TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

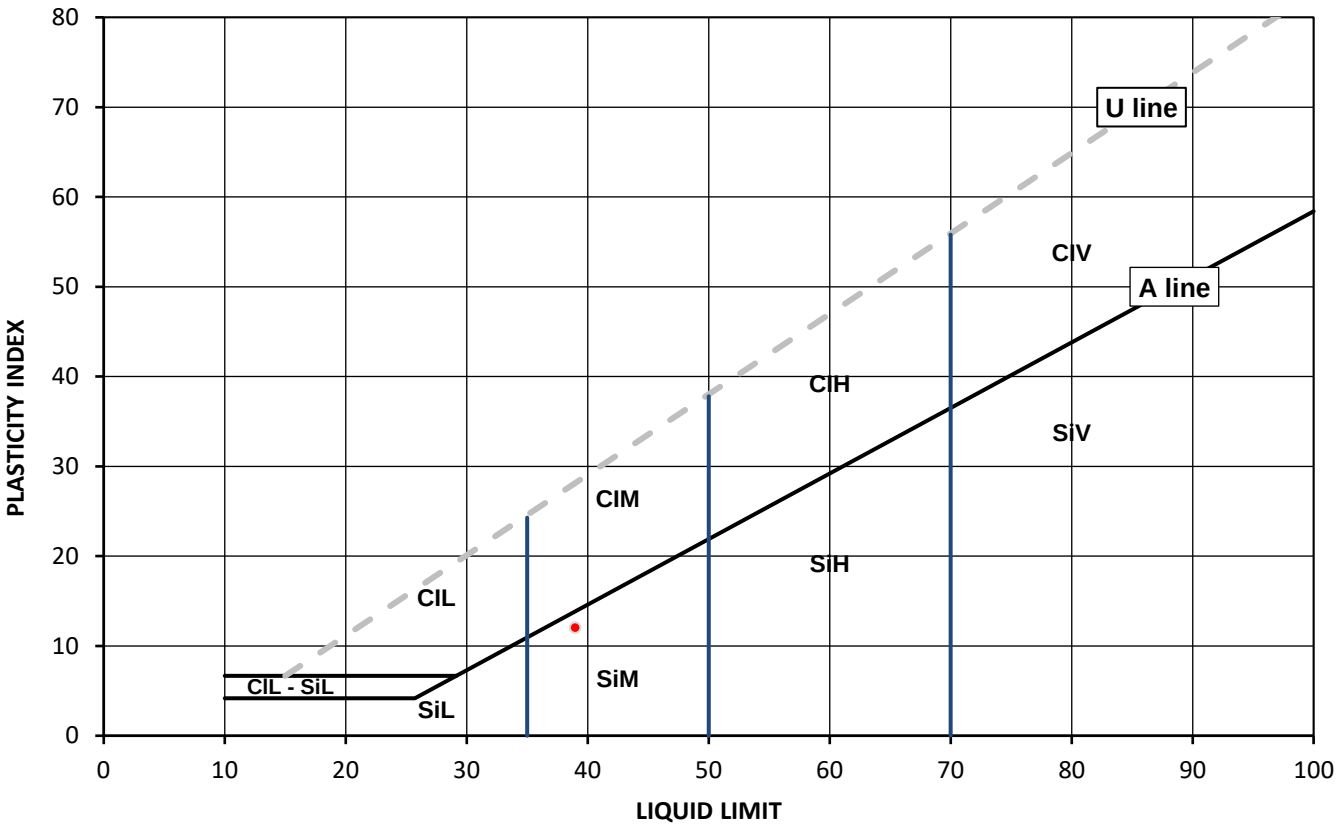
Client:	Travis Baker Geo-Environmental Limited	Client Reference:	22069
Client Address:	Trinity Point, New Road, Halesowen, West Midlands, B63 3HY	Job Number:	23-48829-1
		Date Sampled:	Not Given
		Date Received:	02/08/2023
Contact:	Daniel Potts	Date Tested:	16/08/2023
Site Address:	Burroughs Road Ratby	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2769660	Depth Top [m]:	1.70
Hole No.:	TP01	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Reddish brown mottled light grey sandy clayey SILT		
Sample Preparation:	Tested in natural condition		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
33	39	27	12	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/08/2023

GF 232.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

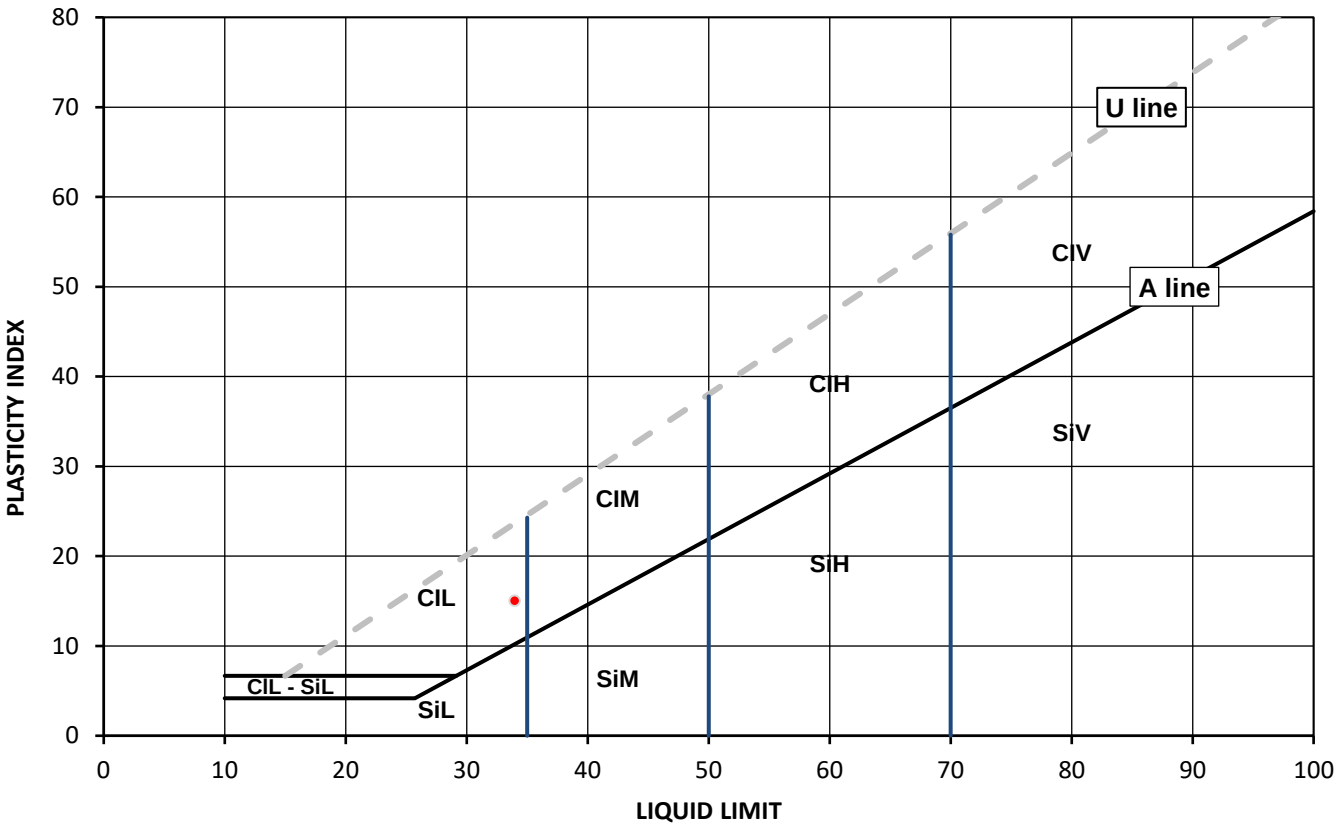
Client:	Travis Baker Geo-Environmental Limited	Client Reference:	22069
Client Address:	Trinity Point, New Road, Halesowen, West Midlands, B63 3HY	Job Number:	23-48829-1
		Date Sampled:	Not Given
		Date Received:	02/08/2023
Contact:	Daniel Potts	Date Tested:	16/08/2023
Site Address:	Burroughs Road Ratby	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2769662	Depth Top [m]:	2.20
Hole No.:	TP03	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Grey slightly gravelly very sandy CLAY		
Sample Preparation:	Tested after washing to remove >425 µm		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
24	34	19	15	87



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Katarzyna Koziel
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for and on behalf of i2 Analytical Ltd

Date Reported: 21/08/2023

GF 232.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

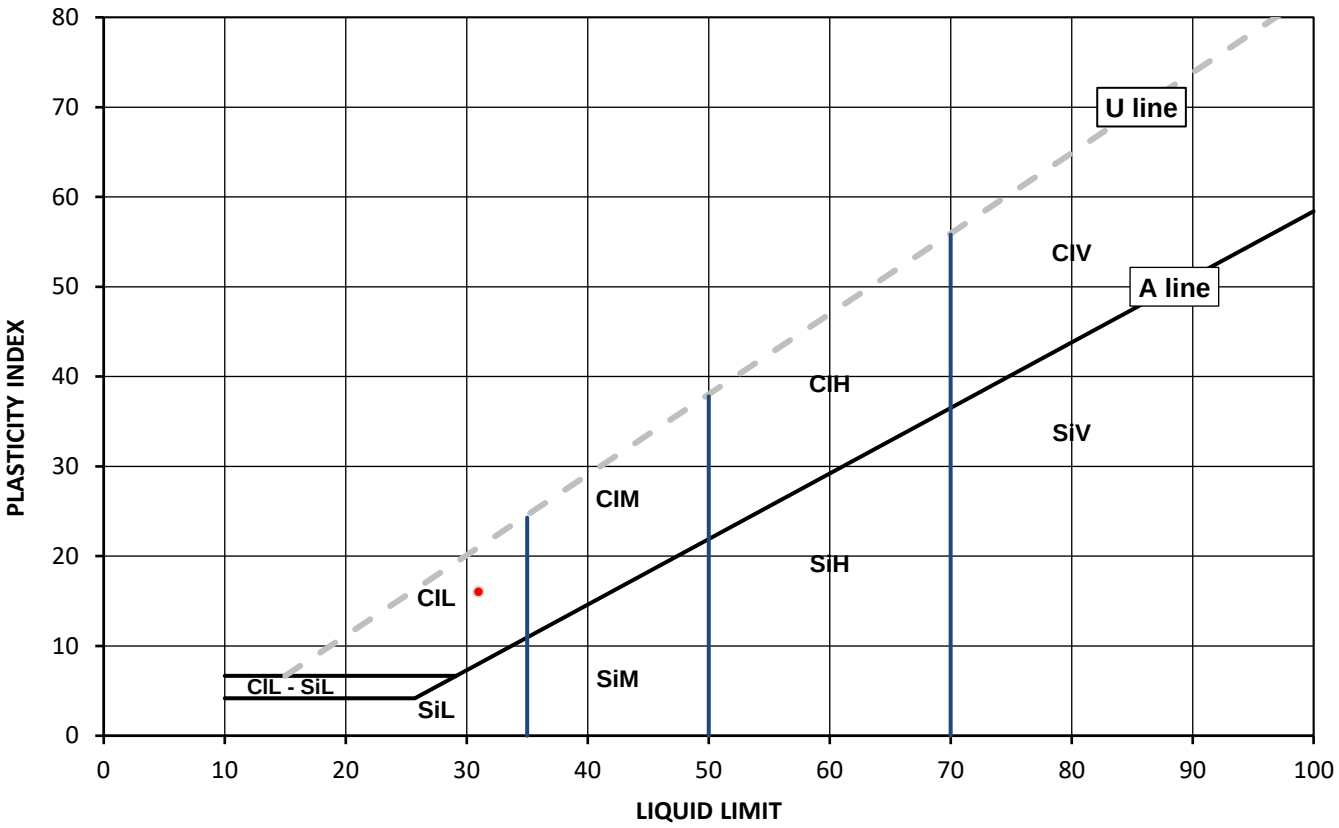
Client:	Travis Baker Geo-Environmental Limited	Client Reference:	22069
Client Address:	Trinity Point, New Road, Halesowen, West Midlands, B63 3HY	Job Number:	23-48829-1
		Date Sampled:	Not Given
		Date Received:	02/08/2023
Contact:	Daniel Potts	Date Tested:	16/08/2023
Site Address:	Burroughs Road Ratby	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2769663	Depth Top [m]:	1.00
Hole No.:	TP04	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Reddish brown mottled light grey sandy CLAY		
Sample Preparation:	Tested after >425 µm removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
15	31	15	16	96



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Katarzyna Koziel
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for and on behalf of i2 Analytical Ltd

Date Reported: 21/08/2023

GF 232.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

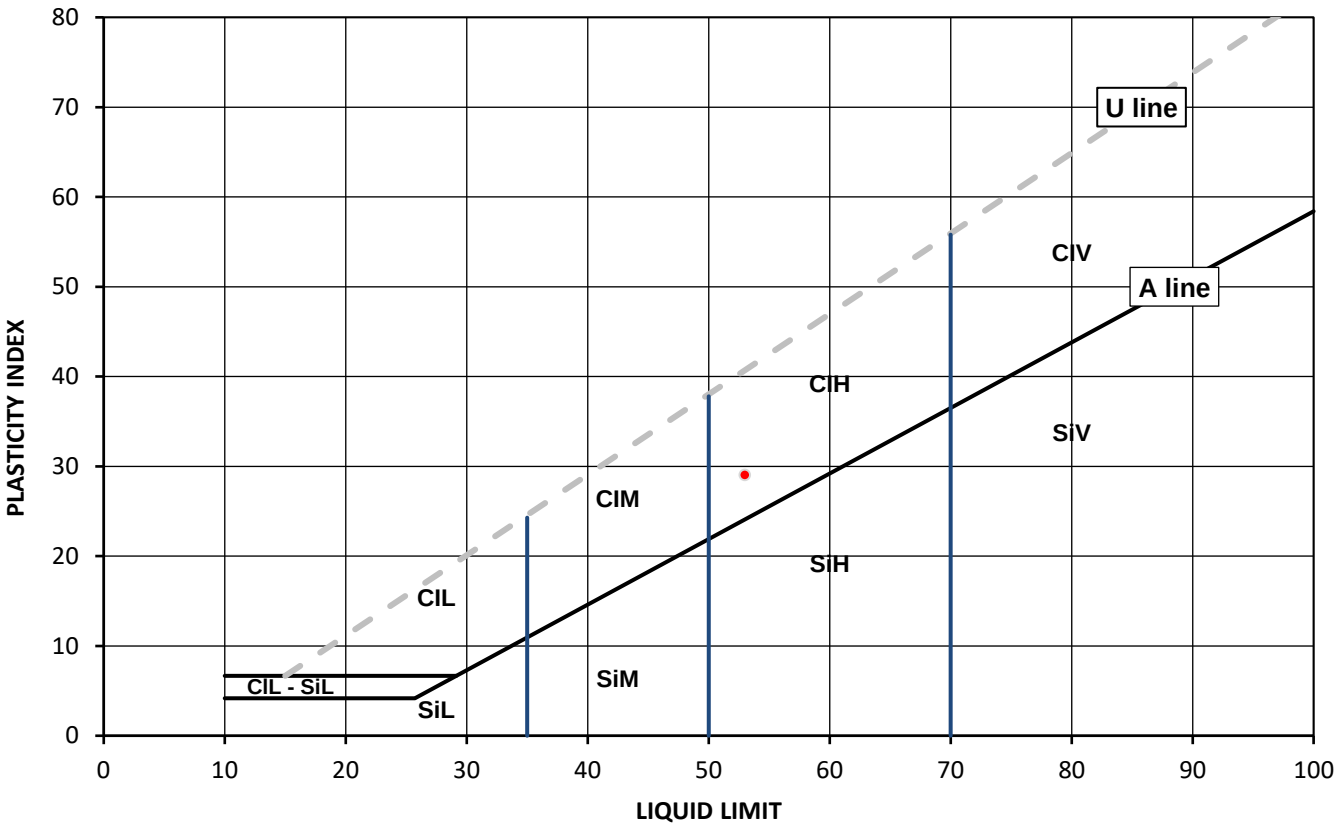
Client:	Travis Baker Geo-Environmental Limited	Client Reference:	22069
Client Address:	Trinity Point, New Road, Halesowen, West Midlands, B63 3HY	Job Number:	23-48829-1
		Date Sampled:	Not Given
		Date Received:	02/08/2023
Contact:	Daniel Potts	Date Tested:	11/08/2023
Site Address:	Burroughs Road Ratby	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2769664	Depth Top [m]:	1.30
Hole No.:	TP05	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Orangish brown slightly gravelly slightly sandy CLAY		
Sample Preparation:	Tested after washing to remove >425 µm		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
23	53	24	29	73



