.010	21.311 20.902 20.650	450 150 450
1	507082.115	105122.997	21.000	1.042	1350		0 1.011 1 1.011	20.650 20.050	450 450

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	19.700	Drain Down Time (mins)	240
Ratio-R	0.350	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 30 60 120 180 240 360

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	40	0	0
2	40	0	0
30	40	0	0
100	40	0	0

Node 13 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	22.950	Diameter (m)	0.026		

Node 14 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	22.650	Diameter (m)	0.026		

Node 15 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	22.950	Diameter (m)	0.026		

Node 16 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	22.550	Diameter (m)	0.026		

Node 17 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	23.200	Diameter (m)	0.026		

Node 18 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	23.300	Diameter (m)	0.026		

Node 19 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	23.900	Diameter (m)	0.026		

Node 20 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	22.500	Diameter (m)	0.026		

Node 22 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	21.950	Diameter (m)	0.026		

Node 23 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	21.750	Diameter (m)	0.026		

Node 24 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	20.950	Diameter (m)	0.026		

Node 33 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	21.950	Diameter (m)	0.026		

Node 34 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	21.500	Diameter (m)	0.026		

Node 35 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	21.000	Diameter (m)	0.026		

Node 36 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	19.700	Product Number	CTL-SHE-0146-1000-1000-1000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	10.0	Min Node Diameter (mm)	1200

Node 1 Online Orifice Control

Flap Valve	x	Invert Level (m)	19.958	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node 25 Online Orifice Control

Flap Valve	x	Invert Level (m)	19.958	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.225		

Node 37 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	31.586
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	19.800	Main Channel Slope (1:X)	200.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.025

Inlets

1 25

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	652.8	0.0	0.400	766.0	0.0	0.800	888.3	0.0	1.200	1019.6	0.0

Node 13 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	22.950	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	192	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	39.567		

Node 14 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	22.650	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	62	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	19.247		

Node 15 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	22.950	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	9.358		

Node 16 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	22.550	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	60	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	65.070		

Node 17 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	23.200	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	16.781		

Node 18 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	23.300	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	112	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	52.091		

Node 19 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	23.900	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	7.419		

Node 20 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	22.500	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	160.199		

Node 22 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	21.950	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	15.740		

Node 23 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	21.750	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	96.002		

Node 24 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	20.950	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	116.197		

Node 33 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	21.950	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	43.918		

Node 34 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	21.500	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	6.837		

Node 35 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	21.000	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.32	Length (m)	74.987		

