

APPENDIX VI

Storm Water Calculations

Hemsley Orrell Partnership		Page 1																																																																																																																																																																																																																																																																																		
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Summary of Results for 100 year Return Period (+20%) Half Drain Time : 393 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (1/s)</th><th>Max Control (1/s)</th><th>Max Σ Outflow (1/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>4.066</td><td>0.271</td><td>0.0</td><td>6.0</td><td>6.0</td><td>120.5</td><td>Flood Risk</td></tr><tr><td>30 min Summer</td><td>4.123</td><td>0.328</td><td>0.0</td><td>6.2</td><td>6.2</td><td>163.7</td><td>Flood Risk</td></tr><tr><td>60 min Summer</td><td>4.180</td><td>0.385</td><td>0.0</td><td>6.4</td><td>6.4</td><td>206.6</td><td>Flood Risk</td></tr><tr><td>120 min Summer</td><td>4.229</td><td>0.434</td><td>0.0</td><td>6.6</td><td>6.6</td><td>243.8</td><td>Flood Risk</td></tr><tr><td>180 min Summer</td><td>4.248</td><td>0.453</td><td>0.0</td><td>6.7</td><td>6.7</td><td>258.0</td><td>Flood Risk</td></tr><tr><td>240 min Summer</td><td>4.254</td><td>0.459</td><td>0.0</td><td>6.7</td><td>6.7</td><td>262.3</td><td>Flood Risk</td></tr><tr><td>360 min Summer</td><td>4.250</td><td>0.455</td><td>0.0</td><td>6.7</td><td>6.7</td><td>259.4</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>4.242</td><td>0.447</td><td>0.0</td><td>6.6</td><td>6.6</td><td>253.6</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>4.233</td><td>0.438</td><td>0.0</td><td>6.6</td><td>6.6</td><td>246.6</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>4.224</td><td>0.429</td><td>0.0</td><td>6.6</td><td>6.6</td><td>240.2</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>4.208</td><td>0.413</td><td>0.0</td><td>6.5</td><td>6.5</td><td>228.0</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>4.177</td><td>0.382</td><td>0.0</td><td>6.4</td><td>6.4</td><td>204.2</td><td>Flood Risk</td></tr><tr><td>2160 min Summer</td><td>4.131</td><td>0.336</td><td>0.0</td><td>6.3</td><td>6.3</td><td>169.9</td><td>Flood Risk</td></tr><tr><td>2880 min Summer</td><td>4.090</td><td>0.295</td><td>0.0</td><td>6.1</td><td>6.1</td><td>138.6</td><td>Flood Risk</td></tr><tr><td>4320 min Summer</td><td>4.021</td><td>0.226</td><td>0.0</td><td>5.9</td><td>5.9</td><td>86.9</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>3.966</td><td>0.171</td><td>0.0</td><td>5.7</td><td>5.7</td><td>49.6</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>3.916</td><td>0.121</td><td>0.0</td><td>5.5</td><td>5.5</td><td>24.8</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>3.870</td><td>0.075</td><td>0.0</td><td>5.3</td><td>5.3</td><td>9.4</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>3.828</td><td>0.033</td><td>0.0</td><td>5.1</td><td>5.1</td><td>1.8</td><td>O K</td></tr><tr><td>15 min Winter</td><td>4.088</td><td>0.293</td><td>0.0</td><td>6.1</td><td>6.1</td><td>137.1</td><td>Flood Risk</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>106.828</td><td>0.0</td><td>125.5</td><td>19</td></tr><tr><td>30 min Summer</td><td>71.819</td><td>0.0</td><td>173.1</td><td>33</td></tr><tr><td>60 min Summer</td><td>46.096</td><td>0.0</td><td>225.9</td><td>62</td></tr><tr><td>120 min Summer</td><td>28.574</td><td>0.0</td><td>282.7</td><td>122</td></tr><tr><td>180 min Summer</td><td>21.285</td><td>0.0</td><td>316.5</td><td>182</td></tr><tr><td>240 min Summer</td><td>17.148</td><td>0.0</td><td>341.1</td><td>240</td></tr><tr><td>360 min Summer</td><td>12.605</td><td>0.0</td><td>376.5</td><td>324</td></tr><tr><td>480 min Summer</td><td>10.130</td><td>0.0</td><td>404.5</td><td>384</td></tr><tr><td>600 min Summer</td><td>8.542</td><td>0.0</td><td>426.5</td><td>446</td></tr><tr><td>720 min Summer</td><td>7.427</td><td>0.0</td><td>444.9</td><td>514</td></tr><tr><td>960 min Summer</td><td>5.951</td><td>0.0</td><td>475.4</td><td>652</td></tr><tr><td>1440 min Summer</td><td>4.347</td><td>0.0</td><td>519.9</td><td>924</td></tr><tr><td>2160 min Summer</td><td>3.168</td><td>0.0</td><td>566.2</td><td>1320</td></tr><tr><td>2880 min Summer</td><td>2.528</td><td>0.0</td><td>600.2</td><td>1704</td></tr><tr><td>4320 min Summer</td><td>1.836</td><td>0.0</td><td>648.7</td><td>2460</td></tr><tr><td>5760 