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/08/2023

GF 232.13

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

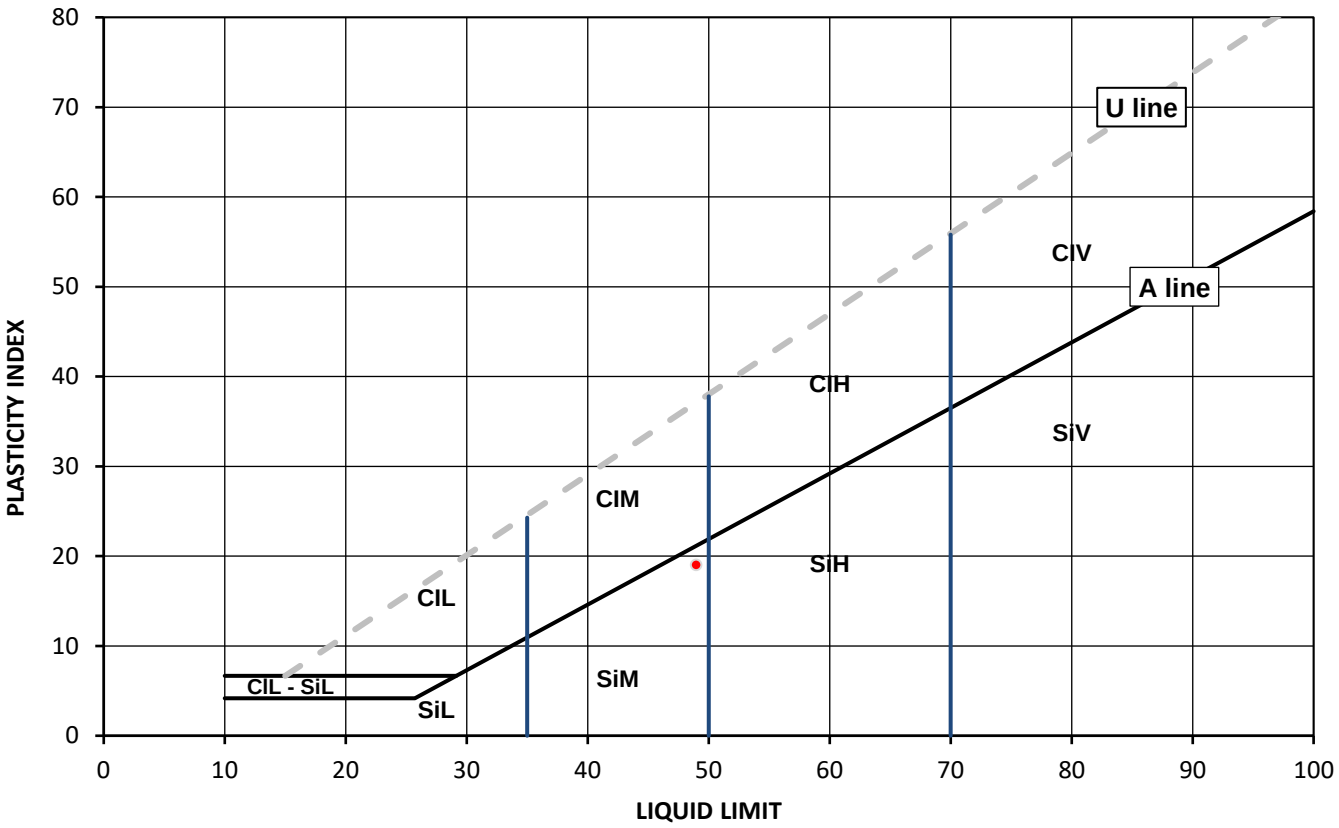
Client:	Travis Baker Geo-Environmental Limited	Client Reference:	22069
Client Address:	Trinity Point, New Road, Halesowen, West Midlands, B63 3HY	Job Number:	23-48829-1
		Date Sampled:	Not Given
		Date Received:	02/08/2023
Contact:	Daniel Potts	Date Tested:	11/08/2023
Site Address:	Burroughs Road Ratby	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2769666	Depth Top [m]:	1.50
Hole No.:	TP08	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Orangish brown mottled grey slightly gravelly slightly sandy silty CLAY		
Sample Preparation:	Tested after >425 µm removed by hand		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
36	49	30	19	98



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

		Plasticity		Liquid Limit
Cl	Clay	L	Low	below 35
Si	Silt	M	Medium	35 to 50
		H	High	50 to 70
		V	Very high	exceeding 70
		O	Organic	append to classification for organic material (eg ClHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/08/2023

GF 232.13

SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Travis Baker Geo-Environmental Limited

Client Address: Trinity Point, New Road, Halesowen, West Midlands, B63 3HY

Contact: Daniel Potts

Site Address: Burroughs Road Ratby

Water Content by BS 1377-2:1990: Clause 3.2Atterberg by BS 1377-2: 1990: Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5

Client Reference: 22069
Job Number: 23-48829-1
Date Sampled: Not Given
Date Received: 02/08/2023
Date Tested: 11/08 - 16/08/2023
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W]	Water Content BS EN ISO 17892-1 [W]	Atterberg				Density			Total Porosity#		
		Reference	Depth Top	Depth Base	Type					% Passing 425um	WL	Wp	Ip	bulk	dry	PD			
			m	m				%	%	%	%	%	%	Mg/m3	Mg/m3	Mg/m3	%		
2769660	TP01	Not Given	1.70	Not Given	B	Reddish brown mottled light grey sandy clayey SILT	Atterberg 1 Point	33		100	39	27	12						
2769662	TP03	Not Given	2.20	Not Given	B	Grey slightly gravelly very sandy CLAY	Atterberg 1 Point	24		87	34	19	15						
2769663	TP04	Not Given	1.00	Not Given	B	Reddish brown mottled light grey sandy CLAY	Atterberg 1 Point	15		96	31	15	16						
2769664	TP05	Not Given	1.30	Not Given	B	Orangish brown slightly gravelly slightly sandy CLAY	Atterberg 1 Point	23		73	53	24	29						
2769666	TP08	Not Given	1.50	Not Given	B	Orangish brown mottled grey slightly gravelly slightly sandy silty CLAY	Atterberg 1 Point	36		98	49	30	19						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Date Reported: 21/08/2023

GF 234.16

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

4041

Client: Travis Baker Geo-Environmental Limited

Client Address: Trinity Point, New Road,
Halesowen, West Midlands,
B63 3HY

Contact: Daniel Potts

Site Address: Burroughs Road Ratby

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: 22069
Job Number: 23-48829-1
Date Sampled: Not Given
Date Received: 02/08/2023
Date Tested: 11/08 - 16/08/2023
Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2769660	TP01	Not Given	1.70	Not Given	B	Reddish brown mottled light grey sandy clayey SILT		33	Sample was quartered, oven dried at 109 °C			
2769662	TP03	Not Given	2.20	Not Given	B	Grey slightly gravelly very sandy CLAY		24	Sample was quartered, oven dried at 109 °C			
2769663	TP04	Not Given	1.00	Not Given	B	Reddish brown mottled light grey sandy CLAY		15	Sample was quartered, oven dried at 109 °C			
2769664	TP05	Not Given	1.30	Not Given	B	Orangish brown slightly gravelly slightly sandy CLAY		23	Sample was quartered, oven dried at 106.1 °C			
2769666	TP08	Not Given	1.50	Not Given	B	Orangish brown mottled grey slightly gravelly slightly sandy silty CLAY		36	Sample was quartered, oven dried at 106.1 °C			

Comments:

Signed:

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Date Reported: 21/08/2023

GF 099.17

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

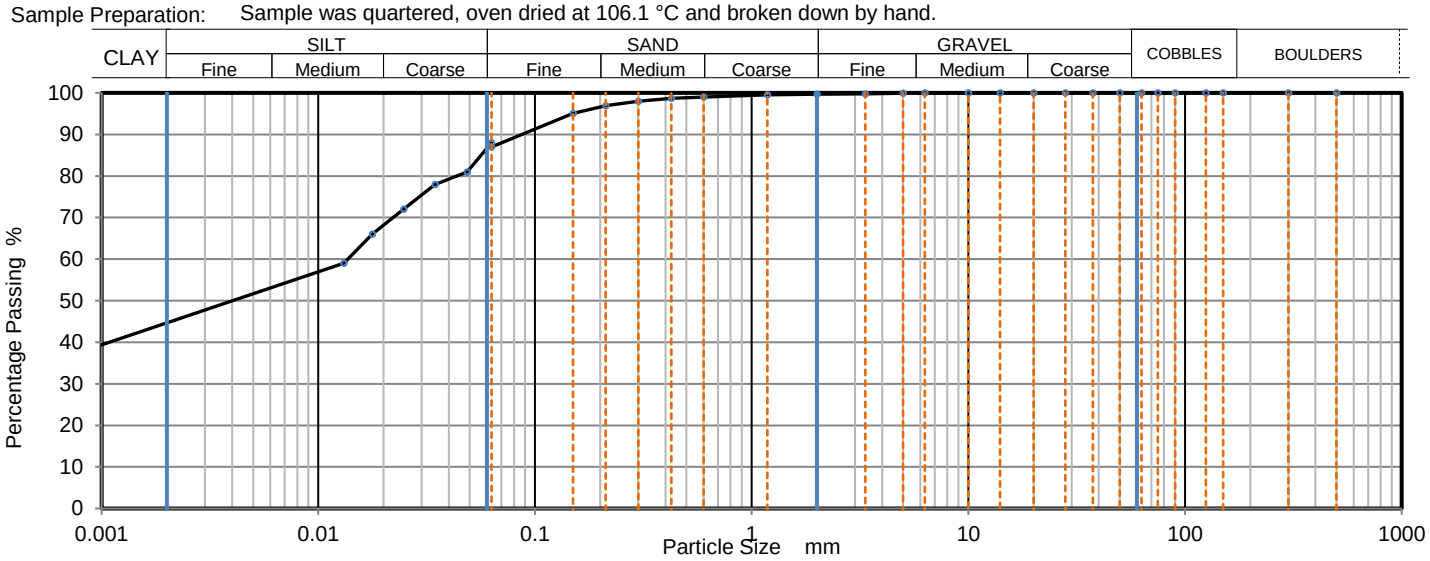
4041

Client:	Travis Baker Geo-Environmental Limited	Client Reference:	22069
Client Address:	Trinity Point, New Road, Halesowen, West Midlands, B63 3HY	Job Number:	23-48829-1
		Date Sampled:	Not Given
		Date Received:	02/08/2023
Contact:	Daniel Potts	Date Tested:	11/08/2023
Site Address:	Burroughs Road Ratby	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2769661	Depth Top [m]:	1.40
Hole No.:	TP02	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Orangish brown mottled grey CLAY		
Sample Preparation:	Sample was quartered, oven dried at 106.1 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	88
300	100	0.0486	81
150	100	0.0346	78
125	100	0.0248	72
90	100	0.0178	66
75	100	0.0131	59
63	100	0.0008	38
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100	Particle density	(assumed)
2	100	2.65	Mg/m3
1.18	100		
0.6	99		
0.425	99		
0.3	98		
0.212	97		
0.15	95		
0.063	88		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	12
Silt	44
Clay	44

Grading Analysis		
D100	mm	6.3
D60	mm	0.0135
D30	mm	
D10	mm	
Uniformity Coefficient		> 16
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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 Date Reported: 21/08/2023 **GF 100.23**

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

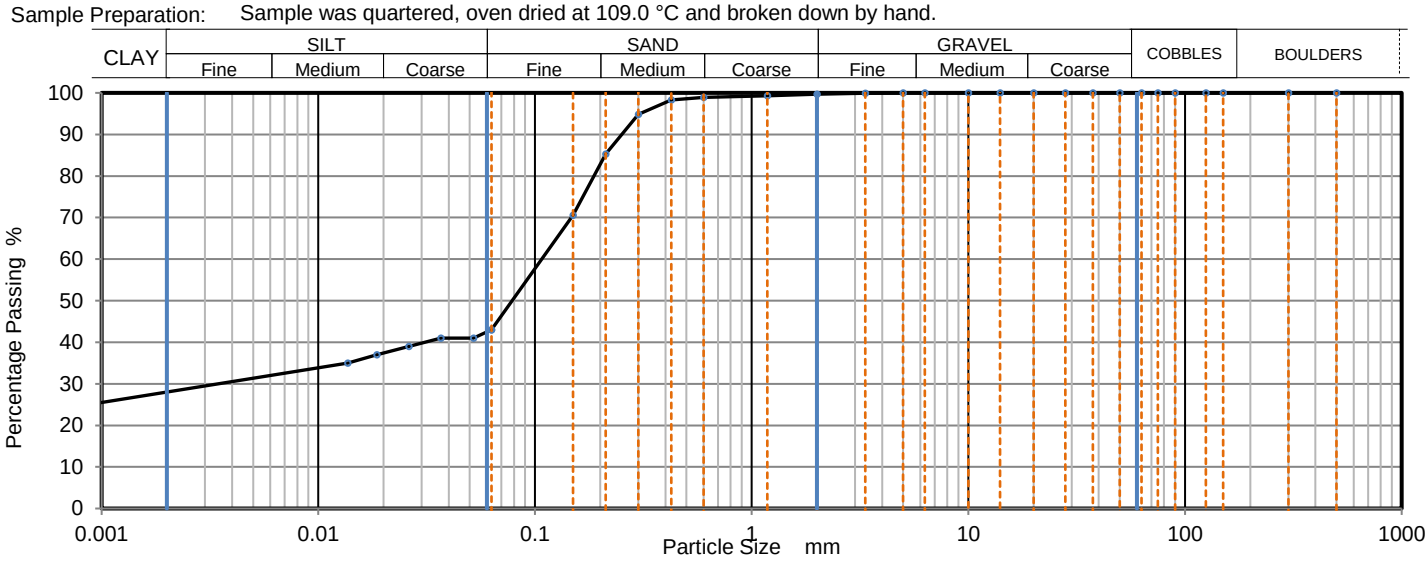
4041

Client:	Travis Baker Geo-Environmental Limited	Client Reference:	22069
Client Address:	Trinity Point, New Road, Halesowen, West Midlands, B63 3HY	Job Number:	23-48829-1
		Date Sampled:	Not Given
		Date Received:	02/08/2023
Contact:	Daniel Potts	Date Tested:	16/08/2023
Site Address:	Burroughs Road Ratby	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2769663	Depth Top [m]:	1.00
Hole No.:	TP04	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Reddish brown mottled light grey sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 109.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	43
300	100	0.0520	41
150	100	0.0368	41
125	100	0.0262	39
90	100	0.0186	37
75	100	0.0137	35
63	100	0.0009	25
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100	Particle density	(assumed)
2	100	2.65	Mg/m3
1.18	99		
0.6	99		
0.425	98		
0.3	95		
0.212	85		
0.15	71		
0.063	43		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	56
Silt	16
Clay	28

Grading Analysis		
D100	mm	5
D60	mm	0.107
D30	mm	0.00354
D10	mm	
Uniformity Coefficient		> 120
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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 Date Reported: 21/08/2023 **GF 100.23**

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

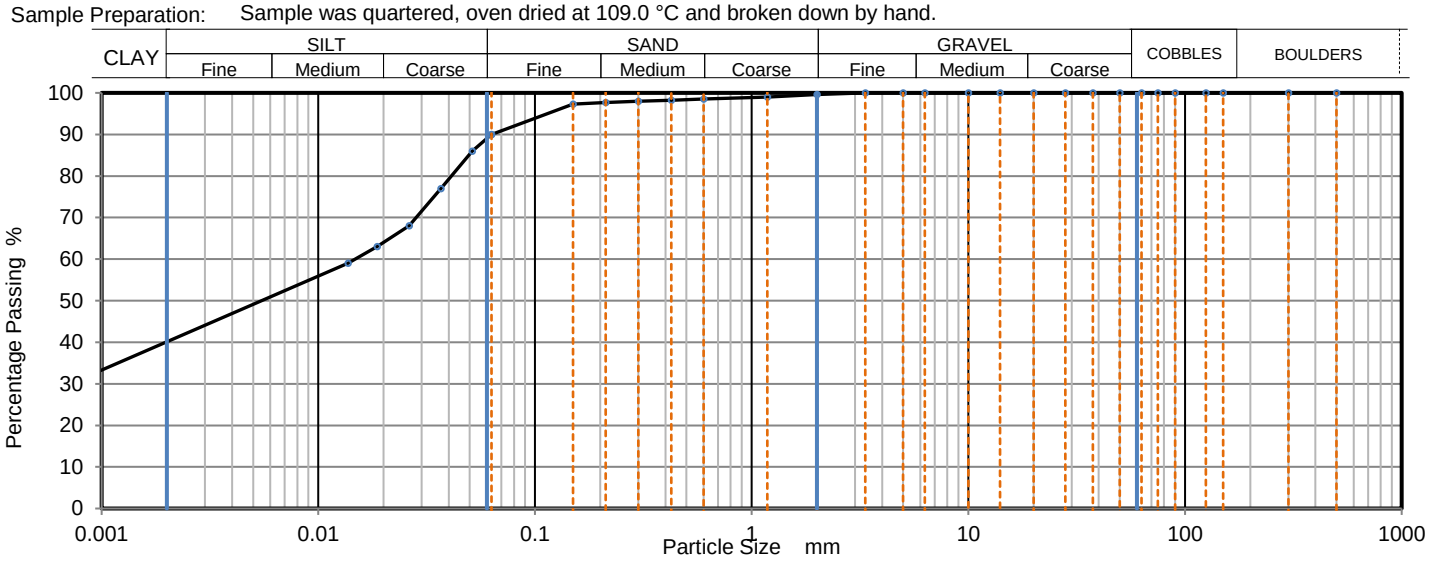
4041

Client:	Travis Baker Geo-Environmental Limited	Client Reference:	22069
Client Address:	Trinity Point, New Road, Halesowen, West Midlands, B63 3HY	Job Number:	23-48829-1
		Date Sampled:	Not Given
		Date Received:	02/08/2023
Contact:	Daniel Potts	Date Tested:	16/08/2023
Site Address:	Burroughs Road Ratby	Sampled By:	Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2769665	Depth Top [m]:	1.60
Hole No.:	TP07	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Reddish brown mottled light grey CLAY		
Sample Preparation:	Sample was quartered, oven dried at 109.0 °C and broken down by hand.		