Results for 1 year +40% CC Critical Storm Duration. Lowest mass balance: 99.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	37	344	20.196	0.396	30.4	0.4475	0.0000	SURCHARGED
360 minute winter	36	344	20.156	0.456	10.0	0.5153	0.0000	OK
180 minute winter	35	136	21.162	0.162	1.8	4.4228	0.0000	SURCHARGED
30 minute winter	34	24	21.532	0.032	0.4	0.1744	0.0000	OK
60 minute winter	33	51	22.065	0.115	2.2	2.1840	0.0000	OK
15 minute winter	32	10	21.934	0.100	21.3	0.3386	0.0000	OK
15 minute winter	31	11	21.678	0.112	23.4	0.1630	0.0000	OK
15 minute winter	30	11	21.472	0.120	27.5	0.1839	0.0000	OK
15 minute winter	29	11	21.332	0.142	38.4	0.3108	0.0000	OK
15 minute winter	28	11	21.066	0.136	40.1	0.1740	0.0000	OK
15 minute winter	27	11	20.953	0.128	40.1	0.1444	0.0000	OK
15 minute winter	26	12	20.761	0.168	51.4	0.4334	0.0000	OK
15 minute winter	25	12	20.298	0.340	50.3	0.3846	0.0000	OK
180 minute winter	24	140	21.195	0.245	2.9	7.7744	0.0000	SURCHARGED
180 minute winter	23	140	21.948	0.198	2.4	6.1311	0.0000	SURCHARGED
30 minute winter	22	26	22.012	0.062	1.2	0.6295	0.0000	OK
15 minute winter	21	11	22.001	0.097	13.0	0.2107	0.0000	OK
240 minute winter	20	184	22.846	0.346	3.3	11.3959	0.0000	SURCHARGED
30 minute winter	19	24	23.938	0.038	0.6	0.2449	0.0000	OK
120 minute winter	18	96	23.466	0.166	2.5	4.5752	0.0000	SURCHARGED
60 minute winter	17	44	23.260	0.060	0.8	0.5947	0.0000	OK
180 minute winter	16	136	22.712	0.162	1.8	4.3505	0.0000	SURCHARGED
60 minute winter	15	43	22.994	0.044	0.5	0.3215	0.0000	OK
120 minute winter	14	90	22.763	0.113	1.4	2.0704	0.0000	OK
180 minute winter	13	136	23.127	0.177	2.1	5.1756	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	37	15.000	36	10.0	0.619	0.564	0.1760	307.4
360 minute winter	36	Hydro-Brake®		10.0				
180 minute winter	35	14.000	28	0.5	0.383	0.038	0.0515	
30 minute winter	34	13.000	30	0.2	0.146	0.010	0.0832	
60 minute winter	33	12.000	32	0.4	0.381	0.004	0.0540	
15 minute winter	32	12.001	31	20.7	1.049	0.222	0.4704	
15 minute winter	31	12.002	30	23.6	1.018	0.274	0.4385	
15 minute winter	30	12.003	29	27.7	1.106	0.299	0.3601	
15 minute winter	29	12.004	28	38.5	1.218	0.416	0.7284	
15 minute winter	28	12.005	27	40.1	1.346	0.340	0.2777	
15 minute winter	27	12.006	26	39.9	1.161	0.337	0.7049	
15 minute winter	26	12.007	25	50.3	1.276	0.574	1.8940	
15 minute winter	25	Flow through pond	37	198.1	0.227	0.004	92.8116	
180 minute winter	24	11.000	2	0.7	0.473	0.038	0.0068	
180 minute winter	23	10.000	3	0.6	0.519	0.029	0.0116	
30 minute winter	22	9.000	21	0.4	0.362	0.023	0.0325	
15 minute winter	21	9.001	5	12.5	1.063	0.703	0.2344	
240 minute winter	20	8.000	6	0.8	0.506	0.045	0.0193	
30 minute winter	19	7.000	7	0.2	0.375	0.011	0.0094	
120 minute winter	18	6.000	8	0.5	0.451	0.031	0.0159	
60 minute winter	17	5.000	9	0.3	0.567	0.010	0.0042	
180 minute winter	16	4.000	10	0.5	0.652	0.018	0.0080	
60 minute winter	15	3.000	11	0.2	0.474	0.009	0.0058	
120 minute winter	14	2.000	12	0.4	0.421	0.025	0.0074	
180 minute winter	13	1.000	12	0.6	0.651	0.019	0.0119	

Results for 1 year +40% CC Critical Storm Duration. Lowest mass balance: 99.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	12	10	22.611	0.107	17.4	0.2744	0.0000	OK
15 minute winter	11	11	22.486	0.123	22.0	0.1858	0.0000	OK
15 minute winter	10	11	22.297	0.174	37.5	0.3949	0.0000	OK
15 minute winter	9	11	22.239	0.184	41.8	0.2521	0.0000	OK
15 minute winter	8	11	22.177	0.205	55.8	0.3714	0.0000	OK
15 minute winter	7	11	21.956	0.246	72.5	0.5212	0.0000	OK
15 minute winter	6	11	21.889	0.231	105.4	0.7996	0.0000	OK
15 minute winter	5	11	21.719	0.314	128.1	0.6352	0.0000	OK
15 minute winter	4	11	21.622	0.268	129.4	0.4129	0.0000	OK
15 minute winter	3	11	21.486	0.175	135.5	0.3372	0.0000	OK
15 minute winter	2	11	20.820	0.170	151.2	0.4690	0.0000	OK
15 minute winter	1	12	20.332	0.374	150.2	0.5355	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	12	1.001	11	17.0	0.849	0.427	0.4805	
15 minute winter	11	1.002	10	21.8	1.009	0.549	0.6063	
15 minute winter	10	1.003	9	37.6	0.860	0.531	0.7300	
15 minute winter	9	1.004	8	41.6	0.864	0.588	0.9786	
15 minute winter	8	1.005	7	54.4	1.139	0.769	2.1834	
15 minute winter	7	1.006	6	72.1	1.003	0.649	1.2331	
15 minute winter	6	1.007	5	104.9	1.458	0.583	1.5974	
15 minute winter	5	1.008	4	127.3	1.176	0.798	2.2336	
15 minute winter	4	1.009	3	128.8	1.670	0.809	1.3556	
15 minute winter	3	1.010	2	135.0	2.445	0.287	1.7439	
15 minute winter	2	1.011	1	150.2	2.093	0.281	1.7450	
15 minute winter	1	Flow through pond	37	198.1	0.227	0.004	92.8116	