min Summer</td><td>1.461</td><td>0.0</td><td>682.5</td><td>3168</td></tr><tr><td>7200 min Summer</td><td>1.223</td><td>0.0</td><td>708.8</td><td>3816</td></tr><tr><td>8640 min Summer</td><td>1.059</td><td>0.0</td><td>731.1</td><td>4496</td></tr><tr><td>10080 min Summer</td><td>0.937</td><td>0.0</td><td>749.2</td><td>5144</td></tr><tr><td>15 min Winter</td><td>106.828</td><td>0.0</td><td>142.0</td><td>18</td></tr></table>				Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status	15 min Summer	4.066	0.271	0.0	6.0	6.0	120.5	Flood Risk	30 min Summer	4.123	0.328	0.0	6.2	6.2	163.7	Flood Risk	60 min Summer	4.180	0.385	0.0	6.4	6.4	206.6	Flood Risk	120 min Summer	4.229	0.434	0.0	6.6	6.6	243.8	Flood Risk	180 min Summer	4.248	0.453	0.0	6.7	6.7	258.0	Flood Risk	240 min Summer	4.254	0.459	0.0	6.7	6.7	262.3	Flood Risk	360 min Summer	4.250	0.455	0.0	6.7	6.7	259.4	Flood Risk	480 min Summer	4.242	0.447	0.0	6.6	6.6	253.6	Flood Risk	600 min Summer	4.233	0.438	0.0	6.6	6.6	246.6	Flood Risk	720 min Summer	4.224	0.429	0.0	6.6	6.6	240.2	Flood Risk	960 min Summer	4.208	0.413	0.0	6.5	6.5	228.0	Flood Risk	1440 min Summer	4.177	0.382	0.0	6.4	6.4	204.2	Flood Risk	2160 min Summer	4.131	0.336	0.0	6.3	6.3	169.9	Flood Risk	2880 min Summer	4.090	0.295	0.0	6.1	6.1	138.6	Flood Risk	4320 min Summer	4.021	0.226	0.0	5.9	5.9	86.9	O K	5760 min Summer	3.966	0.171	0.0	5.7	5.7	49.6	O K	7200 min Summer	3.916	0.121	0.0	5.5	5.5	24.8	O K	8640 min Summer	3.870	0.075	0.0	5.3	5.3	9.4	O K	10080 min Summer	3.828	0.033	0.0	5.1	5.1	1.8	O K	15 min Winter	4.088	0.293	0.0	6.1	6.1	137.1	Flood Risk	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	106.828	0.0	125.5	19	30 min Summer	71.819	0.0	173.1	33	60 min Summer	46.096	0.0	225.9	62	120 min Summer	28.574	0.0	282.7	122	180 min Summer	21.285	0.0	316.5	182	240 min Summer	17.148	0.0	341.1	240	360 min Summer	12.605	0.0	376.5	324	480 min Summer	10.130	0.0	404.5	384	600 min Summer	8.542	0.0	426.5	446	720 min Summer	7.427	0.0	444.9	514	960 min Summer	5.951	0.0	475.4	652	1440 min Summer	4.347	0.0	519.9	924	2160 min Summer	3.168	0.0	566.2	1320	2880 min Summer	2.528	0.0	600.2	1704	4320 min Summer	1.836	0.0	648.7	2460	5760 min Summer	1.461	0.0	682.5	3168	7200 min Summer	1.223	0.0	708.8	3816	8640 min Summer	1.059	0.0	731.1	4496	10080 min Summer	0.937	0.0	749.2	5144	15 min Winter	106.828	0.0	142.0	18
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Micro Drainage			Source Control 2015.1				
<u>Summary of Results for 100 year Return Period (+20%)</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	4.152	0.357	0.0	6.3	6.3	185.9	Flood Risk
60 min Winter	4.217	0.422	0.0	6.6	6.6	234.9	Flood Risk
120 min Winter	4.275	0.480	0.0	6.8	6.8	278.8	Flood Risk
180 min Winter	4.300	0.505	0.0	6.8	6.8	297.5	Flood Risk
240 min Winter	4.310	0.515	0.0	6.9	6.9	305.3	Flood Risk
360 min Winter	4.312	0.517	0.0	6.9	6.9	306.2	Flood Risk
480 min Winter	4.302	0.507	0.0	6.8	6.8	299.3	Flood Risk
600 min Winter	4.291	0.496	0.0	6.8	6.8	290.9	Flood Risk
720 min Winter	4.279	0.484	0.0	6.8	6.8	281.8	Flood Risk
960 min Winter	4.256	0.461	0.0	6.7	6.7	263.9	Flood Risk
1440 min Winter	4.208	0.413	0.0	6.5	6.5	227.7	Flood Risk
2160 min Winter	4.138	0.343	0.0	6.3	6.3	175.3	Flood Risk
2880 min Winter	4.077	0.282	0.0	6.1	6.1	129.0	Flood Risk
4320 min Winter	3.979	0.184	0.0	5.7	5.7	57.6	O K
5760 min Winter	3.889	0.094	0.0	5.3	5.3	14.9	O K
7200 min Winter	3.795	0.000	0.0	4.9	4.9	0.0	O K
8640 min Winter	3.795	0.000	0.0	4.2	4.2	0.0	O K
10080 min Winter	3.795	0.000	0.0	3.7	3.7	0.0	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
30 min Winter	71.819	0.0	195.3	33			
60 min Winter	46.096	0.0	254.1	62			
120 min Winter	28.574	0.0	318.1	120			
180 min Winter	21.285	0.0	356.4	178			
240 min Winter	17.148	0.0	383.4	234			
360 min Winter	12.605	0.0	423.4	344			
480 min Winter	10.130	0.0	454.6	442			
600 min Winter	8.542	0.0	479.0	476			
720 min Winter	7.427	0.0	500.0	550			
960 min Winter	5.951	0.0	534.2	704			
1440 min Winter	4.347	0.0	584.6	1008			
2160 min Winter	3.168	0.0	636.9	1428			
2880 min Winter	2.528	0.0	675.5	1816			
4320 min Winter	1.836	0.0	730.6	2548			
5760 min Winter	1.461	0.0	770.1	3168			
7200 min Winter	1.223	0.0	800.5	0			
8640 min Winter	1.059	0.0	825.9	0			
10080 min Winter	0.937	0.0	847.5	0			
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Micro Drainage Source Control 2015.1		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.690