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	90
300	100	0.0513	86
150	100	0.0367	77
125	100	0.0263	68
90	100	0.0187	63
75	100	0.0137	59
63	100	0.0009	32
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100	Particle density	(assumed)
2	100	2.65	Mg/m3
1.18	99		
0.6	99		
0.425	98		
0.3	98		
0.212	98		
0.15	97		
0.063	90		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	9
Silt	51
Clay	40

Grading Analysis		
D100	mm	5
D60	mm	0.0151
D30	mm	
D10	mm	
Uniformity Coefficient		> 17
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed: Katarzyna Koziel

Katarzyna Koziel
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

 Date Reported: 21/08/2023 **GF 100.23**

APPENDIX 6

Dynamic Cone Penetrometer Test Results

DMH Testing Ltd
74 Fareham Avenue
Rugby
Warwickshire CV22 5HT
Telephone: +44 (0) 7456 617 596
email: phil.jelfs@dmhtesting.co.uk

DMH Testing

TEST REPORT

TEST REPORT: **TRRL DYNAMIC CONE PENETROMETER TESTING**
In accordance with TRRL & in-house procedures (60° Cone)

REPORT No.:	CS/230243/010823/001	CLIENT:	Travis Baker
CLIENT REF:	DCP Test 1	ADDRESS:	Trinity Point, New Road, Halesowen, B63 3HY
DATE TESTED:	01/08/2023	SITE DETAILS:	Burrough Road, Ratby, LE6 0LS
DATE REPORTED:	01/08/2023	SURFACE MATERIAL:	Top Soil
TESTED BY:	C Skipworth	TEST LOCATION:	See map - DCP 1
LAYERS REMOVED:	No		

RESULTS

Gradient 1

Depth from:	50	mm	No. of Blows :	7	per layer	**Estimated C.B.R Value (%):**	**6.6**
Depth to:	310	mm	Blow Rate :	37.1	mm/blow		

Gradient 2

Depth from:	310	mm	No. of Blows :	33	per layer	**Estimated C.B.R Value (%):**	**32**
Depth to:	590	mm	Blow Rate :	8.5	mm/blow		

Gradient 3

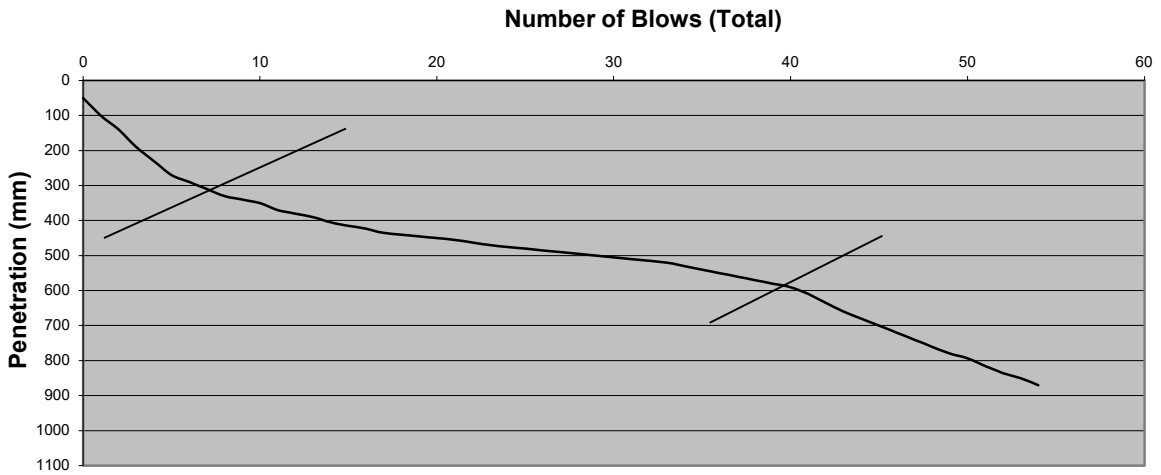
Depth from:	590	mm	No. of Blows :	14	per layer	**Estimated C.B.R Value (%):**	**13**
Depth to:	870	mm	Blow Rate :	20.0	mm/blow		

Gradient 4 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		

Gradient 5 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		



Depth of layer removed: 0 mm Layer Type: Surface Level

REMARKS: No voids noted during testing

Certified that the testing was carried out in accordance with the DMH Testing In House Procedure based upon SHW Design manual IAN73/06. Results relate only to the location tested. Where external contractors have been used, or deviations from the standard method have been necessary, this will be noted in comments.

Signed: _____
For and on behalf of DMH Testing Ltd

[X] L McLundie - Director
[ ] P Jelfs - Director

UKAS TESTING
23594

End of Report

DMH Testing Ltd
74 Fareham Avenue
Rugby
Warwickshire CV22 5HT
Telephone: +44 (0) 7456 617 596
email: phil.jelfs@dmhtesting.co.uk

DMH Testing

TEST REPORT

TEST REPORT: **TRRL DYNAMIC CONE PENETROMETER TESTING**
In accordance with TRRL & in-house procedures (60° Cone)

REPORT No.:	CS/230243/010823/002	CLIENT:	Travis Baker
CLIENT REF:	DCP Test 2	ADDRESS:	Trinity Point, New Road, Halesowen, B63 3HY
DATE TESTED:	01/08/2023	SITE DETAILS:	Burrough Road, Ratby, LE6 0LS
DATE REPORTED:	01/08/2023	SURFACE MATERIAL:	Top Soil
TESTED BY:	C Skipworth	TEST LOCATION:	See map - DCP 2
LAYERS REMOVED:	No		

RESULTS

Gradient 1

Depth from:	30	mm	No. of Blows :	4	per layer	**Estimated C.B.R Value (%):**	**3.3**
Depth to:	320	mm	Blow Rate :	72.5	mm/blow		

Gradient 2

Depth from:	320	mm	No. of Blows :	17	per layer	**Estimated C.B.R Value (%):**	**7.7**
Depth to:	870	mm	Blow Rate :	32.4	mm/blow		

Gradient 3 (Not applicable)

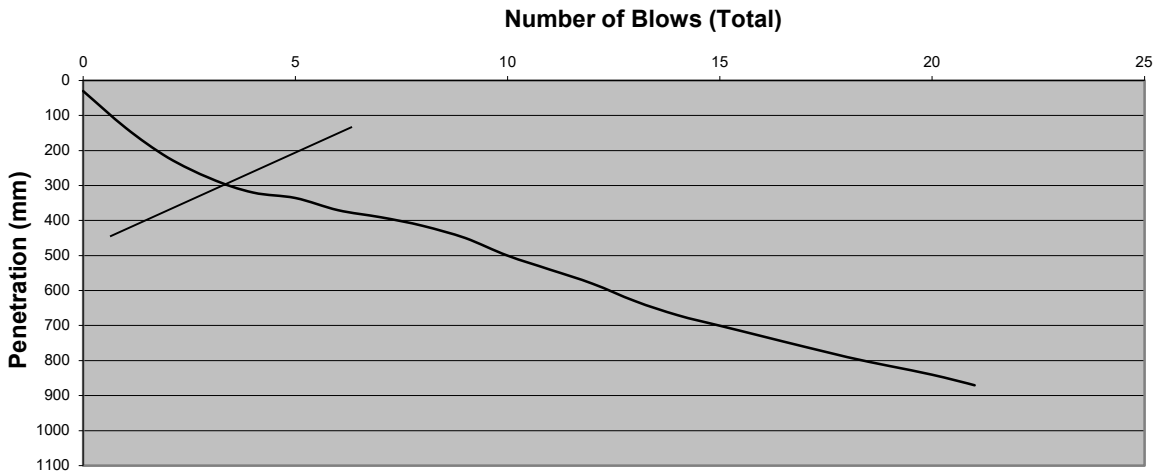
Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		

Gradient 4 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		

Gradient 5 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		



Depth of layer removed: 0 mm Layer Type: Surface Level

REMARKS: No voids noted during testing

Certified that the testing was carried out in accordance with the DMH Testing In House Procedure based upon SHW Design manual IAN73/06. Results relate only to the location tested. Where external contractors have been used, or deviations from the standard method have been necessary, this will be noted in comments.

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[ ] P Jelfs - Director

UKAS TESTING
23594

End of Report

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74 Fareham Avenue
Rugby
Warwickshire CV22 5HT
Telephone: +44 (0) 7456 617 596
email: phil.jelfs@dmhtesting.co.uk

DMH Testing

TEST REPORT

TEST REPORT: **TRRL DYNAMIC CONE PENETROMETER TESTING**
In accordance with TRRL & in-house procedures (60° Cone)

REPORT No.:	CS/230243/010823/003	CLIENT:	Travis Baker
CLIENT REF:	DCP Test 3	ADDRESS:	Trinity Point, New Road, Halesowen, B63 3HY
DATE TESTED:	01/08/2023	SITE DETAILS:	Burrough Road, Ratby, LE6 0LS
DATE REPORTED:	01/08/2023	SURFACE MATERIAL:	Top Soil
TESTED BY:	C Skipworth	TEST LOCATION:	See map - DCP 3
LAYERS REMOVED:	No		

RESULTS

Gradient 1

Depth from:	25	mm	No. of Blows :	2	per layer	**Estimated C.B.R Value (%):**	**3.5**
Depth to:	160	mm	Blow Rate :	67.5	mm/blow		

Gradient 2

Depth from:	160	mm	No. of Blows :	20	per layer	**Estimated C.B.R Value (%):**	**7.2**
Depth to:	850	mm	Blow Rate :	34.5	mm/blow		

Gradient 3 (Not applicable)

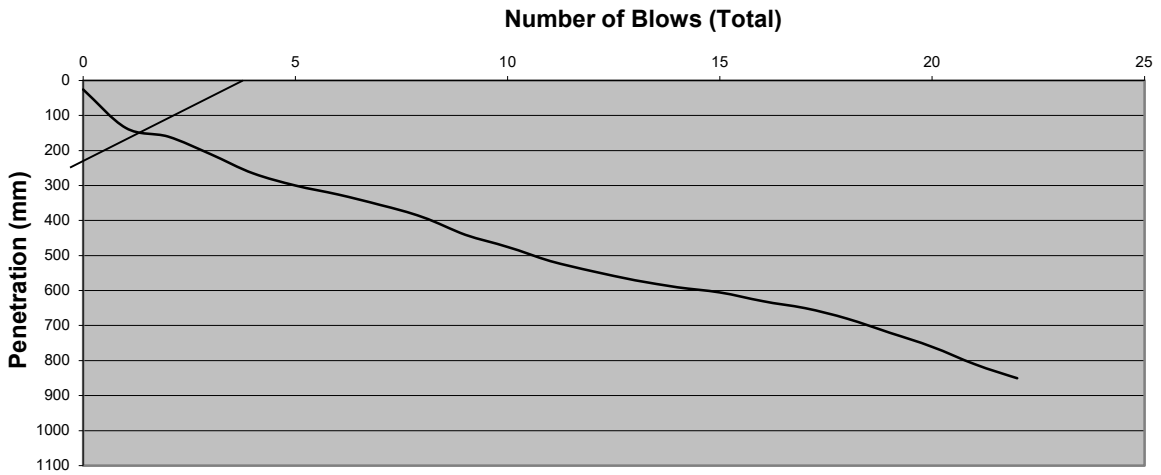
Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		

Gradient 4 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		

Gradient 5 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		



Depth of layer removed: 0 mm Layer Type: Surface Level

REMARKS: No voids noted during testing

Certified that the testing was carried out in accordance with the DMH Testing In House Procedure based upon SHW Design manual IAN73/06. Results relate only to the location tested. Where external contractors have been used, or deviations from the standard method have been necessary, this will be noted in comments.

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[ ] P Jelfs - Director

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23594

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Warwickshire CV22 5HT
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DMH Testing

TEST REPORT

TEST REPORT: **TRRL DYNAMIC CONE PENETROMETER TESTING**
In accordance with TRRL & in-house procedures (60° Cone)

REPORT No.:	CS/230243/010823/004	CLIENT:	Travis Baker
CLIENT REF:	DCP Test 4	ADDRESS:	Trinity Point, New Road, Halesowen, B63 3HY
DATE TESTED:	01/08/2023	SITE DETAILS:	Burrough Road, Ratby, LE6 0LS
DATE REPORTED:	01/08/2023	SURFACE MATERIAL:	Top Soil
TESTED BY:	C Skipworth	TEST LOCATION:	See map - DCP 4
LAYERS REMOVED:	No		

RESULTS

Gradient 1

Depth from:	30	mm	No. of Blows :	36	per layer	**Estimated C.B.R Value (%):**	**11**
Depth to:	870	mm	Blow Rate :	23.3	mm/blow		

Gradient 2 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**
Depth to:	-	mm	Blow Rate :	-	mm/blow	

Gradient 3 (Not applicable)

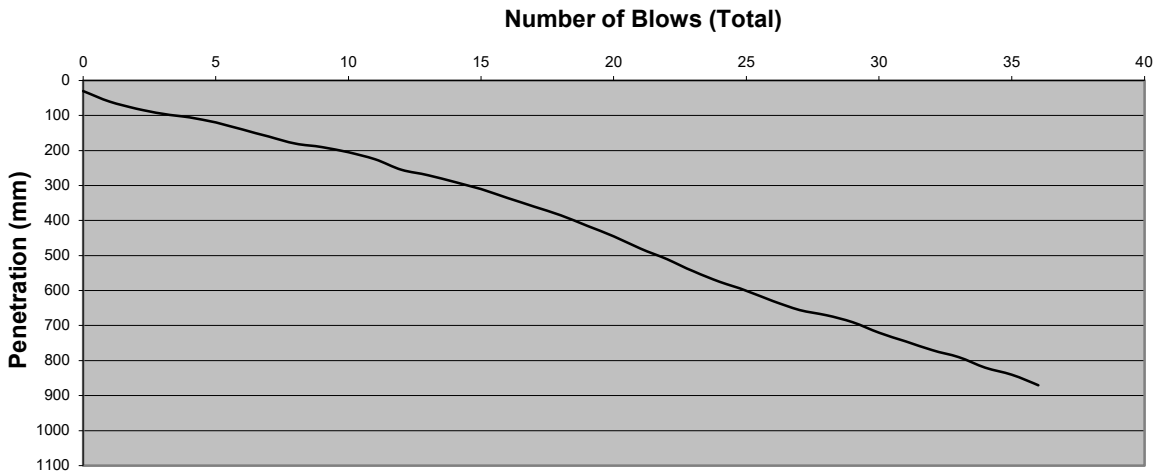
Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**
Depth to:	-	mm	Blow Rate :	-	mm/blow	

Gradient 4 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**
Depth to:	-	mm	Blow Rate :	-	mm/blow	

Gradient 5 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**
Depth to:	-	mm	Blow Rate :	-	mm/blow	



Depth of layer removed: 0 mm Layer Type: Surface Level

REMARKS: No voids noted during testing

Certified that the testing was carried out in accordance with the DMH Testing In House Procedure based upon SHW Design manual IAN73/06. Results relate only to the location tested. Where external contractors have been used, or deviations from the standard method have been necessary, this will be noted in comments.

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UKAS TESTING
23594

End of Report

DMH Testing Ltd
74 Fareham Avenue
Rugby
Warwickshire CV22 5HT
Telephone: +44 (0) 7456 617 596
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TEST REPORT

TEST REPORT: **TRRL DYNAMIC CONE PENETROMETER TESTING**
In accordance with TRRL & in-house procedures (60° Cone)

REPORT No.:	CS/230243/010823/005	CLIENT:	Travis Baker
CLIENT REF:	DCP Test 5	ADDRESS:	Trinity Point, New Road, Halesowen, B63 3HY
DATE TESTED:	01/08/2023	SITE DETAILS:	Burrough Road, Ratby, LE6 0LS
DATE REPORTED:	01/08/2023	SURFACE MATERIAL:	Top Soil
TESTED BY:	C Skipworth	TEST LOCATION:	See map - DCP 5
LAYERS REMOVED:	No		

RESULTS

Gradient 1

Depth from:	140	mm	No. of Blows :	27	per layer	**Estimated C.B.R Value (%):**	**9.3**
Depth to:	865	mm	Blow Rate :	26.9	mm/blow		

Gradient 2 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**
Depth to:	-	mm	Blow Rate :	-	mm/blow	

Gradient 3 (Not applicable)

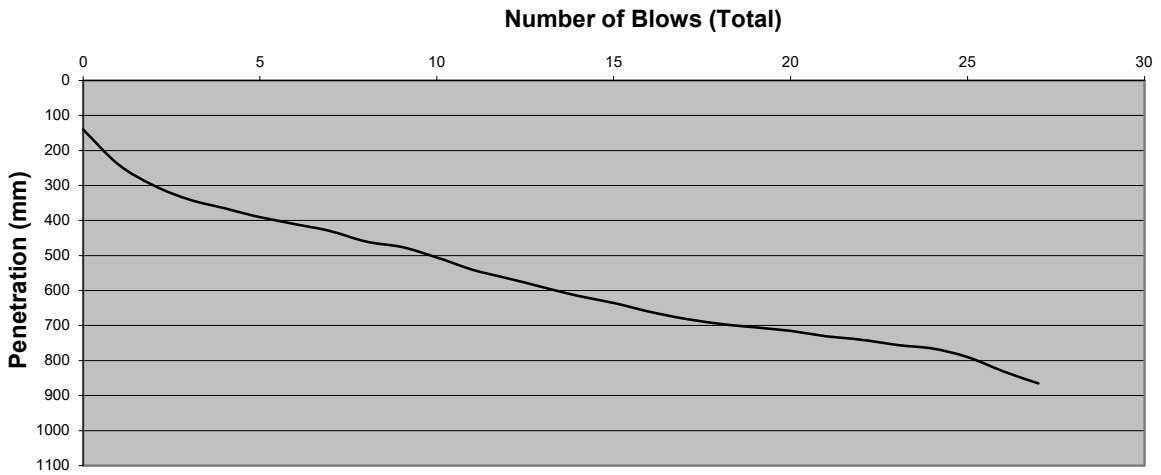
Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**
Depth to:	-	mm	Blow Rate :	-	mm/blow	

Gradient 4 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**
Depth to:	-	mm	Blow Rate :	-	mm/blow	

Gradient 5 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**
Depth to:	-	mm	Blow Rate :	-	mm/blow	



Depth of layer removed: 0 mm Layer Type: Surface Level

REMARKS: No voids noted during testing

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UKAS TESTING
23594

End of Report

DMH Testing Ltd
74 Fareham Avenue
Rugby
Warwickshire CV22 5HT
Telephone: +44 (0) 7456 617 596
email: phil.jelfs@dmhtesting.co.uk

DMH Testing

TEST REPORT

TEST REPORT: **TRRL DYNAMIC CONE PENETROMETER TESTING**
In accordance with TRRL & in-house procedures (60° Cone)

REPORT No.:	CS/230243/010823/006	CLIENT:	Travis Baker
CLIENT REF:	DCP Test 6	ADDRESS:	Trinity Point, New Road, Halesowen, B63 3HY
DATE TESTED:	01/08/2023	SITE DETAILS:	Burrough Road, Ratby, LE6 0LS
DATE REPORTED:	01/08/2023	SURFACE MATERIAL:	Top Soil
TESTED BY:	C Skipworth	TEST LOCATION:	See map - DCP 6
LAYERS REMOVED:	No		