Results for 2 year +40% CC Critical Storm Duration. Lowest mass balance: 99.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	37	352	20.290	0.490	33.6	0.5544	0.0000	SURCHARGED
360 minute winter	36	352	20.253	0.553	10.0	0.6251	0.0000	OK
180 minute winter	35	140	21.188	0.188	2.3	5.9093	0.0000	SURCHARGED
30 minute winter	34	24	21.538	0.038	0.6	0.2350	0.0000	OK
120 minute winter	33	92	22.084	0.134	1.8	2.9485	0.0000	OK
15 minute winter	32	10	21.949	0.115	27.5	0.3906	0.0000	OK
15 minute winter	31	11	21.696	0.130	30.3	0.1886	0.0000	OK
15 minute winter	30	11	21.492	0.140	35.6	0.2138	0.0000	OK
15 minute winter	29	11	21.357	0.167	49.7	0.3645	0.0000	OK
15 minute winter	28	11	21.090	0.160	51.9	0.2054	0.0000	OK
15 minute winter	27	11	20.977	0.152	51.9	0.1716	0.0000	OK
15 minute winter	26	12	20.792	0.199	66.6	0.5151	0.0000	OK
15 minute winter	25	12	20.452	0.494	65.2	0.5592	0.0000	OK
180 minute winter	24	148	21.230	0.280	3.6	10.0791	0.0000	SURCHARGED
180 minute winter	23	144	21.977	0.227	3.0	7.9970	0.0000	SURCHARGED
30 minute winter	22	27	22.023	0.073	1.5	0.8851	0.0000	OK
15 minute winter	21	11	22.023	0.119	16.8	0.2577	0.0000	OK
240 minute winter	20	188	22.896	0.396	4.1	14.8268	0.0000	SURCHARGED
30 minute winter	19	24	23.945	0.045	0.8	0.3296	0.0000	OK
120 minute winter	18	108	23.491	0.191	3.1	6.0290	0.0000	SURCHARGED
60 minute winter	17	46	23.270	0.070	1.0	0.8163	0.0000	OK
180 minute winter	16	140	22.738	0.188	2.3	5.8299	0.0000	SURCHARGED
30 minute winter	15	25	23.002	0.052	0.9	0.4453	0.0000	OK
120 minute winter	14	92	22.787	0.137	1.7	2.8088	0.0000	OK
180 minute winter	13	140	23.153	0.203	2.6	6.7943	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	37	15.000	36	10.0	0.620	0.564	0.1760	307.7
360 minute winter	36	Hydro-Brake®		10.0				
180 minute winter	35	14.000	28	0.6	0.397	0.042	0.0588	
30 minute winter	34	13.000	30	0.2	0.179	0.011	0.0958	
120 minute winter	33	12.000	32	0.5	0.388	0.004	0.0457	
15 minute winter	32	12.001	31	26.7	1.123	0.287	0.5692	
15 minute winter	31	12.002	30	30.5	1.087	0.354	0.5308	
15 minute winter	30	12.003	29	35.9	1.180	0.388	0.4374	
15 minute winter	29	12.004	28	49.9	1.296	0.540	0.8877	
15 minute winter	28	12.005	27	51.9	1.403	0.440	0.3452	
15 minute winter	27	12.006	26	51.7	1.209	0.437	0.8754	
15 minute winter	26	12.007	25	65.2	1.349	0.743	2.3189	
15 minute winter	25	Flow through pond	37	256.2	0.260	0.005	121.3215	
180 minute winter	24	11.000	2	0.7	0.483	0.040	0.0072	
180 minute winter	23	10.000	3	0.6	0.530	0.031	0.0122	
30 minute winter	22	9.000	21	0.5	0.377	0.027	0.0426	
15 minute winter	21	9.001	5	16.0	1.106	0.904	0.2894	
240 minute winter	20	8.000	6	0.9	0.516	0.049	0.0203	
30 minute winter	19	7.000	7	0.3	0.390	0.013	0.0102	
120 minute winter	18	6.000	8	0.6	0.461	0.033	0.0168	
60 minute winter	17	5.000	9	0.3	0.585	0.011	0.0045	
180 minute winter	16	4.000	10	0.6	0.667	0.019	0.0085	
30 minute winter	15	3.000	11	0.3	0.491	0.010	0.0063	
120 minute winter	14	2.000	12	0.5	0.434	0.027	0.0080	
180 minute winter	13	1.000	12	0.6	0.665	0.021	0.0125	