Time (mins)	Area
From:	To: (ha)
0	4 0.690

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Model Details

Storage is Online Cover Level (m) 4.350

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	50.2
Membrane Percolation (mm/hr)	1000	Length (m)	50.2
Max Percolation (l/s)	700.0	Slope (1:X)	225.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	3.795	Cap Volume Depth (m)	0.000

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0112-5000-0500-5000
Design Head (m)	0.500
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	112
Invert Level (m)	3.300
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	5.0
Flush-Flo™	0.178	4.9
Kick-Flo®	0.370	4.3
Mean Flow over Head Range	-	4.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.9	1.200	7.4	3.000	11.5	7.000	17.3
0.200	4.9	1.400	8.0	3.500	12.4	7.500	17.9
0.300	4.7	1.600	8.5	4.000	13.2	8.000	18.5
0.400	4.5	1.800	9.0	4.500	13.9	8.500	19.0
0.500	5.0	2.000	9.5	5.000	14.7	9.000	19.6
0.600	5.4	2.200	9.9	5.500	15.3	9.500	20.1
0.800	6.2	2.400	10.3	6.000	16.0		
1.000	6.8	2.600	10.7	6.500	16.6		

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Site name: Lidl
Site location: Hayling Island

Site coordinates

Latitude: 50.80078° N
Longitude: 0.97738° W

This is an estimation of the green field runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the CIRIA SUDS Manual (2007). It is not to be used for detailed design of drainage systems. It is recommended that every drainage scheme uses hydraulic modelling software to finalise volume requirements and design details before drawings are produced.

Reference: gcp2czbrcr8 / 1.16

Date: 13 Feb 2017

Site characteristics

Total site area	1.16	ha
Significant public open space	0	ha
Area positively drained	1.16	ha

Methodology

Green field runoff method	IH124
Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type
SOIL type	3
HOST class	N/A
SPR	0.37

Hydrological characteristics

	Default	Edited	
SAAR	689	689	mm
M5-60 Rainfall Depth	17	17	mm
'r' Ratio M5-60/M5-2 day	0.4	0.4	
FEH/FSR conversion factor	0.81	0.81	
Hydrological region	7	7	
Growth curve factor: 1 year	0.85	0.85	
Growth curve factor: 10 year	1.62	1.62	
Growth curve factor: 30 year	2.3	2.3	
Growth curve factor: 100 year	3.19	3.19	

Green field runoff rates

	Default	Edited	
Qbar	3.27	3.27	l/s
1 in 1 year	2.78	2.78	l/s
1 in 30 years	7.52	7.52	l/s
1 in 100 years	10.44	10.44	l/s

Please note that a minimum flow of 5 l/s applies to any site

Site name: Lidl

Site location: Hayling Island

Site coordinates

Latitude: 50.80078° N

Longitude: 0.97738° W

Reference: gcp2czbrcu8 / 1.16

Date: 13 Feb 2017

This is an estimation of the green field runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the CIRIA SUDS Manual (2007). It is not to be used for detailed design of drainage systems. It is recommended that every drainage scheme uses hydraulic modelling software to finalise volume requirements and design details before drawings are produced.

Site characteristics

Total site area	1.16	ha
Significant public open space	0	ha
Area positively drained	1.16	ha

Methodology

Green eld runoff method	FEH	
Qmed estimation method	Calculate from BFI and SAAR	
BFI and SPR estimation method	Calculate from dominant HOST	
HOST class	N/A	
BFI / BFIHOST	0.00	
Qmed	N/A	l/s
Qbar / Qmed Conversion Factor	N/A	

Hydrological characteristics

	Default	Edited	
SAAR	689	689	mm
M5-60 Rainfall Depth	17	17	mm
'r' Ratio M5-60/M5-2 day	0.4	0.4	
FEH/FSR conversion factor	0.81	0.81	
Hydrological region	7	7	
Growth curve factor: 1 year	0.85	0.85	
Growth curve factor: 10 year	1.62	1.62	
Growth curve factor: 30 year	2.3	2.3	
Growth curve factor: 100 year	3.19	3.19	