RESULTS

Gradient 1

Depth from:	270	mm	No. of Blows :	12	per layer	**Estimated C.B.R Value (%):**	**9.4**
Depth to:	590	mm	Blow Rate :	26.7	mm/blow		

Gradient 2

Depth from:	590	mm	No. of Blows :	13	per layer	**Estimated C.B.R Value (%):**	**12**
Depth to:	860	mm	Blow Rate :	20.8	mm/blow		

Gradient 3 (Not applicable)

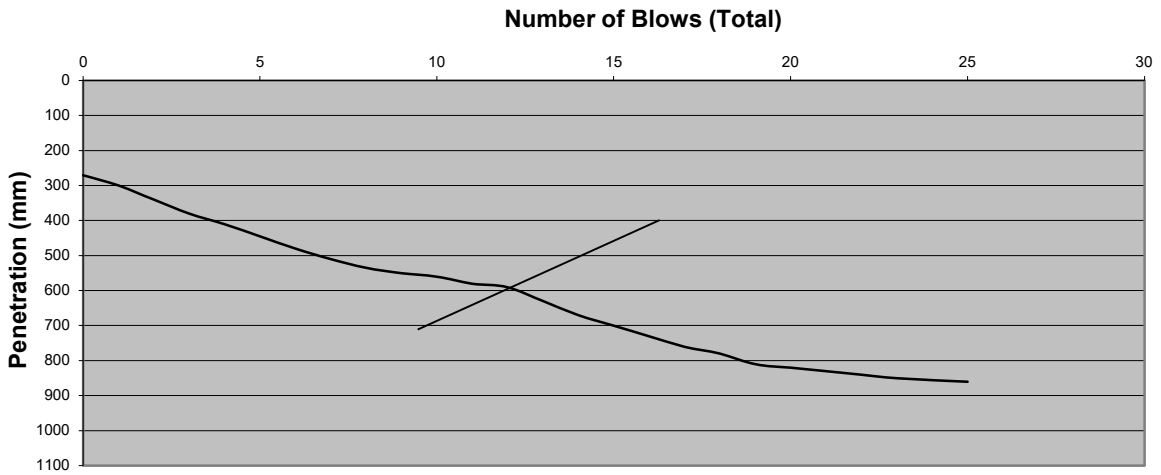
Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		

Gradient 4 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		

Gradient 5 (Not applicable)

Depth from:	-	mm	No. of Blows :	-	per layer	**Estimated C.B.R Value (%):**	
Depth to:	-	mm	Blow Rate :	-	mm/blow		



Depth of layer removed: 0 mm Layer Type: Surface Level

REMARKS: No voids noted during testing

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Signed: _____
For and on behalf of DMH Testing Ltd

[X] L McLundie - Director
[ ] P Jelfs - Director

UKAS TESTING
23594

End of Report

Appendix 7

Adopted Generic Assessment Criteria for Long-term Human Health

BURROUGHS ROAD, RATBY
Appendix 7 – Long-Term Human Health Generic Assessment Criteria for Contamination Assessment (Soils)

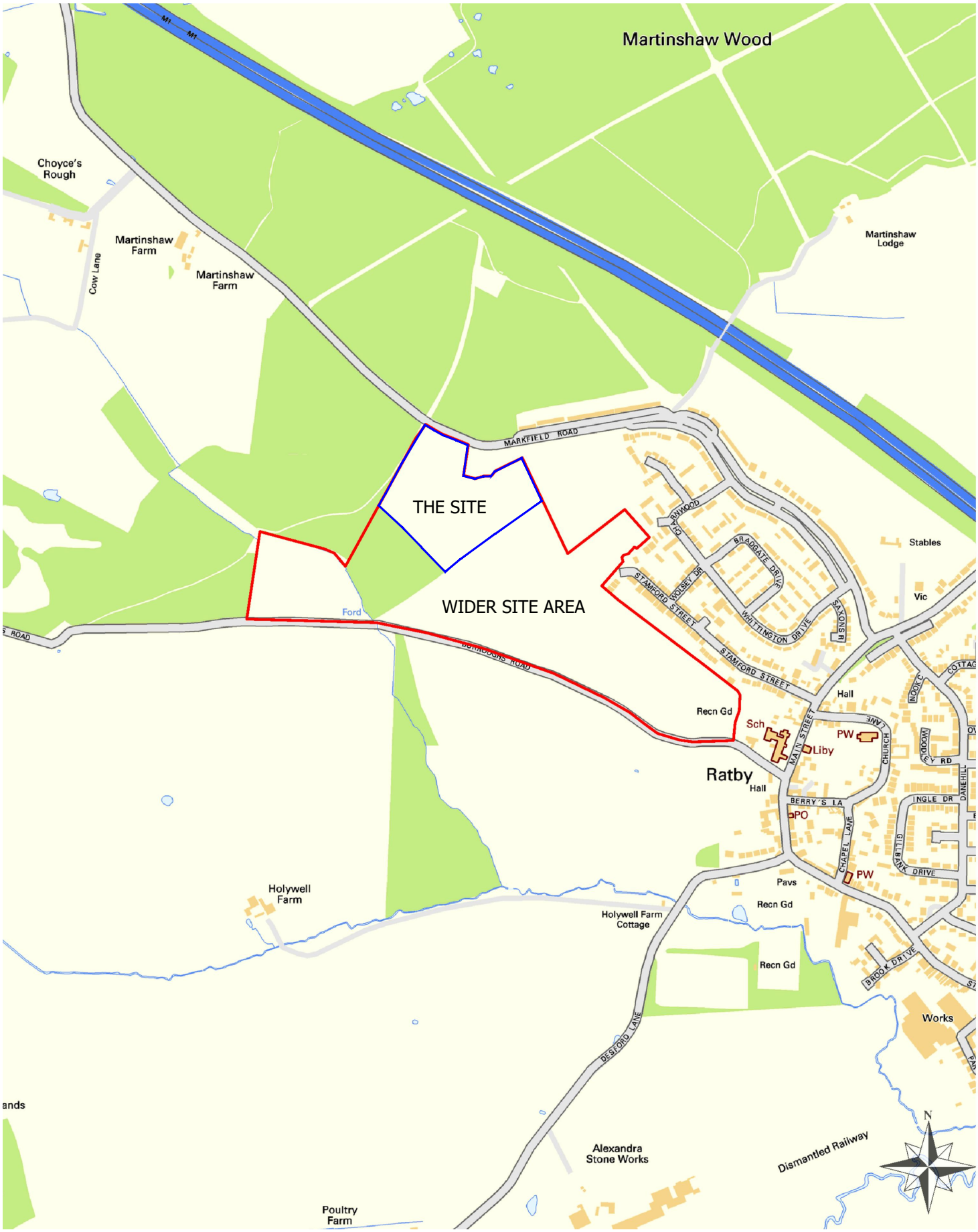
Substance	Source	Target Value (mg/kg)
Inorganic Mercury	CIEH/LQM – S4UL	40
Selenium	CIEH/LQM – S4UL	250
Arsenic	C4SL	37
Nickel	CIEH/LQM – S4UL	180
Cadmium	C4SL	26
Boron	CIEH/LQM – S4UL	290
Chromium (III)	CIEH/LQM – S4UL	910
Copper	CIEH/LQM – S4UL	2,400
Lead	C4SL	200
Zinc	CIEH/LQM – S4UL	3,750
Asbestos	In House	0.001%
Acenaphthene	CIEH/LQM – S4UL	210
Acenaphthylene	CIEH/LQM – S4UL	170
Anthracene	CIEH/LQM – S4UL	2,400
Benzo(a)anthracene	CIEH/LQM – S4UL	7.2
Benzo(a)pyrene	CIEH/LQM – S4UL	2.2
Benzo(b)fluoranthene	CIEH/LQM – S4UL	2.6
Benzo(ghi)perylene	CIEH/LQM – S4UL	320
Benzo(k)fluoranthene	CIEH/LQM – S4UL	77
Chrysene	CIEH/LQM – S4UL	15
Dibenzo(ah)anthracene	CIEH/LQM – S4UL	0.24
Fluoranthene	CIEH/LQM – S4UL	280
Fluorene	CIEH/LQM – S4UL	170
Indeno(123-cd)pyrene	CIEH/LQM – S4UL	27
Naphthalene	CIEH/LQM – S4UL	2.3
Phenanthrene	CIEH/LQM – S4UL	95
Pyrene	CIEH/LQM – S4UL	620

Notes

CIEH/LQM - Suitable for Use Level (S4UL) published by the Chartered Institute of Environmental Health (CIEH) and Land Quality Management (LQM) dated January 2015 (Copyright Land Quality Management Ltd reproduced with permission; Publication Number S4UL3689).

C4SL - Category 4 Screening Levels published by DEFRA in 2014

DRAWINGS



travis baker

Travis Baker Ltd
Trinity Point
New Road
Halesowen
West Midlands
B63 3HY

Tel: **0121 550 8037**

info@travisbaker.co.uk
www.travisbaker.co.uk

CLIENT
LAGAN HOMES LIMITED

PROJECT
BURROUGHS ROAD, RATBY

TITLE
SITE LOCATION PLAN

DRAWN	AUTHORISED	SCALE	DATE
DP	DJ	NTS	05/09/23

PROJECT NO.	DRAWING NO.	REV
22069	GE01	A

STATUS.
-

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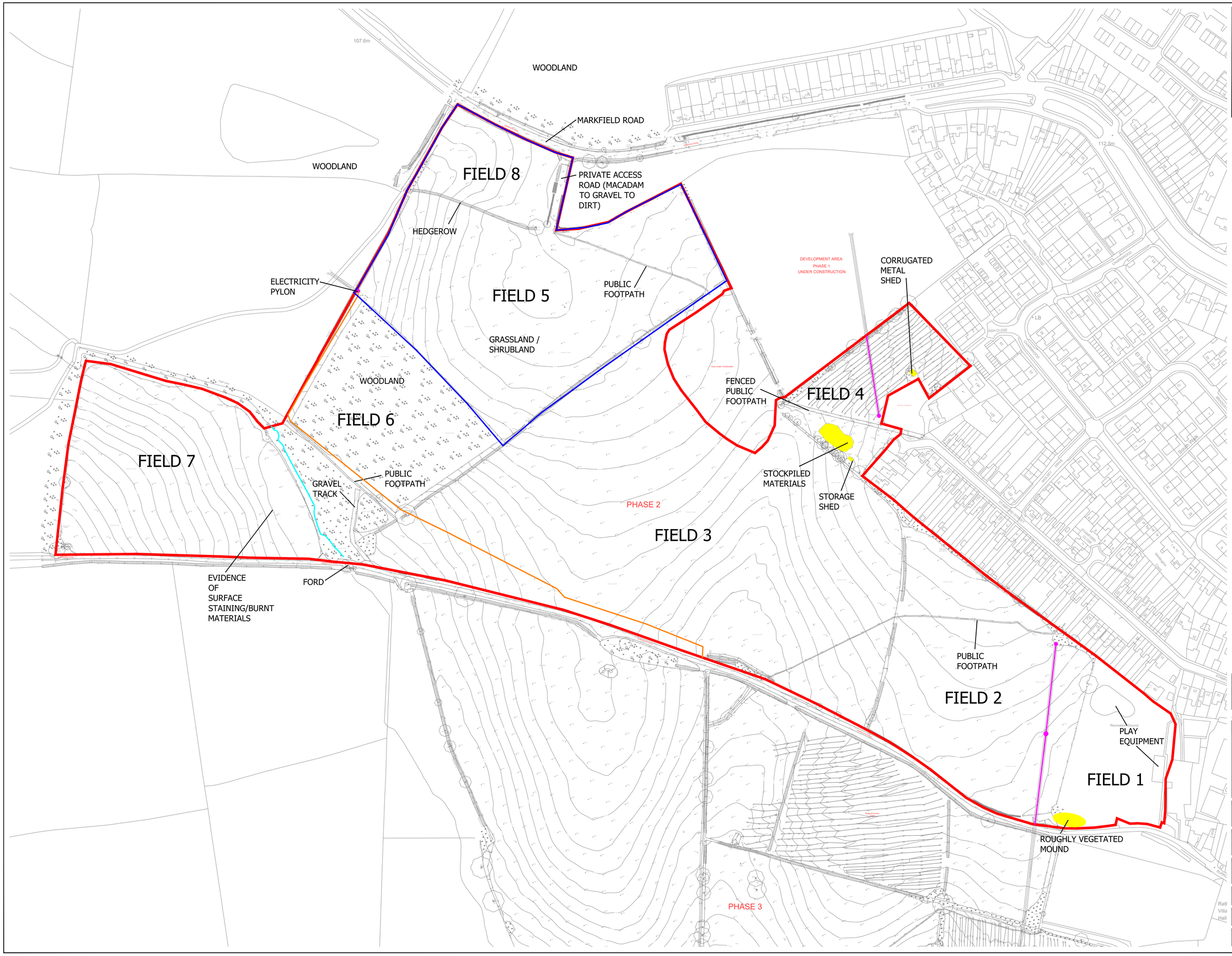

REV	DESCRIPTION	DATE	BY	AUTH
B	UPDATED FOLLOWING GROUND INVESTIGATION	05/09/23	DP	DJ
A	UPDATED TO INCLUDE LATEST PROPOSALS	20/05/22	LHG	DJ

travis baker

Travis Baker Ltd
Trinity Point
New Road
Halesowen
West Midlands
B63 3HY

Tel: 0121 550 8037

info@travisbaker.co.uk
www.travisbaker.co.uk

CLIENT
LAGAN HOMES LIMITED

PROJECT
BURROUGHS ROAD, RATBY

TITLE
SITE FEATURES PLAN

DRAWN	AUTHORISED	SCALE	DATE
LHG	DJ	1:1000@A0	12/05/22

PROJECT NO.	DRAWING NO.	REV
22069	GE02	A

STATUS:
-

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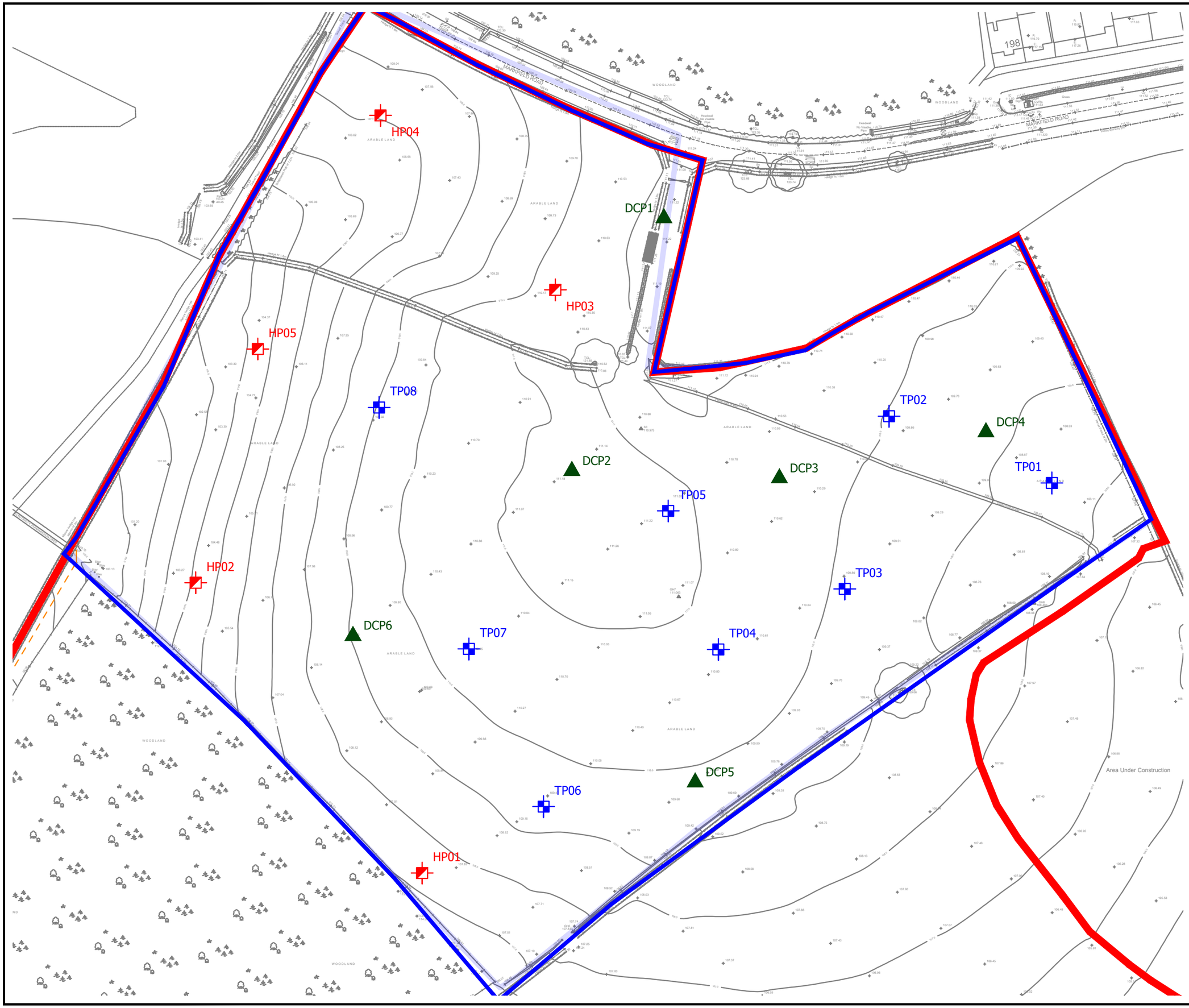

KEY:

- SITE BOUNDARY
- WIDER SITE BOUNDARY
- TP08 TRIAL PIT (AUGUST 2023)
- HP05 SHALLOW TRIAL PIT (AUGUST 2023)
- DCP6 DYNAMIC CONE PENETROMETER TEST (DCP) (AUGUST 2023)