Results for 2 year +40% CC Critical Storm Duration. Lowest mass balance: 99.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	12	10	22.629	0.125	22.4	0.3208	0.0000	OK
15 minute winter	11	11	22.509	0.146	28.4	0.2200	0.0000	OK
15 minute winter	10	11	22.337	0.214	48.3	0.4852	0.0000	OK
15 minute winter	9	11	22.286	0.231	53.5	0.3158	0.0000	OK
15 minute winter	8	11	22.230	0.258	71.2	0.4665	0.0000	OK
15 minute winter	7	11	22.010	0.300	93.8	0.6375	0.0000	OK
15 minute winter	6	11	21.942	0.284	136.1	0.9821	0.0000	OK
15 minute winter	5	11	21.780	0.375	165.4	0.7578	0.0000	OK
15 minute winter	4	11	21.664	0.310	167.0	0.4791	0.0000	OK
15 minute winter	3	11	21.513	0.202	174.4	0.3902	0.0000	OK
15 minute winter	2	11	20.850	0.200	194.0	0.5537	0.0000	OK
15 minute winter	1	12	20.401	0.443	193.3	0.6345	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	12	1.001	11	21.9	0.893	0.550	0.5872	
15 minute winter	11	1.002	10	28.2	1.064	0.708	0.7418	
15 minute winter	10	1.003	9	48.1	0.883	0.680	0.9309	
15 minute winter	9	1.004	8	52.9	0.883	0.747	1.2401	
15 minute winter	8	1.005	7	69.9	1.191	0.987	2.7683	
15 minute winter	7	1.006	6	93.1	1.037	0.839	1.5373	
15 minute winter	6	1.007	5	135.4	1.479	0.753	2.0212	
15 minute winter	5	1.008	4	164.3	1.269	1.029	2.6603	
15 minute winter	4	1.009	3	165.9	1.790	1.041	1.6227	
15 minute winter	3	1.010	2	173.8	2.550	0.369	2.1452	
15 minute winter	2	1.011	1	193.3	2.135	0.361	2.2079	
15 minute winter	1	Flow through pond	37	256.2	0.260	0.005	121.3215	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	37	368	20.675	0.875	48.2	0.9894	0.0000	SURCHARGED
360 minute winter	36	368	20.635	0.935	10.0	1.0576	0.0000	OK
180 minute winter	35	164	21.279	0.279	4.2	12.8207	0.0000	SURCHARGED
15 minute winter	34	15	21.575	0.075	1.7	0.6513	0.0000	OK
120 minute winter	33	100	22.152	0.202	3.4	6.6216	0.0000	OK
15 minute winter	32	10	22.002	0.168	51.9	0.5695	0.0000	OK
15 minute winter	31	11	21.758	0.192	57.1	0.2790	0.0000	OK
15 minute winter	30	12	21.714	0.362	66.6	0.5553	0.0000	SURCHARGED
15 minute winter	29	12	21.666	0.476	91.4	1.0395	0.0000	SURCHARGED
15 minute winter	28	12	21.526	0.596	91.4	0.7636	0.0000	SURCHARGED
15 minute winter	27	12	21.451	0.626	76.4	0.7084	0.0000	FLOOD RISK
15 minute winter	26	12	21.323	0.730	102.6	1.8876	0.0000	FLOOD RISK
15 minute winter	25	13	20.899	0.941	96.5	1.0647	0.0000	OK
240 minute winter	24	224	21.363	0.413	5.4	21.7084	0.0000	SURCHARGED
180 minute winter	23	176	22.088	0.338	5.5	17.5635	0.0000	SURCHARGED
30 minute winter	22	29	22.076	0.126	3.6	2.2141	0.0000	OK
15 minute winter	21	12	22.520	0.616	31.9	1.3369	0.0000	SURCHARGED