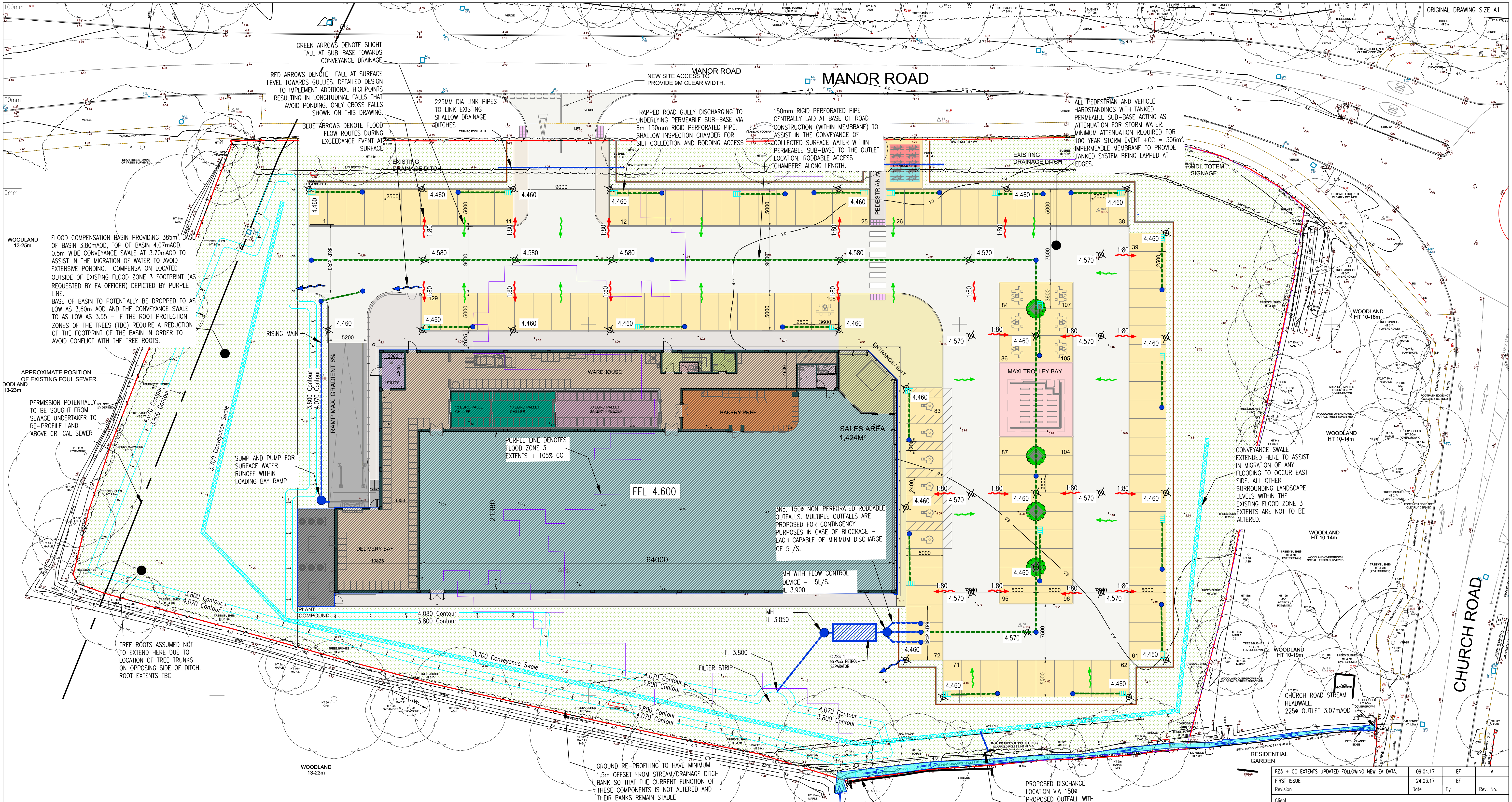
Green field runoff rates

	Default	Edited	
Qbar	---	---	l/s
1 in 1 year	---	---	l/s
1 in 30 years	---	---	l/s
1 in 100 years	---	---	l/s