REV	DESCRIPTION	DATE	BY	AUTH

travis baker

Travis Baker Ltd
Trinity Point
New Road
Halesowen
West Midlands
B63 3HY

Tel: 0121 550 8037

info@travisbaker.co.uk
www.travisbaker.co.uk

CLIENT
LAGAN HOMES LIMITED

PROJECT
BURROUGHS ROAD, RATBY

TITLE
EXPLORATORY HOLE LOCATION PLAN

DRAWN	AUTHORISED	SCALE	DATE
DP	CC	1:1000@A3	24/07/23

PROJECT NO.	DRAWING NO.	REV
22069	GE03	-

STATUS.
-

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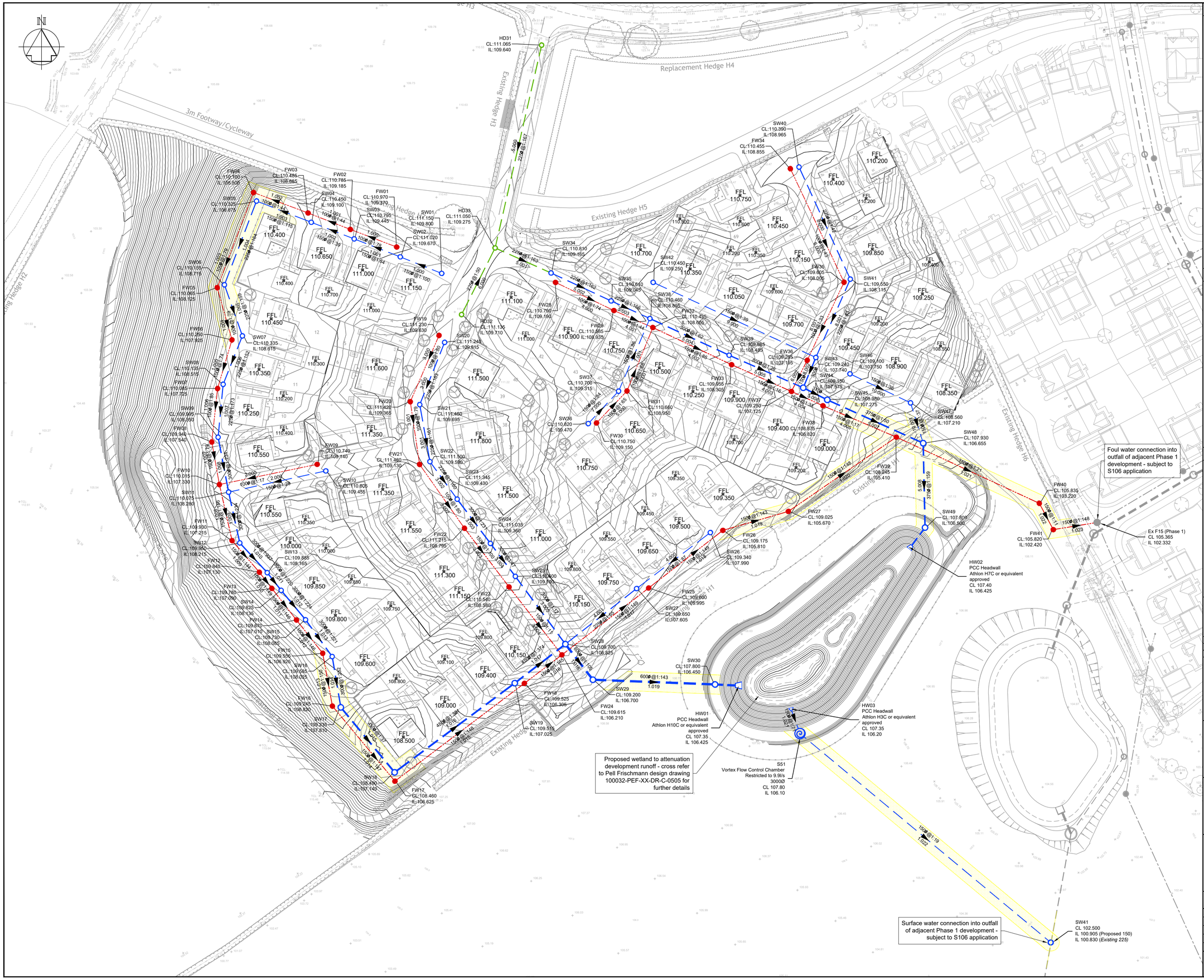
Appendix B Detailed Drainage Layout



GENERAL NOTES

G1. DO NOT SCALE THIS DRAWING.

G2. ANY DIMENSIONAL DISCREPANCIES SHOULD BE NOTIFIED TO THE ENGINEER IMMEDIATELY.

G3. ALL DIMENSIONS ARE IN MILLIMETRES - (mm)
ALL LEVELS ARE IN METRES - (m) AND ARE ABOVE ORDNANCE DATUM AT NEWLYN, CORNWALL UNLESS NOTED OTHERWISE.

G4. NORTH SHOWN INDICATIVE ONLY

G5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT; SPECIFICATIONS; DRAWINGS; DETAILS AND OTHER DESIGN INFORMATION.

G6. ALL DRAWINGS AND WRITTEN MATERIAL CONTAINED WITHIN, CONSTITUTE ORIGINAL AND UNPUBLISHED WORK OF THE ENGINEER AND MAY NOT BE DUPLICATED, USED, REPRODUCED OR DISCLOSED WITHOUT WRITTEN CONSENT OR EXPRESS PERMISSION FROM THE ENGINEER.

G7. ALL INFORMATION CONTAINED IN THIS DOCUMENT IS COPYRIGHT ©

G8. WHERE THE CONTRACTOR UNDERTAKES OR ENGAGES A THIRD PARTY TO UNDERTAKE TEMPORARY WORKS DESIGN, OR VARIES THE PELL FRISCHMANN DESIGN IN ANY WAY, THEN THE CONTRACTOR WILL TAKE FULL RESPONSIBILITY AND LIABILITY FOR ALL DESIGN ASPECTS, INCLUDING A DESIGN RISK ASSESSMENT. THE CONTRACTOR SHALL INFORM PELL FRISCHMANN OF ANY PROPOSED VARIANCES TO THE DESIGN.

DRAINAGE NOTES

- ALL DRAINAGE IS SUBJECT TO APPROVAL BY LEICESTERSHIRE COUNTY COUNCIL AS THE LEAD LOCAL FLOOD AUTHORITY.
- ALL ADOPTABLE DRAINAGE IS SUBJECT TO APPROVAL BY SEVERN TRENT WATER.
- ALL ATTENUATION FEATURES ARE DESIGNED IN ACCORDANCE WITH THE CIRIA SuDS MANUAL C753.
- SURFACE WATER RUNOFF TREATMENT HAS BEEN ASSESSED IN ACCORDANCE WITH THE SIMPLE INDEX APPROACH AS OUTLINED IN CIRIA SuDS MANUAL C753.
- ASSESSMENT OF REQUIRED STORAGE VOLUMES CARRIED OUT WITH SITE SPECIFIC FEH DATA.
- IMPERMEABLE AREA OF DEVELOPMENT IS CALCULATED AT 1.672ha. FOR ROBUSTNESS, A 10% URBAN CREEP FACTOR HAS BEEN ADDED AND THE ATTENUATION FEATURE TESTED AGAINST THIS.
- MAXIMUM PERMISSIBLE DISCHARGE RATE HAS BEEN CALCULATED AS EQUIVALENT GREENFIELD RATE OF 9.9l/s.
- ALL FOUL AND SURFACE WATER MANHOLES AND PIPES HAVE BEEN CALCULATED AND CHECKED USING MICRODRAINAGE.

DRAINAGE LEGEND

- PROPOSED HIGHWAY SURFACE WATER GRAVITY SEWER
- PROPOSED ADOPTABLE SURFACE WATER GRAVITY SEWER
- PROPOSED ADOPTABLE FOUL WATER GRAVITY SEWER
- PROPOSED PCC HEADWALL UNIT - REFER TO LAYOUT FOR PRODUCT SPECIFICATION
- PROPOSED FLOW CONTROL CHAMBER (HYDROBRAKE OR APPROVED EQUIVALENT)
- 5m EASEMENT

REV	DESCRIPTION	DRN	CHK	APP	DATE
P02	UPDATED TO SUIT REVISED MASTERPLAN	JN	LDH	LDH	29.04.24
P01	ISSUED FOR INFORMATION	SP	LDH	LDH	05.04.24

Pell Frischmann
4th FLOOR, THE POYNT, WOLLATON STREET, NOTTINGHAM NG1 5FW
Telephone +44 (0)115 784 8960
Email: pfnottingham@pellfrischmann.com
www.pellfrischmann.com

Architect/Client/Contractor

LAGAN HOMES

Project

RATBY PHASE 2
RESERVED MATTERS

Drawing Title

DETAILED DRAINAGE LAYOUT

Drawing Status

FOR INFORMATION

	Name	Date	Status Code	
Drawn	S. PAOLI	25.03.24		S2
Designed	S. PAOLI	25.03.24	Scale	1:500
Eng Chk	L. HULKA	25.03.24		
Approved	L. HULKA	25.03.24	Revision	P02

Drawing No.

100032 -PEF -ZZ - XX - DR - C -0500

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Appendix C Detailed Hydraulic Modelling Results (Surface and Foul)

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.649	4-8	0.970	8-12	0.053

Total Area Contributing (ha) = 1.672

Total Pipe Volume (m³) = 70.515

Network Design Table for Storm

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	13.053	0.130	100.4	0.017	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	14.474	0.225	64.3	0.017	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	13.479	0.345	39.1	0.026	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	17.183	0.150	114.6	0.028	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.22	109.800	0.017	0.0	0.0	0.0	1.00	17.7	3.1
S1.001	50.00	5.41	109.670	0.034	0.0	0.0	0.0	1.26	22.2	6.1
S1.002	50.00	5.55	109.445	0.060	0.0	0.0	0.0	1.62	28.5	10.8
S1.003	50.00	5.85	109.100	0.088	0.0	0.0	0.0	0.94	16.6	15.9

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.004	26.243	0.160	164.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.005	15.858	0.100	158.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	15.249	0.100	152.5	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.007	15.552	0.090	172.8	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.008	16.353	0.070	233.6	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	29.122	1.025	28.4	0.042	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.009	15.217	0.065	234.1	0.053	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.010	11.845	0.050	236.9	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.011	6.592	0.030	219.7	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.012	11.183	0.050	223.7	0.020	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.013	13.283	0.060	221.4	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.014	15.080	0.065	232.0	0.040	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.015	24.694	0.670	36.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.016	43.802	0.115	380.9	0.091	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.017	18.704	0.050	374.1	0.020	0.00	0.0	0.600	o	450	Pipe/Conduit	
S3.000	19.620	0.120	163.5	0.031	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.001	16.931	0.105	161.2	0.060	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	13.585	0.085	159.8	0.055	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.003	16.191	0.070	231.3	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.004	50.00	6.28	108.875	0.101	0.0	0.0	0.0	1.02	40.5	18.2
S1.005	50.00	6.54	108.715	0.101	0.0	0.0	0.0	1.04	41.2	18.2
S1.006	50.00	6.78	108.615	0.141	0.0	0.0	0.0	1.06	42.0	25.5
S1.007	50.00	7.04	108.515	0.162	0.0	0.0	0.0	0.99	39.4	29.2
S1.008	50.00	7.31	108.350	0.186	0.0	0.0	0.0	1.02	72.4	33.6
S2.000	50.00	5.26	109.455	0.042	0.0	0.0	0.0	1.90	33.5	7.6
S1.009	50.00	7.55	108.280	0.281	0.0	0.0	0.0	1.02	72.3	50.7
S1.010	50.00	7.75	108.215	0.306	0.0	0.0	0.0	1.02	71.9	55.2
S1.011	50.00	7.85	108.165	0.335	0.0	0.0	0.0	1.06	74.7	60.5
S1.012	50.00	8.03	108.135	0.355	0.0	0.0	0.0	1.05	74.0	64.1
S1.013	50.00	8.24	108.085	0.376	0.0	0.0	0.0	1.05	74.4	67.9
S1.014	50.00	8.48	108.025	0.416	0.0	0.0	0.0	1.03	72.7«	75.1
S1.015	50.00	8.61	107.810	0.416	0.0	0.0	0.0	3.36	534.0	75.1
S1.016	50.00	9.31	107.140	0.507	0.0	0.0	0.0	1.04	164.7	91.5
S1.017	50.00	9.61	107.025	0.527	0.0	0.0	0.0	1.05	166.2	95.1
S3.000	50.00	5.32	109.815	0.031	0.0	0.0	0.0	1.02	40.5	5.6
S3.001	50.00	5.60	109.695	0.091	0.0	0.0	0.0	1.03	40.8	16.4
S3.002	50.00	5.81	109.590	0.146	0.0	0.0	0.0	1.03	41.0	26.4
S3.003	50.00	6.08	109.430	0.209	0.0	0.0	0.0	1.03	72.8	37.7

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.004	12.101	0.260	46.5	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.005	24.644	1.975	12.5	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	27.104	0.310	87.4	0.083	5.00	0.0	0.600	o	150	Pipe/Conduit	
S4.001	26.429	0.405	65.3	0.041	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.018	13.160	0.125	105.3	0.034	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.019	35.784	0.250	143.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.020	5.000#	0.250	20.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.000	60.882	0.365	166.8	0.075	5.00	0.0	0.600	o	225	Pipe/Conduit	
S6.000	21.832	0.435	50.2	0.032	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.001	17.930	0.110	163.0	0.010	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.002	19.389	0.120	161.6	0.075	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.003	12.475	0.075	166.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S7.000	12.981	0.155	84.0	0.046	5.00	0.0	0.600	o	150	Pipe/Conduit	
S7.001	23.156	0.270	85.8	0.037	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.004	25.555	0.410	62.3	0.045	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3.004	50.00	6.16	109.360	0.259	0.0	0.0	0.0	2.31	163.3	46.8
S3.005	50.00	6.26	109.100	0.309	0.0	0.0	0.0	4.47	316.3	55.8
S4.000	50.00	5.42	107.990	0.083	0.0	0.0	0.0	1.08	19.0	15.0
S4.001	50.00	5.69	107.605	0.124	0.0	0.0	0.0	1.62	64.5	22.4
S1.018	50.00	9.70	106.825	0.994	0.0	0.0	0.0	2.37	671.0	179.5
S1.019	50.00	10.00	106.700	0.994	0.0	0.0	0.0	2.03	575.0	179.5
S1.020	50.00	10.01	106.450	0.994	0.0	0.0	0.0	5.46	1544.3	179.5
S5.000	50.00	6.01	109.640	0.075	0.0	0.0	0.0	1.01	40.1	13.5
S6.000	50.00	5.20	109.710	0.032	0.0	0.0	0.0	1.85	73.6	5.8
S5.001	50.00	6.30	109.275	0.117	0.0	0.0	0.0	1.02	40.6	21.1
S5.002	50.00	6.61	109.165	0.192	0.0	0.0	0.0	1.03	40.8	34.7
S5.003	50.00	6.82	109.045	0.192	0.0	0.0	0.0	1.01	40.2	34.7
S7.000	50.00	5.20	109.470	0.046	0.0	0.0	0.0	1.10	19.4	8.3
S7.001	50.00	5.55	109.315	0.083	0.0	0.0	0.0	1.09	19.2	15.0
S5.004	50.00	7.03	108.895	0.320	0.0	0.0	0.0	1.99	141.0	57.8

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S5.005	23.679	0.835	28.4	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	
S8.000	36.074	0.850	42.4	0.132	5.00	0.0	0.600	o	225	Pipe/Conduit	
S8.001	25.046	0.300	83.5	0.055	0.00	0.0	0.600	o	225	Pipe/Conduit	
S9.000	52.449	1.360	38.6	0.071	5.00	0.0	0.600	o	150	Pipe/Conduit	
S8.002	9.594	0.090	106.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S5.006	7.884	0.300	26.3	0.019	0.00	0.0	0.600	o	375	Pipe/Conduit	
S5.007	30.800	0.620	49.7	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S10.000	19.652	0.540	36.4	0.032	5.00	0.0	0.600	o	150	Pipe/Conduit	
S10.001	12.367	0.330	37.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.008	24.710	0.155	159.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S5.009	5.000#	0.300	16.7	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.021	7.078	0.100	70.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.022	95.626	5.150	18.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S5.005	50.00	7.17	108.485	0.369	0.0	0.0	0.0	2.96	209.5	66.6
S8.000	50.00	5.30	108.965	0.132	0.0	0.0	0.0	2.01	80.1	23.8
S8.001	50.00	5.59	108.115	0.187	0.0	0.0	0.0	1.43	56.9	33.8
S9.000	50.00	5.54	109.250	0.071	0.0	0.0	0.0	1.63	28.7	12.8
S8.002	50.00	5.70	107.740	0.258	0.0	0.0	0.0	1.52	107.6	46.6
S5.006	50.00	7.20	107.575	0.646	0.0	0.0	0.0	3.55	391.7	116.6
S5.007	50.00	7.40	107.275	0.646	0.0	0.0	0.0	2.58	284.5	116.6
S10.000	50.00	5.20	107.750	0.032	0.0	0.0	0.0	1.67	29.6	5.8
S10.001	50.00	5.32	107.210	0.032	0.0	0.0	0.0	1.65	29.1	5.8
S5.008	50.00	7.69	106.655	0.678	0.0	0.0	0.0	1.43	158.2	122.4
S5.009	50.00	7.71	106.500	0.678	0.0	0.0	0.0	4.46	492.3	122.4
S1.021	49.99	10.11	106.200	1.672	0.0	0.0	0.0	1.20	21.1«	301.8
S1.022	48.27	10.79	106.100	1.672	0.0	0.0	0.0	2.35	41.5«	301.8