240 minute winter	20	232	23.083	0.583	7.4	31.5276	0.0000	SURCHARGED
60 minute winter	19	44	23.979	0.079	1.0	0.7427	0.0000	OK
180 minute winter	18	168	23.585	0.285	4.3	13.1678	0.0000	SURCHARGED
60 minute winter	17	49	23.308	0.108	1.9	1.8170	0.0000	OK
180 minute winter	16	164	22.829	0.279	4.2	12.6903	0.0000	SURCHARGED
15 minute winter	15	16	23.040	0.090	2.6	1.0137	0.0000	OK
120 minute winter	14	96	22.893	0.243	3.2	6.1212	0.0000	SURCHARGED
180 minute winter	13	168	23.278	0.328	4.8	14.8148	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	37	15.000	36	10.0	0.628	0.565	0.1760	316.8
360 minute winter	36	Hydro-Brake®		10.0				
180 minute winter	35	14.000	28	0.7	0.422	0.052	0.0941	
15 minute winter	34	13.000	30	-4.1	0.276	-0.207	0.2125	
120 minute winter	33	12.000	32	0.6	0.416	0.006	0.0783	
15 minute winter	32	12.001	31	50.4	1.311	0.540	0.9176	
15 minute winter	31	12.002	30	57.2	1.255	0.665	1.0601	
15 minute winter	30	12.003	29	63.6	1.282	0.688	1.0133	
15 minute winter	29	12.004	28	87.8	1.396	0.950	1.6240	
15 minute winter	28	12.005	27	76.4	1.510	0.648	0.6569	
15 minute winter	27	12.006	26	76.2	1.269	0.644	1.4454	
15 minute winter	26	12.007	25	96.5	1.370	1.101	3.3801	
15 minute winter	25	Flow through pond	37	394.3	0.264	0.007	232.9708	
240 minute winter	24	11.000	2	0.9	0.512	0.050	0.0083	
180 minute winter	23	10.000	3	0.8	0.565	0.038	0.0142	
30 minute winter	22	9.000	21	-1.9	0.416	-0.110	0.0812	
15 minute winter	21	9.001	5	25.6	1.457	1.448	0.3521	
240 minute winter	20	8.000	6	1.1	0.547	0.059	0.0234	
60 minute winter	19	7.000	7	0.4	0.435	0.018	0.0131	
180 minute winter	18	6.000	8	0.7	0.491	0.041	0.0195	
60 minute winter	17	5.000	9	0.4	0.633	0.014	0.0054	
180 minute winter	16	4.000	10	0.7	0.710	0.024	0.0098	
15 minute winter	15	3.000	11	-5.4	0.556	-0.199	0.1936	
120 minute winter	14	2.000	12	0.7	0.476	0.037	0.0101	
180 minute winter	13	1.000	12	0.8	0.717	0.027	0.0149	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	12	12	23.311	0.807	41.1	2.0789	0.0000	SURCHARGED
15 minute winter	11	12	23.237	0.874	38.8	1.3170	0.0000	SURCHARGED
15 minute winter	10	12	23.108	0.985	65.2	2.2371	0.0000	SURCHARGED
15 minute winter	9	12	23.035	0.980	74.7	1.3393	0.0000	SURCHARGED
15 minute winter	8	12	22.922	0.950	98.8	1.7201	0.0000	SURCHARGED
15 minute winter	7	11	22.505	0.795	138.8	1.6876	0.0000	SURCHARGED
15 minute winter	6	11	22.385	0.727	218.0	2.5171	0.0000	SURCHARGED
15 minute winter	5	11	22.029	0.624	266.3	1.2630	0.0000	SURCHARGED
15 minute winter	4	11	21.822	0.468	269.3	0.7215	0.0000	SURCHARGED
15 minute winter	3	11	21.585	0.274	283.2	0.5295	0.0000	OK
15 minute winter	2	12	21.010	0.360	322.2	0.9964	0.0000	OK