Please note that a minimum flow of 5 l/s applies to any site

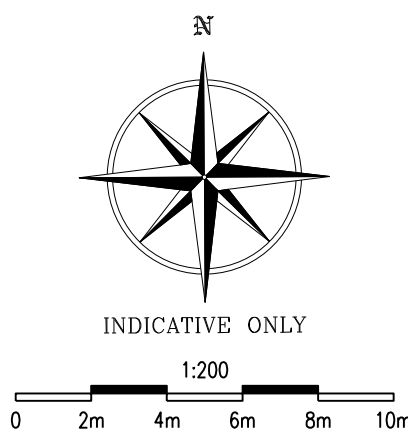
APPENDIX VII

HOP Flood and Drainage Drawings

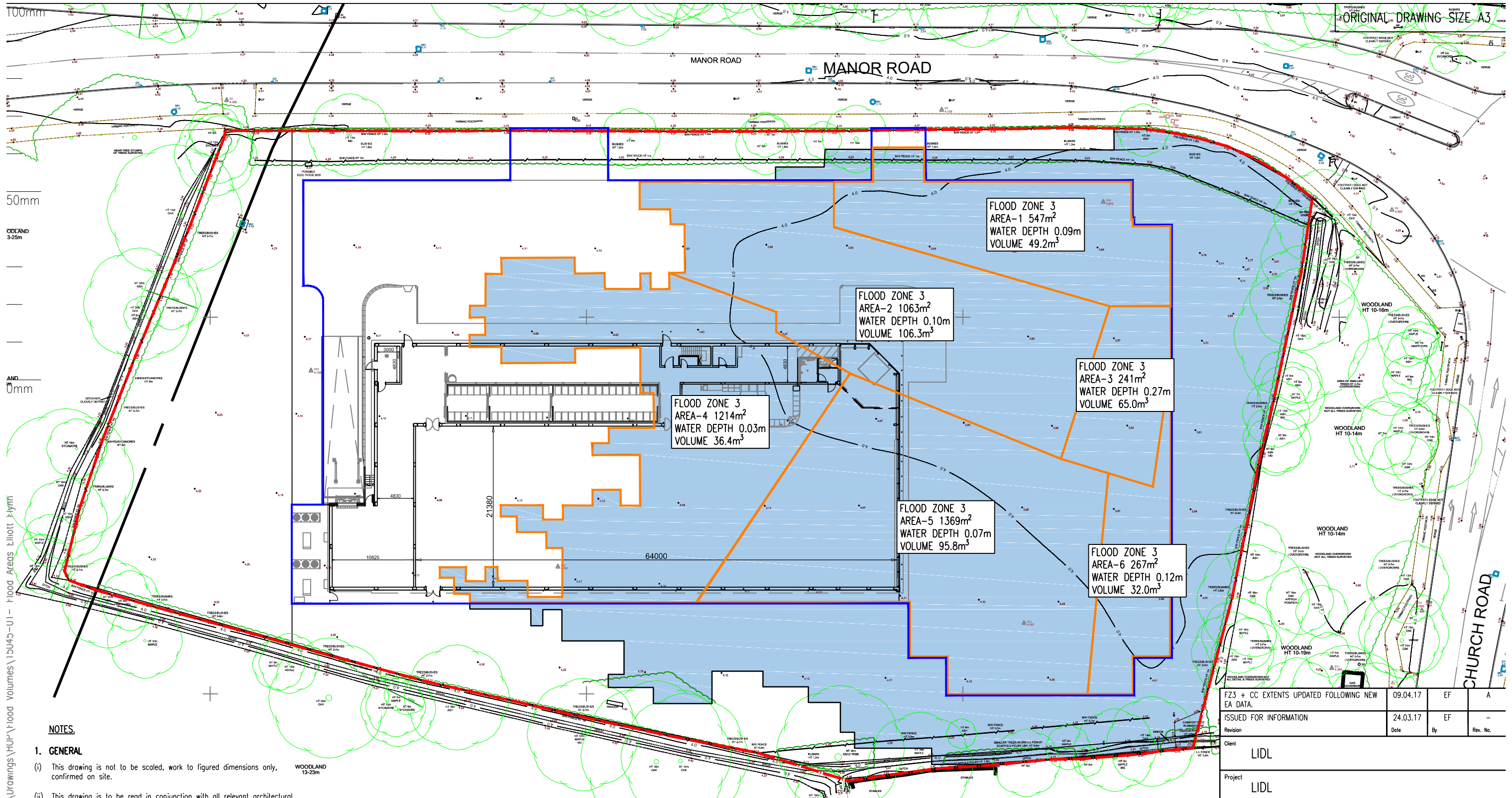


NOTES

- GENERAL
 - This drawing is not to be scaled, work to figured dimensions only, confirmed on site.
 - This drawing is to be read in conjunction with all relevant architectural drawings, detailed specifications where applicable and all associated drawings in this series.
 - Any discrepancy on this drawing is to be reported immediately to the partnership for clarification.
 - The contractor is responsible for all temporary works and for the stability of the works in progress.



FZ3 + CC EXTENTS UPDATED FOLLOWING NEW EA DATA.		09.04.17	EF	A		
FIRST ISSUE		24.03.17	EF	-		
Revision		Date	By	Rev. No.		
Client	LIDL					
Project	LIDL HAYLING ISLAND					
Title	PRELIMINARY SUDS PROPOSALS AND FLOOD ZONE COMPENSATION					
HOP HEMSLEY ORRELL PARTNERSHIP CONSULTING CIVIL & STRUCTURAL ENGINEERS HOP House, 41 Church Road, Hove BN3 2BE Tel : +44 (0)1273 223900 Fax : +44 (0)1273 326767 E-Mail : engineers@hop.co.uk www.hop.co.uk						
Scales	Date	Drawn	Engineer	Checked	Approved	HOP Contact
1:250	MARCH '17	EF	EF	AK	AK	EF
Project No.	Task No.	Dwg. No.	Rev. No.			
15045	01	DR01	A			



F:\K000015\15045 New Lidl Store, Hayling Island\Drawings\HOP\Flood Volumes\15045-U1 - Flood Areas Elliott Hym

NOTES

1. GENERAL
- (i) This drawing is not to be scaled, work to figured dimensions only, confirmed on site.
- (ii) This drawing is to be read in conjunction with all relevant architectural drawings, detailed specifications where applicable and all associated drawings in this series.
- (iii) Any discrepancy on this drawing is to be reported immediately to the partnership for clarification.
- (iv) The contractor is responsible for all temporary works and for the stability of the works in progress.