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	SW01	111.150	109.800	1.200	Open Manhole	1200
S1.001	o	150	SW02	111.020	109.670	1.200	Open Manhole	1200
S1.002	o	150	SW03	110.795	109.445	1.200	Open Manhole	1200
S1.003	o	150	SW04	110.450	109.100	1.200	Open Manhole	1200
S1.004	o	225	SW05	110.325	108.875	1.225	Open Manhole	1200
S1.005	o	225	SW06	110.155	108.715	1.215	Open Manhole	1200
S1.006	o	225	SW07	110.335	108.615	1.495	Open Manhole	1200
S1.007	o	225	SW08	110.135	108.515	1.395	Open Manhole	1200
S1.008	o	300	SW09	109.995	108.350	1.345	Open Manhole	1200
S2.000	o	150	SW10	110.805	109.455	1.200	Open Manhole	1200
S1.009	o	300	SW11	110.075	108.280	1.495	Open Manhole	1200
S1.010	o	300	SW12	109.950	108.215	1.435	Open Manhole	1200
S1.011	o	300	SW13	109.885	108.165	1.420	Open Manhole	1200
S1.012	o	300	SW14	109.825	108.135	1.390	Open Manhole	1200
S1.013	o	300	SW15	109.730	108.085	1.345	Open Manhole	1200
S1.014	o	300	SW16	109.585	108.025	1.260	Open Manhole	1200
S1.015	o	450	SW17	109.235	107.810	0.975	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	13.053	100.4	SW02	111.020	109.670	1.200	Open Manhole	1200
S1.001	14.474	64.3	SW03	110.795	109.445	1.200	Open Manhole	1200
S1.002	13.479	39.1	SW04	110.450	109.100	1.200	Open Manhole	1200
S1.003	17.183	114.6	SW05	110.325	108.950	1.225	Open Manhole	1200
S1.004	26.243	164.0	SW06	110.155	108.715	1.215	Open Manhole	1200
S1.005	15.858	158.6	SW07	110.335	108.615	1.495	Open Manhole	1200
S1.006	15.249	152.5	SW08	110.135	108.515	1.395	Open Manhole	1200
S1.007	15.552	172.8	SW09	109.995	108.425	1.345	Open Manhole	1200
S1.008	16.353	233.6	SW11	110.075	108.280	1.495	Open Manhole	1200
S2.000	29.122	28.4	SW11	110.075	108.430	1.495	Open Manhole	1200
S1.009	15.217	234.1	SW12	109.950	108.215	1.435	Open Manhole	1200
S1.010	11.845	236.9	SW13	109.885	108.165	1.420	Open Manhole	1200
S1.011	6.592	219.7	SW14	109.825	108.135	1.390	Open Manhole	1200
S1.012	11.183	223.7	SW15	109.730	108.085	1.345	Open Manhole	1200
S1.013	13.283	221.4	SW16	109.585	108.025	1.260	Open Manhole	1200
S1.014	15.080	232.0	SW17	109.235	107.960	0.975	Open Manhole	1500
S1.015	24.694	36.9	SW18	108.490	107.140	0.900	Open Manhole	1500

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.016	o	450	SW18	108.490	107.140	0.900	Open Manhole	1500
S1.017	o	450	SW19	109.515	107.025	2.040	Open Manhole	1500
S3.000	o	225	SW20	111.240	109.815	1.200	Open Manhole	1200
S3.001	o	225	SW21	111.450	109.695	1.530	Open Manhole	1200
S3.002	o	225	SW22	111.500	109.590	1.685	Open Manhole	1200
S3.003	o	300	SW23	111.345	109.430	1.615	Open Manhole	1200
S3.004	o	300	SW24	111.035	109.360	1.375	Open Manhole	1200
S3.005	o	300	SW25	110.600	109.100	1.200	Open Manhole	1200
S4.000	o	150	SW26	109.340	107.990	1.200	Open Manhole	1200
S4.001	o	225	SW27	109.650	107.605	1.820	Open Manhole	1200
S1.018	o	600	SW28	109.700	106.825	2.275	Open Manhole	1500
S1.019	o	600	SW29	109.200	106.700	1.900	Open Manhole	1500
S1.020	o	600	SW30	107.800	106.450	0.750	Open Manhole	1500
S5.000	o	225	HD31	111.065	109.640	1.200	Open Manhole	1200
S6.000	o	225	HD32	111.135	109.710	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.016	43.802	380.9	SW19	109.515	107.025	2.040	Open Manhole	1500
S1.017	18.704	374.1	SW28	109.700	106.975	2.275	Open Manhole	1500
S3.000	19.620	163.5	SW21	111.450	109.695	1.530	Open Manhole	1200
S3.001	16.931	161.2	SW22	111.500	109.590	1.685	Open Manhole	1200
S3.002	13.585	159.8	SW23	111.345	109.505	1.615	Open Manhole	1200
S3.003	16.191	231.3	SW24	111.035	109.360	1.375	Open Manhole	1200
S3.004	12.101	46.5	SW25	110.600	109.100	1.200	Open Manhole	1200
S3.005	24.644	12.5	SW28	109.700	107.125	2.275	Open Manhole	1500
S4.000	27.104	87.4	SW27	109.650	107.680	1.820	Open Manhole	1200
S4.001	26.429	65.3	SW28	109.700	107.200	2.275	Open Manhole	1500
S1.018	13.160	105.3	SW29	109.200	106.700	1.900	Open Manhole	1500
S1.019	35.784	143.1	SW30	107.800	106.450	0.750	Open Manhole	1500
S1.020	5.000#	20.0	SW50	107.800	106.200	1.000	Open Manhole	1500
S5.000	60.882	166.8	HD33	111.050	109.275	1.550	Open Manhole	1200
S6.000	21.832	50.2	HD33	111.050	109.275	1.550	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.001	o	225	HD33	111.050	109.275	1.550	Open Manhole	1200
S5.002	o	225	SW34	110.810	109.165	1.420	Open Manhole	1200
S5.003	o	225	SW35	110.610	109.045	1.340	Open Manhole	1200
S7.000	o	150	SW36	110.820	109.470	1.200	Open Manhole	1200
S7.001	o	150	SW37	110.700	109.315	1.235	Open Manhole	1200
S5.004	o	300	SW38	110.460	108.895	1.265	Open Manhole	1200
S5.005	o	300	SW39	109.985	108.485	1.200	Open Manhole	1200
S8.000	o	225	SW40	110.390	108.965	1.200	Open Manhole	1200
S8.001	o	225	SW41	109.550	108.115	1.210	Open Manhole	1200
S9.000	o	150	SW42	110.450	109.250	1.050	Open Manhole	1200
S8.002	o	300	SW43	109.240	107.740	1.200	Open Manhole	1200
S5.006	o	375	SW44	109.150	107.575	1.200	Open Manhole	1500
S5.007	o	375	SW45	108.980	107.275	1.330	Open Manhole	1500
S10.000	o	150	SW46	109.100	107.750	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.001	17.930	163.0	SW34	110.810	109.165	1.420	Open Manhole	1200
S5.002	19.389	161.6	SW35	110.610	109.045	1.340	Open Manhole	1200
S5.003	12.475	166.3	SW38	110.460	108.970	1.265	Open Manhole	1200
S7.000	12.981	84.0	SW37	110.700	109.315	1.235	Open Manhole	1200
S7.001	23.156	85.8	SW38	110.460	109.045	1.265	Open Manhole	1200
S5.004	25.555	62.3	SW39	109.985	108.485	1.200	Open Manhole	1200
S5.005	23.679	28.4	SW44	109.150	107.650	1.200	Open Manhole	1500
S8.000	36.074	42.4	SW41	109.550	108.115	1.210	Open Manhole	1200
S8.001	25.046	83.5	SW43	109.240	107.815	1.200	Open Manhole	1200
S9.000	52.449	38.6	SW43	109.240	107.890	1.200	Open Manhole	1200
S8.002	9.594	106.6	SW44	109.150	107.650	1.200	Open Manhole	1500
S5.006	7.884	26.3	SW45	108.980	107.275	1.330	Open Manhole	1500
S5.007	30.800	49.7	SW48	107.930	106.655	0.900	Open Manhole	1500
S10.000	19.652	36.4	SW47	108.560	107.210	1.200	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S10.001	o	150	SW47	108.560	107.210	1.200	Open Manhole	1200
S5.008	o	375	SW48	107.930	106.655	0.900	Open Manhole	1500
S5.009	o	375	SW49	107.800	106.500	0.925	Open Manhole	1500
S1.021	o	150	SW50	107.800	106.200	1.450	Open Manhole	1500
S1.022	o	150	SW51	107.800	106.100	1.550	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S10.001	12.367	37.5	SW48	107.930	106.880	0.900	Open Manhole	1500
S5.008	24.710	159.4	SW49	107.800	106.500	0.925	Open Manhole	1500
S5.009	5.000#	16.7	SW50	107.800	106.200	1.225	Open Manhole	1500
S1.021	7.078	70.8	SW51	107.800	106.100	1.550	Open Manhole	1200
S1.022	95.626	18.6		102.500	100.950	1.400	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.017	0.017	0.017
1.001	-	-	100	0.017	0.017	0.017
1.002	-	-	100	0.026	0.026	0.026
1.003	-	-	100	0.028	0.028	0.028
1.004	-	-	100	0.013	0.013	0.013
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.040	0.040	0.040
1.007	-	-	100	0.021	0.021	0.021
1.008	-	-	100	0.024	0.024	0.024
2.000	-	-	100	0.042	0.042	0.042
1.009	-	-	100	0.053	0.053	0.053
1.010	-	-	100	0.025	0.025	0.025
1.011	-	-	100	0.029	0.029	0.029
1.012	-	-	100	0.020	0.020	0.020
1.013	-	-	100	0.021	0.021	0.021
1.014	-	-	100	0.040	0.040	0.040
1.015	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.091	0.091	0.091
1.017	-	-	100	0.020	0.020	0.020
3.000	-	-	100	0.031	0.031	0.031
3.001	-	-	100	0.060	0.060	0.060
3.002	-	-	100	0.055	0.055	0.055
3.003	-	-	100	0.063	0.063	0.063
3.004	-	-	100	0.050	0.050	0.050
3.005	-	-	100	0.050	0.050	0.050
4.000	-	-	100	0.083	0.083	0.083
4.001	-	-	100	0.041	0.041	0.041
1.018	-	-	100	0.034	0.034	0.034
1.019	-	-	100	0.000	0.000	0.000
1.020	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.075	0.075	0.075
6.000	-	-	100	0.032	0.032	0.032
5.001	-	-	100	0.010	0.010	0.010
5.002	-	-	100	0.075	0.075	0.075
5.003	-	-	100	0.000	0.000	0.000
7.000	-	-	100	0.046	0.046	0.046
7.001	-	-	100	0.037	0.037	0.037
5.004	-	-	100	0.045	0.045	0.045
5.005	-	-	100	0.049	0.049	0.049
8.000	-	-	100	0.132	0.132	0.132
8.001	-	-	100	0.055	0.055	0.055
9.000	-	-	100	0.071	0.071	0.071
8.002	-	-	100	0.000	0.000	0.000
5.006	-	-	100	0.019	0.019	0.019
5.007	-	-	100	0.000	0.000	0.000
10.000	-	-	100	0.032	0.032	0.032
10.001	-	-	100	0.000	0.000	0.000
5.008	-	-	100	0.000	0.000	0.000
5.009	-	-	100	0.000	0.000	0.000
1.021	-	-	100	0.000	0.000	0.000
1.022	-	-	100	0.000	0.000	0.000

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
				Total 1.672	Total 1.672	Total 1.672

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.022		102.500	100.950	0.000	0	0

Simulation Criteria for Storm

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

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 450501 306499 SK 50501 06499
Data Type	Point
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	1.000
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW50, DS/PN: S1.021, Volume (m³): 4.2

Unit Reference	MD-SHE-0141-9900-1300-9900
Design Head (m)	1.300
Design Flow (l/s)	9.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	141
Invert Level (m)	106.200
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	9.9
Flush-Flo™	0.382	9.9
Kick-Flo®	0.825	8.0
Mean Flow over Head Range	-	8.6

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.1	1.200	9.5	3.000	14.7	7.000	22.1
0.200	9.2	1.400	10.3	3.500	15.8	7.500	22.8
0.300	9.8	1.600	10.9	4.000	16.9	8.000	23.5
0.400	9.9	1.800	11.5	4.500	17.8	8.500	24.2
0.500	9.8	2.000	12.1	5.000	18.8	9.000	24.9
0.600	9.5	2.200	12.7	5.500	19.6	9.500	25.6
0.800	8.3	2.400	13.2	6.000	20.5		
1.000	8.8	2.600	13.7	6.500	21.3		

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Storage Structures for Storm

Tank or Pond Manhole: SW50, DS/PN: S1.021

Invert Level (m) 106.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	727.0	1.600	1755.0

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 450501 306499 SK 50501 06499
Data Type Point
Cv (Summer) 1.000
Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SW01	15 Summer	2	+0%	30/15 Summer			
S1.001	SW02	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S1.002	SW03	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S1.003	SW04	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S1.004	SW05	15 Summer	2	+0%	30/15 Summer			
S1.005	SW06	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S1.006	SW07	15 Summer	2	+0%	30/15 Summer			
S1.007	SW08	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S1.008	SW09	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S2.000	SW10	15 Summer	2	+0%	100/15 Summer			
S1.009	SW11	15 Summer	2	+0%	30/15 Summer			
S1.010	SW12	15 Summer	2	+0%	30/15 Summer			
S1.011	SW13	15 Summer	2	+0%	30/15 Summer			
S1.012	SW14	15 Summer	2	+0%	30/15 Summer			
S1.013	SW15	15 Summer	2	+0%	30/15 Summer			
S1.014	SW16	15 Summer	2	+0%	30/15 Summer			
S1.015	SW17	15 Summer	2	+0%				
S1.016	SW18	15 Summer	2	+0%	100/15 Summer			

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SW01	109.847	-0.103	0.000	0.21			3.4	OK	
S1.001	SW02	109.727	-0.093	0.000	0.30			6.2	OK	1
S1.002	SW03	109.512	-0.083	0.000	0.40			10.5	OK	2
S1.003	SW04	109.220	-0.030	0.000	0.98			15.2	OK	5
S1.004	SW05	108.982	-0.118	0.000	0.46			17.1	OK	
S1.005	SW06	108.824	-0.116	0.000	0.47			17.1	OK	4
S1.006	SW07	108.745	-0.095	0.000	0.62			22.9	OK	
S1.007	SW08	108.660	-0.080	0.000	0.74			25.8	OK	2
S1.008	SW09	108.512	-0.138	0.000	0.47			28.8	OK	2
S2.000	SW10	109.507	-0.098	0.000	0.26			8.4	OK	
S1.009	SW11	108.474	-0.106	0.000	0.70			42.8	OK	
S1.010	SW12	108.429	-0.086	0.000	0.79			45.7	OK	
S1.011	SW13	108.394	-0.071	0.000	0.93			49.6	OK	
S1.012	SW14	108.355	-0.080	0.000	0.88			52.2	OK	
S1.013	SW15	108.308	-0.077	0.000	0.89			54.7	OK	
S1.014	SW16	108.261	-0.064	0.000	0.97			59.3	OK	
S1.015	SW17	107.919	-0.341	0.000	0.13			59.3	OK	
S1.016	SW18	107.358	-0.232	0.000	0.47			69.2	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.017	SW19	15 Summer	2	+0%	100/15 Summer			
S3.000	SW20	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S3.001	SW21	15 Summer	2	+0%	30/15 Summer			
S3.002	SW22	15 Summer	2	+0%	30/15 Summer			
S3.003	SW23	15 Summer	2	+0%	30/15 Summer			
S3.004	SW24	15 Summer	2	+0%	100/15 Summer			
S3.005	SW25	15 Summer	2	+0%				
S4.000	SW26	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S4.001	SW27	15 Summer	2	+0%	100/15 Summer			
S1.018	SW28	15 Summer	2	+0%	100/15 Summer			
S1.019	SW29	15 Summer	2	+0%	100/15 Summer			
S1.020	SW30	15 Summer	2	+0%	100/60 Summer			
S5.000	HD31	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S6.000	HD32	15 Summer	2	+0%	100/15 Summer			
S5.001	HD33	15 Summer	2	+0%	30/15 Summer			
S5.002	SW34	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S5.003	SW35	15 Summer	2	+0%	30/15 Summer			
S7.000	SW36	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S7.001	SW37	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S5.004	SW38	15 Summer	2	+0%	100/15 Summer			
S5.005	SW39	15 Summer	2	+0%	100/15 Summer			
S8.000	SW40	15 Summer	2	+0%	100/15 Summer	100/15 Summer		
S8.001	SW41	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S9.000	SW42	15 Summer	2	+0%	30/15 Summer	100/15 Summer		
S8.002	SW43	15 Summer	2	+0%	30/15 Summer			
S5.006	SW44	15 Summer	2	+0%	30/15 Summer			
S5.007	SW45	15 Summer	2	+0%	30/15 Summer			
S10.000	SW46	15 Summer	2	+0%	100/15 Summer			
S10.001	SW47	15 Summer	2	+0%	100/15 Summer			
S5.008	SW48	15 Summer	2	+0%	30/15 Summer			
S5.009	SW49	15 Summer	2	+0%	30/15 Summer			
S1.021	SW50	480 Summer	2	+0%	2/15 Summer			
S1.022	SW51	480 Summer	2	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.017	SW19	107.259	-0.216	0.000	0.53			70.5	OK
S3.000	SW20	109.877	-0.163	0.000	0.17			6.1	OK
S3.001	SW21	109.801	-0.119	0.000	0.44			16.0	OK
S3.002	SW22	109.731	-0.084	0.000	0.71			25.2	OK
S3.003	SW23	109.594	-0.136	0.000	0.57			35.4	OK
S3.004	SW24	109.481	-0.179	0.000	0.34			43.4	OK
S3.005	SW25	109.186	-0.214	0.000	0.18			51.3	OK
S4.000	SW26	108.103	-0.037	0.000	0.90			16.3	OK
S4.001	SW27	107.703	-0.127	0.000	0.39			23.1	OK