15 minute winter	1	12	20.750	0.792	318.1	1.1333	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	12	1.001	11	32.3	0.942	0.811	0.9470	
15 minute winter	11	1.002	10	43.7	1.099	1.099	1.1141	
15 minute winter	10	1.003	9	70.1	0.996	0.992	1.1715	
15 minute winter	9	1.004	8	79.9	1.135	1.128	1.4243	
15 minute winter	8	1.005	7	104.1	1.479	1.471	3.2168	
15 minute winter	7	1.006	6	139.7	1.267	1.258	1.8419	
15 minute winter	6	1.007	5	215.0	1.950	1.195	2.4250	
15 minute winter	5	1.008	4	264.2	1.668	1.655	3.2717	
15 minute winter	4	1.009	3	268.4	2.000	1.685	2.2696	
15 minute winter	3	1.010	2	283.3	2.626	0.602	3.7082	
15 minute winter	2	1.011	1	318.1	2.078	0.594	3.2399	
15 minute winter	1	Flow through pond	37	394.3	0.264	0.007	232.9708	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	37	368	20.888	1.088	60.2	1.2301	0.0000	FLOOD RISK
360 minute winter	36	368	20.840	1.140	10.6	1.2890	0.0000	OK
180 minute winter	35	176	21.330	0.330	5.5	17.8948	0.0000	FLOOD RISK
30 minute winter	34	25	21.621	0.121	2.1	1.1699	0.0000	OK
120 minute winter	33	114	22.190	0.240	4.4	9.2901	0.0000	OK
15 minute winter	32	12	22.196	0.362	66.7	1.2282	0.0000	SURCHARGED
15 minute winter	31	12	22.138	0.572	73.8	0.8300	0.0000	SURCHARGED
15 minute winter	30	12	22.069	0.717	74.7	1.0984	0.0000	SURCHARGED
15 minute winter	29	12	21.996	0.806	103.8	1.7602	0.0000	SURCHARGED
15 minute winter	28	12	21.798	0.868	99.3	1.1120	0.0000	FLOOD RISK
15 minute winter	27	12	21.689	0.864	91.5	0.9768	0.0000	FLOOD RISK
15 minute winter	26	11	21.500	0.907	123.6	2.3455	2.6869	FLOOD
30 minute winter	25	19	21.000	1.042	104.6	1.1785	2.0993	FLOOD
240 minute winter	24	232	21.437	0.487	7.0	30.0823	0.0000	SURCHARGED
180 minute winter	23	176	22.147	0.397	7.2	24.1422	0.0000	SURCHARGED
60 minute winter	22	50	22.114	0.164	3.1	3.1921	0.0000	SURCHARGED
15 minute winter	21	12	23.028	1.124	41.3	2.4403	0.0000	FLOOD RISK
360 minute winter	20	336	23.185	0.685	7.2	43.3328	0.0000	SURCHARGED
60 minute winter	19	46	24.004	0.104	1.3	1.0414	0.0000	OK
180 minute winter	18	172	23.647	0.347	5.7	18.3367	0.0000	SURCHARGED
60 minute winter	17	56	23.336	0.136	2.6	2.5601	0.0000	OK
180 minute winter	16	176	22.880	0.330	5.5	17.7025	0.0000	SURCHARGED
30 minute winter	15	27	23.094	0.144	3.1	1.8487	0.0000	OK
120 minute winter	14	108	22.968	0.318	4.2	8.4875	0.0000	SURCHARGED
180 minute winter	13	176	23.363	0.413	6.3	20.3060	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	37	15.000	36	10.6	0.631	0.600	0.1760	341.4
360 minute winter	36	Hydro-Brake®		10.6				
180 minute winter	35	14.000	28	0.8	0.423	0.057	0.1203	
30 minute winter	34	13.000	30	-3.7	0.314	-0.186	0.2125	