BLUE SHADING DENOTES EXTENTS OF FLOOD ZONE 3 +CC. AREAS AND FLOOD WATER DEPTHS BASED ON THE ENVIRONMENT AGENCY FLOOD MAP (Ref: SSD/30703)

A TOTAL OF 385m³ OF FLOOD ZONE 3 INCLUDING 105% CLIMATE CHANGE IS DISPLACED BY THE HARDSTANDING FOOTPRINT OF THE DEVELOPMENT.

HOP

HEMSLEY ORRELL PARTNERSHIP
CONSULTING CIVIL & STRUCTURAL ENGINEERS

ISSUED FOR
INFORMATION

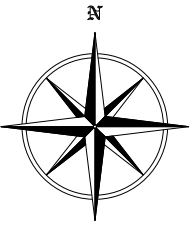
LEGEND

SITE BOUNDARY

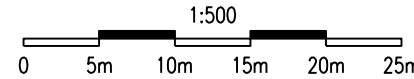
DEVELOPMENT FOOTPRINT

EXTENT OF FLOOD ZONE 3
+105% CC

ESTIMATED EXTENT OF SHOWN
FLOOD WATER DEPTH UNDER
DEVELOPMENT FOOTPRINT



INDICATIVE ONLY



FZ3 + CC EXTENTS UPDATED FOLLOWING NEW EA DATA.	09.04.17	EF	A
ISSUED FOR INFORMATION	24.03.17	EF	-
Revision	Date	By	Rev. No.

Client	LIDL
Project	LIDL HAYLING ISLAND
Title	FLOOD ZONE 3 EXTENTS AND DEVELOPMENT COMPENSATION VOLUME

HOP

HEMSLEY ORRELL PARTNERSHIP
CONSULTING CIVIL & STRUCTURAL ENGINEERS

HOP House, 41 Church Road, Hove BN3 2BE
Tel : +44 (0)1273 223900 Fax : +44 (0)1273 326767
E-Mail : engineers@hop.uk.com
www.hop.uk.com

Scales	Date	Drawn	Engineer	Checked	Approved	HOP Contact
1:500	MAR 2017	IMR	EF	-	-	EF
Project No.	Task No.	Dwg. No.	Rev. No.			
15045	01	FRA01	A			

APPENDIX VIII

Preliminary Site Investigation Information

VISIT NO: 1 of 6

<u>Ambient Concentration (% Vol)</u>	
CH ₄	ND
CO ₂	ND
O ₂	20.2

Monitoring Equipment	GFM 436 Gas Analyser	Weather Conditions	Sunny
Operator	EB	Surface Conditions	Wet

Text shown in Bold & Italic indicates either:
a) Carbon Dioxide equal to or above 5% by Volume
or
b) Methane equal to or above 1% by Volume

Checked:	SMD	Approved:	PJE
----------	-----	-----------	-----

VISIT NO: 2 of 6

<u>Ambient Concentration (% Vol)</u>	
CH ₄	ND
CO ₂	ND
O ₂	20.0

Monitoring Equipment	GFM 436 Gas Analyser	Weather Conditions	Light Cloud
Operator	EB	Surface Conditions	Wet

Text shown in Bold & Italic indicates either:
a) Carbon Dioxide equal to or above 5% by Volume
or
b) Methane equal to or above 1% by Volume

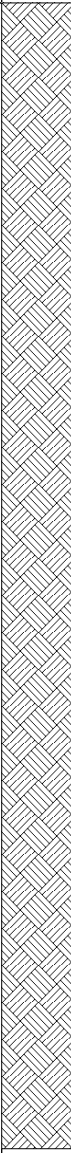
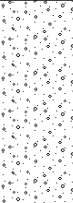
Checked:	SMD	Approved:	PJE
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Exploratory Hole ID:	Client: Lidl UK GmbH				 www.opusinternational.co.uk				
WS01	Site: Hayling Island								
Job No:	J-B1118.00				Start Date:		End Date:		
				06/12/2016		06/12/2016			
Drilling Equipment/ Excavation Method:				Co-ords:		Backfill Date:		Field Records:	
Tracked Windowless Sampling Rig						06/12/2016		SMD	
				Ground Level (mAOD):		Logged:		Chkd:	
						SMD		PJE	
								PJE	
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details	
Grass over TOPSOIL : Brown clayey SAND topsoil with rootlets.	0.35			ES1	0.20				
Soft, brown, sandy, gravelly CLAY. Gravel is subangular to subrounded, fine and medium chert and quartzite.				ES2	0.50				
Brown, clayey, very gravelly, coarse SAND. Gravel is subangular to subrounded, fine and medium chert and quartzite.	1.35			D3	1.00	N=8 (C)			
	1.60			D4	1.50				
Firm, brown, sandy, gravelly CLAY. Gravel is subangular to subrounded, fine and medium chert and quartzite.	2.10			D5	2.00	N=10 (C)			
Firm, reddish brown CLAY with slight grey-brown mottling.	2.50			D6	2.50				
Firm to stiff, dark red-brown CLAY.	3.00			D7	3.50	N=13 (C)			
	5.00					N=14 (C)			
						N=29 (C)			
Remarks:						Sample Type Key		Test Type Key	
1. SPT 'N' values corrected to a N60 value in accordance with BS EN 22476 Part 3 and where appropriate extrapolated for partial penetration.						D - Disturbed Representative		(C) - Cone SPT	
2. Groundwater not encountered during drilling.						B - Bulk Representative		(S) - Spoon SPT	
3. Hole terminated at 5.00m begl.						S - Spot Non-Representative		P - Pocket Penetrometer Reading	
4. Borehole installed with gas and groundwater monitoring standpipe as detailed above.						W - Water		PID - PID Reading	
						U - Undisturbed Representative		V - Hand Shear Vane Reading	
						J - Jar Sample			
						ES - Environmental Sample			
						Sheet:			
						Sheet 1 of 1			