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.018	SW28	107.078	-0.347	0.000	0.37			131.5	OK
S1.019	SW29	106.913	-0.387	0.000	0.27			131.6	OK
S1.020	SW30	106.658	-0.392	0.000	0.26			131.0	OK
S5.000	HD31	109.737	-0.128	0.000	0.37			14.3	OK
S6.000	HD32	109.757	-0.178	0.000	0.10			6.4	OK
S5.001	HD33	109.401	-0.099	0.000	0.59			21.6	OK
S5.002	SW34	109.333	-0.057	0.000	0.89			32.9	OK
S5.003	SW35	109.219	-0.051	0.000	0.96			33.1	OK
S7.000	SW36	109.547	-0.073	0.000	0.52			9.1	OK
S7.001	SW37	109.422	-0.043	0.000	0.84			15.3	OK
S5.004	SW38	109.033	-0.162	0.000	0.43			53.8	OK
S5.005	SW39	108.604	-0.181	0.000	0.33			61.0	OK
S8.000	SW40	109.057	-0.133	0.000	0.34			26.0	OK
S8.001	SW41	108.252	-0.088	0.000	0.67			35.2	OK
S9.000	SW42	109.326	-0.074	0.000	0.50			14.0	OK
S8.002	SW43	107.919	-0.121	0.000	0.66			49.4	OK
S5.006	SW44	107.769	-0.181	0.000	0.52			112.0	OK
S5.007	SW45	107.451	-0.199	0.000	0.45			112.4	OK
S10.000	SW46	107.799	-0.101	0.000	0.23			6.4	OK
S10.001	SW47	107.260	-0.100	0.000	0.24			6.3	OK
S5.008	SW48	106.926	-0.104	0.000	0.87			118.7	OK
S5.009	SW49	106.699	-0.176	0.000	0.55			118.2	OK
S1.021	SW50	106.600	0.250	0.000	0.55			9.8	SURCHARGED
S1.022	SW51	106.150	-0.100	0.000	0.24			9.8	OK

PN	US/MH Name	Level Exceeded
S1.017	SW19	
S3.000	SW20	1
S3.001	SW21	
S3.002	SW22	
S3.003	SW23	
S3.004	SW24	
S3.005	SW25	
S4.000	SW26	3
S4.001	SW27	
S1.018	SW28	
S1.019	SW29	
S1.020	SW30	
S5.000	HD31	2
S6.000	HD32	
S5.001	HD33	
S5.002	SW34	2
S5.003	SW35	
S7.000	SW36	3

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Level Exceeded
S7.001	SW37	2
S5.004	SW38	
S5.005	SW39	
S8.000	SW40	2
S8.001	SW41	3
S9.000	SW42	3
S8.002	SW43	
S5.006	SW44	
S5.007	SW45	
S10.000	SW46	
S10.001	SW47	
S5.008	SW48	
S5.009	SW49	
S1.021	SW50	
S1.022	SW51	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 450501 306499 SK 50501 06499
Data Type Point
Cv (Summer) 1.000
Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SW01	15 Summer	30	+0%	30/15 Summer			
S1.001	SW02	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S1.002	SW03	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S1.003	SW04	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S1.004	SW05	15 Summer	30	+0%	30/15 Summer			
S1.005	SW06	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S1.006	SW07	15 Summer	30	+0%	30/15 Summer			
S1.007	SW08	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S1.008	SW09	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S2.000	SW10	15 Summer	30	+0%	100/15 Summer			
S1.009	SW11	15 Summer	30	+0%	30/15 Summer			
S1.010	SW12	15 Summer	30	+0%	30/15 Summer			
S1.011	SW13	15 Summer	30	+0%	30/15 Summer			
S1.012	SW14	15 Summer	30	+0%	30/15 Summer			
S1.013	SW15	15 Summer	30	+0%	30/15 Summer			
S1.014	SW16	15 Summer	30	+0%	30/15 Summer			
S1.015	SW17	15 Summer	30	+0%				
S1.016	SW18	15 Summer	30	+0%	100/15 Summer			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	SW01	110.075	0.125	0.000	0.41			6.6	SURCHARGED
S1.001	SW02	110.053	0.233	0.000	0.60			12.3	SURCHARGED
S1.002	SW03	110.011	0.416	0.000	0.70			18.3	SURCHARGED
S1.003	SW04	109.886	0.636	0.000	1.78			27.5	SURCHARGED
S1.004	SW05	109.536	0.436	0.000	0.75			28.1	SURCHARGED
S1.005	SW06	109.459	0.519	0.000	0.88			32.2	SURCHARGED
S1.006	SW07	109.415	0.575	0.000	1.03			38.0	SURCHARGED
S1.007	SW08	109.325	0.585	0.000	1.25			43.6	SURCHARGED
S1.008	SW09	109.209	0.559	0.000	0.81			49.6	SURCHARGED
S2.000	SW10	109.536	-0.069	0.000	0.56			17.9	OK
S1.009	SW11	109.166	0.586	0.000	1.25			75.8	SURCHARGED
S1.010	SW12	109.062	0.547	0.000	1.43			83.1	SURCHARGED
S1.011	SW13	108.951	0.486	0.000	1.71			91.3	SURCHARGED
S1.012	SW14	108.816	0.381	0.000	1.64			97.2	SURCHARGED
S1.013	SW15	108.664	0.279	0.000	1.69			103.2	SURCHARGED
S1.014	SW16	108.490	0.165	0.000	1.89			115.0	SURCHARGED
S1.015	SW17	107.966	-0.294	0.000	0.26			115.6	OK
S1.016	SW18	107.534	-0.056	0.000	0.94			139.6	OK

PN	US/MH Name	Level Exceeded
S1.000	SW01	
S1.001	SW02	1
S1.002	SW03	2
S1.003	SW04	5
S1.004	SW05	
S1.005	SW06	4
S1.006	SW07	
S1.007	SW08	2
S1.008	SW09	2
S2.000	SW10	
S1.009	SW11	
S1.010	SW12	
S1.011	SW13	
S1.012	SW14	
S1.013	SW15	
S1.014	SW16	
S1.015	SW17	
S1.016	SW18	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.017	SW19	15 Summer	30	+0%	100/15 Summer			
S3.000	SW20	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S3.001	SW21	15 Summer	30	+0%	30/15 Summer			
S3.002	SW22	15 Summer	30	+0%	30/15 Summer			
S3.003	SW23	15 Summer	30	+0%	30/15 Summer			
S3.004	SW24	15 Summer	30	+0%	100/15 Summer			
S3.005	SW25	15 Summer	30	+0%				
S4.000	SW26	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S4.001	SW27	15 Summer	30	+0%	100/15 Summer			
S1.018	SW28	15 Summer	30	+0%	100/15 Summer			
S1.019	SW29	15 Summer	30	+0%	100/15 Summer			
S1.020	SW30	480 Summer	30	+0%	100/60 Summer			
S5.000	HD31	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S6.000	HD32	15 Summer	30	+0%	100/15 Summer			
S5.001	HD33	15 Summer	30	+0%	30/15 Summer			
S5.002	SW34	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S5.003	SW35	15 Summer	30	+0%	30/15 Summer			
S7.000	SW36	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S7.001	SW37	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S5.004	SW38	15 Summer	30	+0%	100/15 Summer			
S5.005	SW39	15 Summer	30	+0%	100/15 Summer			
S8.000	SW40	15 Summer	30	+0%	100/15 Summer	100/15 Summer		
S8.001	SW41	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S9.000	SW42	15 Summer	30	+0%	30/15 Summer	100/15 Summer		
S8.002	SW43	15 Summer	30	+0%	30/15 Summer			
S5.006	SW44	15 Summer	30	+0%	30/15 Summer			
S5.007	SW45	15 Summer	30	+0%	30/15 Summer			
S10.000	SW46	15 Summer	30	+0%	100/15 Summer			
S10.001	SW47	15 Summer	30	+0%	100/15 Summer			
S5.008	SW48	15 Summer	30	+0%	30/15 Summer			
S5.009	SW49	480 Summer	30	+0%	30/15 Summer			
S1.021	SW50	480 Summer	30	+0%	2/15 Summer			
S1.022	SW51	60 Winter	30	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.017	SW19	107.449	-0.026	0.000	1.00			132.8	OK
S3.000	SW20	110.171	0.131	0.000	0.40			14.6	SURCHARGED
S3.001	SW21	110.148	0.228	0.000	1.02			37.0	SURCHARGED
S3.002	SW22	110.040	0.225	0.000	1.68			59.9	SURCHARGED
S3.003	SW23	109.791	0.061	0.000	1.40			86.3	SURCHARGED
S3.004	SW24	109.576	-0.084	0.000	0.84			107.6	OK
S3.005	SW25	109.245	-0.155	0.000	0.46			128.6	OK
S4.000	SW26	108.742	0.602	0.000	1.70			30.8	SURCHARGED
S4.001	SW27	107.758	-0.072	0.000	0.78			46.3	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.018	SW28	107.266	-0.159	0.000	0.86			304.7	OK
S1.019	SW29	107.051	-0.249	0.000	0.64			308.3	OK
S1.020	SW30	106.932	-0.118	0.000	0.14			68.3	OK
S5.000	HD31	110.031	0.166	0.000	0.69			26.8	SURCHARGED
S6.000	HD32	109.880	-0.055	0.000	0.20			13.6	OK
S5.001	HD33	109.857	0.357	0.000	1.14			41.6	SURCHARGED
S5.002	SW34	109.748	0.358	0.000	1.61			59.4	SURCHARGED
S5.003	SW35	109.408	0.138	0.000	1.73			59.6	SURCHARGED
S7.000	SW36	110.079	0.459	0.000	1.01			17.8	SURCHARGED
S7.001	SW37	109.933	0.468	0.000	1.63			29.6	SURCHARGED
S5.004	SW38	109.107	-0.088	0.000	0.82			103.5	OK
S5.005	SW39	108.666	-0.119	0.000	0.66			122.8	OK
S8.000	SW40	109.166	-0.024	0.000	0.72			54.7	OK
S8.001	SW41	108.755	0.415	0.000	1.41			73.9	SURCHARGED
S9.000	SW42	109.495	0.095	0.000	0.99			27.8	SURCHARGED
S8.002	SW43	108.201	0.161	0.000	1.29			96.8	SURCHARGED
S5.006	SW44	108.054	0.104	0.000	1.02			218.5	SURCHARGED
S5.007	SW45	107.752	0.102	0.000	0.86			217.5	SURCHARGED
S10.000	SW46	107.825	-0.075	0.000	0.49			13.6	OK
S10.001	SW47	107.347	-0.013	0.000	0.50			13.3	OK
S5.008	SW48	107.299	0.269	0.000	1.65			224.8	SURCHARGED
S5.009	SW49	106.933	0.058	0.000	0.22			47.1	SURCHARGED
S1.021	SW50	106.932	0.582	0.000	0.54			9.8	SURCHARGED
S1.022	SW51	106.150	-0.100	0.000	0.24			9.9	OK

PN	US/MH Name	Level Exceeded
S1.017	SW19	
S3.000	SW20	1
S3.001	SW21	
S3.002	SW22	
S3.003	SW23	
S3.004	SW24	
S3.005	SW25	
S4.000	SW26	3
S4.001	SW27	
S1.018	SW28	
S1.019	SW29	
S1.020	SW30	
S5.000	HD31	2
S6.000	HD32	
S5.001	HD33	
S5.002	SW34	2
S5.003	SW35	
S7.000	SW36	3

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Level Exceeded
S7.001	SW37	2
S5.004	SW38	
S5.005	SW39	
S8.000	SW40	2
S8.001	SW41	3
S9.000	SW42	3
S8.002	SW43	
S5.006	SW44	
S5.007	SW45	
S10.000	SW46	
S10.001	SW47	
S5.008	SW48	
S5.009	SW49	
S1.021	SW50	
S1.022	SW51	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 450501 306499 SK 50501 06499
Data Type Point
Cv (Summer) 1.000
Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SW01	15 Summer	100	+40%	30/15 Summer			
S1.001	SW02	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S1.002	SW03	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S1.003	SW04	30 Summer	100	+40%	30/15 Summer	100/15 Summer		
S1.004	SW05	15 Summer	100	+40%	30/15 Summer			
S1.005	SW06	30 Summer	100	+40%	30/15 Summer	100/15 Summer		
S1.006	SW07	15 Summer	100	+40%	30/15 Summer			
S1.007	SW08	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S1.008	SW09	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S2.000	SW10	15 Summer	100	+40%	100/15 Summer			
S1.009	SW11	15 Summer	100	+40%	30/15 Summer			
S1.010	SW12	15 Summer	100	+40%	30/15 Summer			
S1.011	SW13	15 Summer	100	+40%	30/15 Summer			
S1.012	SW14	15 Summer	100	+40%	30/15 Summer			
S1.013	SW15	15 Summer	100	+40%	30/15 Summer			
S1.014	SW16	15 Summer	100	+40%	30/15 Summer			
S1.015	SW17	15 Summer	100	+40%				
S1.016	SW18	15 Summer	100	+40%	100/15 Summer			

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	SW01	111.097	1.147	0.000	0.70			11.3	FLOOD RISK
S1.001	SW02	111.020	1.200	0.056	0.99			20.3	FLOOD
S1.002	SW03	110.796	1.201	1.093	1.00			26.0	FLOOD
S1.003	SW04	110.457	1.207	7.252	2.45			37.8	FLOOD
S1.004	SW05	110.257	1.157	0.000	1.11			41.5	FLOOD RISK
S1.005	SW06	110.160	1.220	5.391	1.45			52.8	FLOOD
S1.006	SW07	110.185	1.345	0.000	1.62			59.9	FLOOD RISK
S1.007	SW08	110.135	1.395	0.242	1.88			65.6	FLOOD
S1.008	SW09	109.999	1.349	4.528	1.26			77.7	FLOOD
S2.000	SW10	110.724	1.119	0.000	0.86			27.6	FLOOD RISK
S1.009	SW11	110.019	1.439	0.000	1.84			112.1	FLOOD RISK
S1.010	SW12	109.928	1.413	0.000	2.03			117.9	FLOOD RISK
S1.011	SW13	109.744	1.279	0.000	2.34			124.6	FLOOD RISK
S1.012	SW14	109.478	1.043	0.000	2.33			137.9	SURCHARGED
S1.013	SW15	109.193	0.808	0.000	2.49			152.2	SURCHARGED
S1.014	SW16	108.829	0.504	0.000	2.93			178.8	SURCHARGED
S1.015	SW17	108.148	-0.112	0.000	0.40			179.7	OK
S1.016	SW18	108.047	0.457	0.000	1.51			222.8	SURCHARGED

PN	US/MH Name	Level Exceeded
S1.000	SW01	
S1.001	SW02	1
S1.002	SW03	2
S1.003	SW04	5
S1.004	SW05	
S1.005	SW06	4
S1.006	SW07	
S1.007	SW08	2
S1.008	SW09	2
S2.000	SW10	
S1.009	SW11	
S1.010	SW12	
S1.011	SW13	
S1.012	SW14	
S1.013	SW15	
S1.014	SW16	
S1.015	SW17	
S1.016	SW18	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.017	SW19	15 Summer	100	+40%	100/15 Summer			
S3.000	SW20	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S3.001	SW21	15 Summer	100	+40%	30/15 Summer			
S3.002	SW22	15 Summer	100	+40%	30/15 Summer			
S3.003	SW23	15 Summer	100	+40%	30/15 Summer			
S3.004	SW24	15 Summer	100	+40%	100/15 Summer			
S3.005	SW25	15 Summer	100	+40%				
S4.000	SW26	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S4.001	SW27	15 Summer	100	+40%	100/15 Summer			
S1.018	SW28	15 Summer	100	+40%	100/15 Summer			
S1.019	SW29	480 Summer	100	+40%	100/15 Summer			
S1.020	SW30	480 Summer	100	+40%	100/60 Summer			
S5.000	HD31	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S6.000	HD32	15 Summer	100	+40%	100/15 Summer			
S5.001	HD33	15 Summer	100	+40%	30/15 Summer			
S5.002	SW34	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S5.003	SW35	15 Summer	100	+40%	30/15 Summer			
S7.000	SW36	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S7.001	SW37	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S5.004	SW38	15 Summer	100	+40%	100/15 Summer			
S5.005	SW39	15 Summer	100	+40%	100/15 Summer			
S8.000	SW40	15 Summer	100	+40%	100/15 Summer	100/15 Summer		
S8.001	SW41	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S9.000	SW42	15 Summer	100	+40%	30/15 Summer	100/15 Summer		
S8.002	SW43	15 Summer	100	+40%	30/15 Summer			
S5.006	SW44	15 Summer	100	+40%	30/15 Summer			
S5.007	SW45	15 Summer	100	+40%	30/15 Summer			
S10.000	SW46	15 Summer	100	+40%	100/15 Summer			
S10.001	SW47	15 Summer	100	+40%	100/15 Summer			
S5.008	SW48	15 Summer	100	+40%	30/15 Summer			
S5.009	SW49	480 Summer	100	+40%	30/15 Summer			
S1.021	SW50	480 Summer	100	+40%	2/15 Summer			
S1.022	SW51	480 Summer	100	+40%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.017	SW19	107.773	0.298	0.000	1.75			232.2	SURCHARGED
S3.000	SW20	111.241	1.201	0.777	0.83			30.4	FLOOD
S3.001	SW21	111.239	1.319	0.000	1.76			64.1	FLOOD RISK
S3.002	SW22	110.975	1.160	0.000	2.75			97.9	SURCHARGED
S3.003	SW23	110.338	0.608	0.000	2.36			145.3	SURCHARGED
S3.004	SW24	109.941	0.281	0.000	1.43			183.3	SURCHARGED
S3.005	SW25	109.306	-0.094	0.000	0.79			221.4	OK
S4.000	SW26	109.345	1.205	4.528	2.21			40.2	FLOOD
S4.001	SW27	108.091	0.261	0.000	1.13			67.4	SURCHARGED