120 minute winter	33	12.000	32	0.7	0.427	0.006	0.0983	
15 minute winter	32	12.001	31	64.9	1.369	0.696	1.6731	
15 minute winter	31	12.002	30	62.5	1.268	0.727	1.3334	
15 minute winter	30	12.003	29	69.9	1.269	0.756	1.0133	
15 minute winter	29	12.004	28	94.9	1.390	1.027	1.6240	
15 minute winter	28	12.005	27	91.5	1.495	0.776	0.6569	
15 minute winter	27	12.006	26	91.1	1.294	0.771	1.4454	
15 minute winter	26	12.007	25	104.6	1.485	1.193	3.3801	
30 minute winter	25	Flow through pond	37	285.8	0.202	0.005	406.3427	
240 minute winter	24	11.000	2	1.0	0.524	0.054	0.0088	
180 minute winter	23	10.000	3	0.9	0.579	0.041	0.0150	
60 minute winter	22	9.000	21	-1.2	0.435	-0.066	0.0812	
15 minute winter	21	9.001	5	30.7	1.745	1.734	0.3521	
360 minute winter	20	8.000	6	1.1	0.560	0.065	0.0249	
60 minute winter	19	7.000	7	0.4	0.455	0.021	0.0146	
180 minute winter	18	6.000	8	0.8	0.507	0.045	0.0210	
60 minute winter	17	5.000	9	0.5	0.659	0.015	0.0058	
180 minute winter	16	4.000	10	0.8	0.729	0.026	0.0104	
30 minute winter	15	3.000	11	-7.4	0.602	-0.277	0.1936	
120 minute winter	14	2.000	12	0.8	0.496	0.043	0.0177	
180 minute winter	13	1.000	12	0.9	0.743	0.030	0.0178	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	12	12	23.750	1.246	53.1	3.2097	1.9816	FLOOD
15 minute winter	11	12	23.726	1.363	43.9	2.0520	0.0000	FLOOD RISK
15 minute winter	10	12	23.650	1.527	76.0	3.4663	0.3759	FLOOD
15 minute winter	9	12	23.588	1.533	81.3	2.0956	0.0000	SURCHARGED
15 minute winter	8	12	23.483	1.511	109.2	2.7345	0.0000	SURCHARGED
15 minute winter	7	12	22.970	1.260	158.9	2.6739	0.0000	SURCHARGED
15 minute winter	6	12	22.811	1.153	259.9	3.9911	0.0000	SURCHARGED
15 minute winter	5	12	22.344	0.939	316.4	1.8997	0.0000	SURCHARGED
15 minute winter	4	12	22.065	0.711	321.2	1.0975	0.0000	SURCHARGED
15 minute winter	3	12	21.806	0.495	339.8	0.9555	0.0000	SURCHARGED
15 minute winter	2	12	21.372	0.722	375.0	1.9957	0.0000	SURCHARGED
15 minute winter	1	12	20.944	0.986	368.8	1.4116	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	12	1.001	11	34.0	0.939	0.854	0.9470	
15 minute winter	11	1.002	10	49.8	1.252	1.251	1.1141	
15 minute winter	10	1.003	9	77.0	1.093	1.089	1.1715	
15 minute winter	9	1.004	8	92.0	1.307	1.299	1.4243	
15 minute winter	8	1.005	7	115.8	1.645	1.636	3.2168	
15 minute winter	7	1.006	6	158.2	1.434	1.425	1.8419	
15 minute winter	6	1.007	5	252.9	2.293	1.406	2.4250	
15 minute winter	5	1.008	4	314.5	1.985	1.970	3.2717	
15 minute winter	4	1.009	3	319.2	2.026	2.004	2.7712	
15 minute winter	3	1.010	2	327.2	2.693	0.695	4.9599	
15 minute winter	2	1.011	1	368.8	2.328	0.689	3.4859	
15 minute winter	1	Flow through pond	37	420.7	0.279	0.008	294.6500	