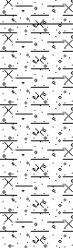
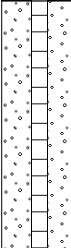
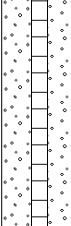
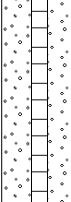
Exploratory Hole ID: WS02	Client: Lidl UK GmbH		 www.opusinternational.co.uk					
Job No: J-B1118.00	Site: Hayling Island							
Drilling Equipment/ Excavation Method: Tracked Windowless Sampling Rig		Co-ords:	Backfill Date: 06/12/2016	End Date: 06/12/2016				
		Ground Level (mAOD):	Logged: SMD	Chkd: PJE				
			Appr: PJE					
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
Grass over TOPSOIL : Brown clayey SAND topsoil with rootlets.	0.35			ES1	0.20	N=8 (C)	1.80 1.80	
Very soft to soft, brown, sandy, slightly gravelly CLAY. Gravel is subangular to subrounded, fine and medium chert and quartzite.				ES2	0.50			
Becoming firm at 1.30m.				D3	1.00			
				D4	1.50			
Firm, reddish brown CLAY with slight grey-brown mottling.	2.00			D5	2.50	N=12 (C)		
Firm to stiff, dark red-brown CLAY.	3.10			D6	3.50	N=10 (C)		
						N=10 (C)		
	5.00					N=14 (C)		
Remarks: 1. SPT 'N' values corrected to a N60 value in accordance with BS EN 22476 Part 3 and where appropriate extrapolated for partial penetration. 2. Groundwater encountered at 1.80m begl. 3. Hole terminated at 5.00m begl. 4. Borehole installed with gas and groundwater monitoring standpipe as detailed above.					Sample Type Key D - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water U - Undisturbed Representative J - Jar Sample ES - Environmental Sample		Test Type Key (C) - Cone SPT (S) - Spoon SPT P - Pocket Penetrometer Reading PID - PID Reading V - Hand Shear Vane Reading	
					Sheet: Sheet 1 of 1			

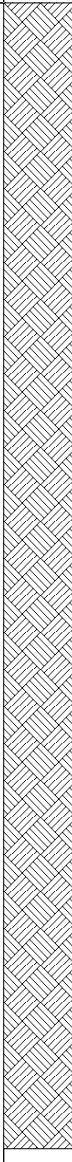
Exploratory Hole ID:	Client: Lidl UK GmbH				 www.opusinternational.co.uk				
WS03	Site: Hayling Island								
Job No:	J-B1118.00				Start Date:		End Date:		
				06/12/2016		06/12/2016			
Drilling Equipment/ Excavation Method:				Co-ords:		Backfill Date:		Field Records:	
Tracked Windowless Sampling Rig						06/12/2016		SMD	
				Ground Level (mAOD):		Logged:		Chkd:	
						SMD		PJE	
								PJE	
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details	
Grass over TOPSOIL : Brown clayey SAND topsoil with rootlets.	0.35			ES1	0.20				
Soft, brown, sandy, gravelly CLAY. Gravel is subangular to subrounded, fine and medium chert and quartzite.				ES2	0.50				
	1.00			D3	1.20	N=25 (C)			
Grey-brown, very sandy, subangular to subrounded, fine to coarse GRAVEL of quartzite and chert.				D4	1.60				
Light brown, slightly clayey, slightly gravelly, fine to coarse SAND. Gravel is subangular to subrounded, fine to coarse chert and quartzite.	1.50			D4	1.60	N=15 (C)	1.70 1.70	▼	
	2.20			D5	2.30				
Firm, reddish brown CLAY with slight grey-brown mottling.	3.10			D5	2.30	N=9 (C)			
				D6	3.50				
Firm to stiff, dark red-brown CLAY.	5.00			D6	3.50	N=13 (C)			
					N=18 (C)				
Remarks:					Sample Type Key		Test Type Key		
1. SPT 'N' values corrected to a N60 value in accordance with BS EN 22476 Part 3 and where appropriate extrapolated for partial penetration.					D - Disturbed Representative		(C) - Cone SPT		
2. Groundwater encountered at 1.70m begl.					B - Bulk Representative		(S) - Spoon SPT		
3. Hole terminated at 5.00m begl.					S - Spot Non-Representative		P - Pocket Penetrometer Reading		
4. Borehole backfilled with arisings upon completion.					W - Water		PID - PID Reading		
					U - Undisturbed Representative		V - Hand Shear Vane Reading		
					J - Jar Sample				
					ES - Environmental Sample				
					Sheet:				
					Sheet 1 of 1				

Exploratory Hole ID:	Client: Lidl UK GmbH		 www.opusinternational.co.uk	
WS04	Site: Hayling Island			
Job No:	J-B1118.00		Start Date:	End Date:
		06/12/2016		06/12/2016
Drilling Equipment/ Excavation Method:		Co-ords:		Backfill Date:
Tracked Windowless Sampling Rig				06/12/2016
		Ground Level (mAOD):		Field Records:
				SMD
		Logged:		Chkd:
		SMD		PJE
				Appr:
				PJE

Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
Grass over TOPSOIL : Brown clayey SAND topsoil with rootlets.	0.30			ES1	0.20	N=37 (C)	1.60 1.60	
Soft, brown, sandy, gravelly CLAY. Gravel is subangular to subrounded, fine and medium chert and quartzite.				ES2	0.50			
Brown, sandy, subangular to subrounded, fine to coarse GRAVEL of quartzite and chert.	0.80			D3	1.00			
				D4	2.00			
Light brown, slightly gravelly, fine to coarse SAND. Gravel is subangular to subrounded, fine to coarse chert and quartzite.	1.70			D5	2.70			
Firm, reddish brown CLAY with slight grey-brown mottling.	2.50							
Light brown, slightly gravelly, fine to coarse SAND. Gravel is subangular to subrounded, fine to coarse chert and quartzite.	3.00					N=14 (C)		
	4.00					N=11 (C)		

Remarks: 1. SPT 'N' values corrected to a N60 value in accordance with BS EN 22476 Part 3 and where appropriate extrapolated for partial penetration. 2. Groundwater encountered at 1.60m begl. 3. Hole terminated at 4.00m begl. 4. Borehole backfilled with arisings upon completion.	Sample Type Key D - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water U - Undisturbed Representative J - Jar Sample ES - Environmental Sample	Test Type Key (C) - Cone SPT (S) - Spoon SPT P - Pocket Penetrometer Reading PID - PID Reading V - Hand Shear Vane Reading
	Sheet: Sheet 1 of 1	

Exploratory Hole ID:	Client: Lidl UK GmbH		 www.opusinternational.co.uk					
WS05	Site: Hayling Island							
Job No:	J-B1118.00		Start Date:	End Date:				
		06/12/2016		06/12/2016				
Drilling Equipment/ Excavation Method:		Co-ords:	Backfill Date:	Field Records:				
Tracked Windowless Sampling Rig			06/12/2016	SMD				
		Ground Level (mAOD):	Logged:	Chkd:				
			SMD	PJE				
				PJE				
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details
Grass over TOPSOIL : Brown clayey SAND topsoil with rootlets.	0.30			ES1	0.20			
Brown, sandy, subangular to subrounded, fine to coarse GRAVEL of quartzite and chert.				ES2	0.50			
Brown mottled grey-brown, sandy, subangular to subrounded, fine to coarse GRAVEL of quartzite and chert.	1.10			D3	1.10	N=10 (C)		
Firm, reddish brown mottled grey brown CLAY	2.10			D4	2.20	N=12 (C)		
Firm, dark red-brown CLAY.	3.10					N=12 (C)		
	4.00					N=12 (C)		
Remarks:			Sample Type Key D - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water U - Undisturbed Representative J - Jar Sample ES - Environmental Sample			Test Type Key (C) - Cone SPT (S) - Spoon SPT P - Pocket Penetrometer Reading PID - PID Reading V - Hand Shear Vane Reading		
1. SPT 'N' values corrected to a N60 value in accordance with BS EN 22476 Part 3 and where appropriate extrapolated for partial penetration. 2. Groundwater not encountered during drilling. 3. Hole terminated at 4.00m begl. 4. Borehole installed with gas and groundwater monitoring standpipe as detailed above.			Sheet: Sheet 1 of 1					

Exploratory Hole ID:	Client: Lidl UK GmbH				 www.opusinternational.co.uk				
WS06	Site: Hayling Island								
Job No:	J-B1118.00				Start Date:		End Date:		
				06/12/2016		06/12/2016			
Drilling Equipment/ Excavation Method:				Co-ords:		Backfill Date:		Field Records:	
Tracked Windowless Sampling Rig						06/12/2016		SMD	
				Ground Level (mAOD):		Logged:		Chkd:	
						SMD		PJE	
								PJE	
Strata Description	Depth (m)	Level (m)	Legend	Sample Type	Sample Depth (m)	Tests	Groundwater Records	Backfill Details	
Grass over TOPSOIL : Brown clayey SAND topsoil with rootlets.	0.35			ES1	0.20	N=9 (C)			
Brown, sandy, subangular to subrounded, fine to coarse GRAVEL of quartzite and chert.				ES2	0.50				
				D3	1.00				
				D4	1.50				
Firm, reddish brown mottled grey brown CLAY	1.75			D5	2.00	N=10 (C)			
Firm, dark red-brown CLAY.	3.30			D6	3.50	N=11 (C)			
						N=14 (C)			
	5.00					N=22 (C)			
Remarks:					Sample Type Key D - Disturbed Representative B - Bulk Representative S - Spot Non-Representative W - Water U - Undisturbed Representative J - Jar Sample ES - Environmental Sample		Test Type Key (C) - Cone SPT (S) - Spoon SPT P - Pocket Penetrometer Reading PID - PID Reading V - Hand Shear Vane Reading		
1. SPT 'N' values corrected to a N60 value in accordance with BS EN 22476 Part 3 and where appropriate extrapolated for partial penetration. 2. Groundwater not encountered during drilling. 3. Hole terminated at 5.00m begl. 4. Borehole backfilled with arisings upon completion.					Sheet: Sheet 1 of 1				