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.018	SW28	107.604	0.179	0.000	1.47			519.8	SURCHARGED
S1.019	SW29	107.489	0.189	0.000	0.27			129.5	SURCHARGED
S1.020	SW30	107.487	0.437	0.000	0.25			126.0	SURCHARGED
S5.000	HD31	111.070	1.205	5.457	1.21			46.7	FLOOD
S6.000	HD32	111.100	1.165	0.000	0.34			23.1	FLOOD RISK
S5.001	HD33	111.035	1.535	0.000	1.58			57.6	FLOOD RISK
S5.002	SW34	110.812	1.422	1.745	2.30			84.8	FLOOD
S5.003	SW35	110.345	1.075	0.000	2.43			84.1	FLOOD RISK
S7.000	SW36	110.823	1.203	2.990	1.62			28.6	FLOOD
S7.001	SW37	110.701	1.236	1.197	2.10			38.1	FLOOD
S5.004	SW38	110.010	0.815	0.000	1.08			136.1	SURCHARGED
S5.005	SW39	109.547	0.762	0.000	0.87			162.2	SURCHARGED
S8.000	SW40	110.393	1.203	2.913	0.99			75.0	FLOOD
S8.001	SW41	109.557	1.217	7.351	1.72			90.2	FLOOD
S9.000	SW42	110.453	1.053	3.404	1.12			31.4	FLOOD
S8.002	SW43	109.032	0.992	0.000	1.52			114.5	FLOOD RISK
S5.006	SW44	108.882	0.932	0.000	1.26			269.2	FLOOD RISK
S5.007	SW45	108.428	0.778	0.000	1.06			267.2	SURCHARGED
S10.000	SW46	108.148	0.248	0.000	0.83			23.1	SURCHARGED
S10.001	SW47	107.906	0.546	0.000	0.71			18.8	SURCHARGED
S5.008	SW48	107.749	0.719	0.000	2.07			282.2	FLOOD RISK
S5.009	SW49	107.487	0.612	0.000	0.41			88.4	SURCHARGED
S1.021	SW50	107.486	1.136	0.000	0.55			9.9	SURCHARGED
S1.022	SW51	106.150	-0.100	0.000	0.24			9.9	OK

PN	US/MH Name	Level Exceeded
S1.017	SW19	
S3.000	SW20	1
S3.001	SW21	
S3.002	SW22	
S3.003	SW23	
S3.004	SW24	
S3.005	SW25	
S4.000	SW26	3
S4.001	SW27	
S1.018	SW28	
S1.019	SW29	
S1.020	SW30	
S5.000	HD31	2
S6.000	HD32	
S5.001	HD33	
S5.002	SW34	2
S5.003	SW35	
S7.000	SW36	3

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Level Exceeded
S7.001	SW37	2
S5.004	SW38	
S5.005	SW39	
S8.000	SW40	2
S8.001	SW41	3
S9.000	SW42	3
S8.002	SW43	
S5.006	SW44	
S5.007	SW45	
S10.000	SW46	
S10.001	SW47	
S5.008	SW48	
S5.009	SW49	
S1.021	SW50	
S1.022	SW51	

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FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	222.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	14.492	0.185	78.3	0.000	1	0.0	1.500	o	100	Pipe/Conduit	
F1.001	13.297	0.300	44.3	0.000	1	0.0	1.500	o	100	Pipe/Conduit	
F1.002	17.057	0.385	44.3	0.000	2	0.0	1.500	o	100	Pipe/Conduit	
F1.003	29.798	0.375	79.5	0.000	0	0.0	1.500	o	100	Pipe/Conduit	
F1.004	15.881	0.200	79.4	0.000	0	0.0	1.500	o	100	Pipe/Conduit	
F1.005	14.841	0.200	74.2	0.000	1	0.0	1.500	o	100	Pipe/Conduit	
F1.006	15.730	0.185	85.2	0.000	1	0.0	1.500	o	100	Pipe/Conduit	
F1.007	12.654	0.160	79.1	0.000	1	0.0	1.500	o	100	Pipe/Conduit	
F2.000	29.222	1.760	16.6	0.000	2	0.0	1.500	o	100	Pipe/Conduit	
F1.008	16.826	0.115	146.3	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F1.009	12.233	0.085	143.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.010	5.972	0.040	149.3	0.000	1	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	109.370	0.000	0.0	1	0.0	7	0.21	0.75	5.9	0.0
F1.001	109.185	0.000	0.0	2	0.0	8	0.32	1.00	7.9	0.1
F1.002	108.885	0.000	0.0	4	0.0	11	0.40	1.00	7.9	0.2
F1.003	108.500	0.000	0.0	4	0.0	13	0.33	0.75	5.9	0.2
F1.004	108.125	0.000	0.0	4	0.0	13	0.33	0.75	5.9	0.2
F1.005	107.925	0.000	0.0	5	0.0	14	0.36	0.77	6.1	0.2
F1.006	107.725	0.000	0.0	6	0.0	15	0.36	0.72	5.7	0.3
F1.007	107.540	0.000	0.0	7	0.0	16	0.39	0.75	5.9	0.3
F2.000	109.140	0.000	0.0	2	0.0	6	0.44	1.64	12.9	0.1
F1.008	107.330	0.000	0.0	11	0.0	21	0.35	0.72	12.8	0.5
F1.009	107.215	0.000	0.0	11	0.0	21	0.35	0.73	12.9	0.5
F1.010	107.130	0.000	0.0	12	0.0	22	0.35	0.72	12.7	0.6

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Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.011	11.718	0.080	146.5	0.000	1	0.0	1.500	o	150	Pipe/Conduit	
F1.012	12.396	0.085	145.8	0.000	1	0.0	1.500	o	150	Pipe/Conduit	
F1.013	15.722	0.105	150.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F1.014	28.583	0.195	146.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.015	47.492	0.320	148.4	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.016	13.779	0.095	145.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F3.000	21.126	0.265	79.7	0.000	2	0.0	1.500	o	100	Pipe/Conduit	
F3.001	18.562	0.235	79.0	0.000	3	0.0	1.500	o	100	Pipe/Conduit	
F3.002	22.835	0.285	80.1	0.000	2	0.0	1.500	o	100	Pipe/Conduit	
F3.003	21.563	0.215	100.3	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
F3.004	25.181	2.370	10.6	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
F1.017	32.070	0.215	149.2	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
F1.018	27.477	0.185	148.5	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
F1.019	19.974	0.140	142.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.020	38.355	0.260	147.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F4.000	18.965	0.255	74.4	0.000	1	0.0	1.500	o	100	Pipe/Conduit	
F4.001	12.437	0.280	44.4	0.000	4	0.0	1.500	o	100	Pipe/Conduit	
F5.000	12.918	0.200	64.6	0.000	3	0.0	1.500	o	100	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.011	107.090	0.000	0.0	13	0.0	22	0.36	0.72	12.8	0.6
F1.012	107.010	0.000	0.0	14	0.0	23	0.37	0.72	12.8	0.6
F1.013	106.925	0.000	0.0	16	0.0	25	0.38	0.71	12.6	0.7
F1.014	106.820	0.000	0.0	16	0.0	25	0.39	0.72	12.8	0.7
F1.015	106.625	0.000	0.0	16	0.0	25	0.39	0.72	12.7	0.7
F1.016	106.305	0.000	0.0	20	0.0	27	0.42	0.73	12.8	0.9
F3.000	109.630	0.000	0.0	2	0.0	9	0.26	0.75	5.9	0.1
F3.001	109.365	0.000	0.0	5	0.0	14	0.35	0.75	5.9	0.2
F3.002	109.130	0.000	0.0	7	0.0	16	0.39	0.74	5.8	0.3
F3.003	108.795	0.000	0.0	11	0.0	19	0.39	0.87	15.5	0.5
F3.004	108.580	0.000	0.0	16	0.0	13	0.96	2.70	47.7	0.7
F1.017	106.210	0.000	0.0	38	0.0	38	0.50	0.72	12.7	1.8
F1.018	105.995	0.000	0.0	41	0.0	39	0.51	0.72	12.7	1.9
F1.019	105.810	0.000	0.0	41	0.0	39	0.52	0.73	12.9	1.9
F1.020	105.670	0.000	0.0	41	0.0	39	0.51	0.72	12.7	1.9
F4.000	109.190	0.000	0.0	1	0.0	7	0.21	0.77	6.1	0.0
F4.001	108.935	0.000	0.0	5	0.0	12	0.43	1.00	7.9	0.2
F5.000	109.150	0.000	0.0	3	0.0	10	0.32	0.83	6.5	0.1

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Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F5.001	20.061	0.295	68.0	0.000	2	0.0	1.500	o	100	Pipe/Conduit	
F4.002	25.489	0.300	85.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F4.003	19.173	1.180	16.2	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
F6.000	36.762	0.850	43.2	0.000	8	0.0	1.500	o	100	Pipe/Conduit	
F6.001	25.257	0.760	33.2	0.000	9	0.0	1.500	o	100	Pipe/Conduit	
F6.002	10.217	0.070	146.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F4.004	10.149	0.305	33.3	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
F4.005	23.349	1.410	16.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.021	46.103	2.190	21.1	0.000	1	0.0	1.500	o	150	Pipe/Conduit	
F1.022	8.733	0.800	10.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
F1.023	12.982	0.088	147.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F5.001	108.950	0.000	0.0	5	0.0	13	0.37	0.81	6.3	0.2
F4.002	108.605	0.000	0.0	10	0.0	17	0.40	0.95	16.8	0.5
F4.003	108.305	0.000	0.0	13	0.0	13	0.78	2.18	38.5	0.6
F6.000	108.855	0.000	0.0	8	0.0	15	0.50	1.01	8.0	0.4
F6.001	108.005	0.000	0.0	17	0.0	20	0.70	1.16	9.1	0.8
F6.002	107.195	0.000	0.0	17	0.0	25	0.40	0.72	12.8	0.8
F4.004	107.125	0.000	0.0	33	0.0	25	0.81	1.52	26.9	1.5
F4.005	106.820	0.000	0.0	33	0.0	21	1.04	2.16	38.2	1.5
F1.021	105.410	0.000	0.0	75	0.0	33	1.22	1.92	33.8	3.5
F1.022	103.220	0.000	0.0	75	0.0	28	1.54	2.66	47.0	3.5
F1.023	102.420	0.000	0.0	75	0.0	54	0.61	0.72	12.7	3.5

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PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	o	100	FW01	110.970	109.370	1.500	Open Manhole	1200
F1.001	o	100	FW02	110.785	109.185	1.500	Open Manhole	1200
F1.002	o	100	FW03	110.485	108.885	1.500	Open Manhole	1200
F1.003	o	100	FW04	110.100	108.500	1.500	Open Manhole	1200
F1.004	o	100	FW05	110.065	108.125	1.840	Open Manhole	1200
F1.005	o	100	FW06	110.250	107.925	2.225	Open Manhole	1200
F1.006	o	100	FW07	110.085	107.725	2.260	Open Manhole	1200
F1.007	o	100	FW08	109.940	107.540	2.300	Open Manhole	1200
F2.000	o	100	FW09	110.740	109.140	1.500	Open Manhole	1200
F1.008	o	150	FW10	110.015	107.330	2.535	Open Manhole	1200
F1.009	o	150	FW11	109.930	107.215	2.565	Open Manhole	1200
F1.010	o	150	FW12	109.840	107.130	2.560	Open Manhole	1200
F1.011	o	150	FW13	109.780	107.090	2.540	Open Manhole	1200
F1.012	o	150	FW14	109.670	107.010	2.510	Open Manhole	1200
F1.013	o	150	FW15	109.555	106.925	2.480	Open Manhole	1200
F1.014	o	150	FW16	109.245	106.820	2.275	Open Manhole	1200
F1.015	o	150	FW17	108.460	106.625	1.685	Open Manhole	1200
F1.016	o	150	FW18	109.525	106.305	3.070	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F1.000	14.492	78.3	FW02	110.785	109.185	1.500	Open Manhole	1200
F1.001	13.297	44.3	FW03	110.485	108.885	1.500	Open Manhole	1200
F1.002	17.057	44.3	FW04	110.100	108.500	1.500	Open Manhole	1200
F1.003	29.798	79.5	FW05	110.065	108.125	1.840	Open Manhole	1200
F1.004	15.881	79.4	FW06	110.250	107.925	2.225	Open Manhole	1200
F1.005	14.841	74.2	FW07	110.085	107.725	2.260	Open Manhole	1200
F1.006	15.730	85.2	FW08	109.940	107.540	2.300	Open Manhole	1200
F1.007	12.654	79.1	FW10	110.015	107.380	2.535	Open Manhole	1200
F2.000	29.222	16.6	FW10	110.015	107.380	2.535	Open Manhole	1200
F1.008	16.826	146.3	FW11	109.930	107.215	2.565	Open Manhole	1200
F1.009	12.233	143.9	FW12	109.840	107.130	2.560	Open Manhole	1200
F1.010	5.972	149.3	FW13	109.780	107.090	2.540	Open Manhole	1200
F1.011	11.718	146.5	FW14	109.670	107.010	2.510	Open Manhole	1200
F1.012	12.396	145.8	FW15	109.555	106.925	2.480	Open Manhole	1200
F1.013	15.722	150.0	FW16	109.245	106.820	2.275	Open Manhole	1200
F1.014	28.583	146.6	FW17	108.460	106.625	1.685	Open Manhole	1200
F1.015	47.492	148.4	FW18	109.525	106.305	3.070	Open Manhole	1200
F1.016	13.779	145.0	FW24	109.615	106.210	3.255	Open Manhole	1200

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PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F3.000	o	100	FW19	111.230	109.630	1.500	Open Manhole	1200
F3.001	o	100	FW20	111.420	109.365	1.955	Open Manhole	1200
F3.002	o	100	FW21	111.480	109.130	2.250	Open Manhole	1200
F3.003	o	150	FW22	111.215	108.795	2.270	Open Manhole	1200
F3.004	o	150	FW23	110.540	108.580	1.810	Open Manhole	1200
F1.017	o	150	FW24	109.615	106.210	3.255	Open Manhole	1200
F1.018	o	150	FW25	109.600	105.995	3.455	Open Manhole	1200
F1.019	o	150	FW26	109.175	105.810	3.215	Open Manhole	1200
F1.020	o	150	FW27	109.025	105.670	3.205	Open Manhole	1200
F4.000	o	100	FW28	110.790	109.190	1.500	Open Manhole	1200
F4.001	o	100	FW29	110.585	108.935	1.550	Open Manhole	1200
F5.000	o	100	FW30	110.750	109.150	1.500	Open Manhole	1200
F5.001	o	100	FW31	110.660	108.950	1.560	Open Manhole	1200
F4.002	o	150	FW32	110.435	108.605	1.680	Open Manhole	1200
F4.003	o	150	FW33	109.955	108.305	1.500	Open Manhole	1200
F6.000	o	100	FW34	110.455	108.855	1.500	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F3.000	21.126	79.7	FW20	111.420	109.365	1.955	Open Manhole	1200
F3.001	18.562	79.0	FW21	111.480	109.130	2.250	Open Manhole	1200
F3.002	22.835	80.1	FW22	111.215	108.845	2.270	Open Manhole	1200
F3.003	21.563	100.3	FW23	110.540	108.580	1.810	Open Manhole	1200
F3.004	25.181	10.6	FW24	109.615	106.210	3.255	Open Manhole	1200
F1.017	32.070	149.2	FW25	109.600	105.995	3.455	Open Manhole	1200
F1.018	27.477	148.5	FW26	109.175	105.810	3.215	Open Manhole	1200
F1.019	19.974	142.7	FW27	109.025	105.670	3.205	Open Manhole	1200
F1.020	38.355	147.5	FW39	108.245	105.410	2.685	Open Manhole	1200
F4.000	18.965	74.4	FW29	110.585	108.935	1.550	Open Manhole	1200
F4.001	12.437	44.4	FW32	110.435	108.655	1.680	Open Manhole	1200
F5.000	12.918	64.6	FW31	110.660	108.950	1.610	Open Manhole	1200
F5.001	20.061	68.0	FW32	110.435	108.655	1.630	Open Manhole	1200
F4.002	25.489	85.0	FW33	109.955	108.305	1.500	Open Manhole	1200
F4.003	19.173	16.2	FW37	109.250	107.125	1.975	Open Manhole	1200
F6.000	36.762	43.2	FW35	109.605	108.005	1.500	Open Manhole	1200

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PIPELINE SCHEDULES for Foul - Main

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F6.001	o	100	FW35	109.605	108.005	1.500	Open Manhole	1200
F6.002	o	150	FW36	109.265	107.195	1.920	Open Manhole	1200
F4.004	o	150	FW37	109.250	107.125	1.975	Open Manhole	1200
F4.005	o	150	FW38	108.875	106.820	1.905	Open Manhole	1200
F1.021	o	150	FW39	108.245	105.410	2.685	Open Manhole	1200
F1.022	o	150	FW40	105.835	103.220	2.465	Open Manhole	1200
F1.023	o	150	FW41	105.820	102.420	3.250	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
F6.001	25.257	33.2	FW36	109.265	107.245	1.920	Open Manhole	1200
F6.002	10.217	146.0	FW37	109.250	107.125	1.975	Open Manhole	1200
F4.004	10.149	33.3	FW38	108.875	106.820	1.905	Open Manhole	1200
F4.005	23.349	16.6	FW39	108.245	105.410	2.685	Open Manhole	1200
F1.021	46.103	21.1	FW40	105.835	103.220	2.465	Open Manhole	1200
F1.022	8.733	10.9	FW41	105.820	102.420	3.250	Open Manhole	1200
F1.023	12.982	147.5		105.365	102.332	2.883	Open Manhole	0

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Appendix D Surface Water Wetland Attenuation Calculations

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	106.730	0.530	9.9	462.0	O K
30 min Summer	106.865	0.665	9.9	605.7	O K
60 min Summer	106.989	0.789	9.9	747.9	O K
120 min Summer	107.119	0.919	9.9	907.0	O K
180 min Summer	107.191	0.991	9.9	1000.7	O K
240 min Summer	107.235	1.035	9.9	1059.9	O K
360 min Summer	107.279	1.079	9.9	1120.0	O K
480 min Summer	107.292	1.092	9.9	1137.8	O K
600 min Summer	107.289	1.089	9.9	1134.1	O K
720 min Summer	107.278	1.078	9.9	1118.1	O K
960 min Summer	107.240	1.040	9.9	1066.8	O K
1440 min Summer	107.164	0.964	9.9	965.6	O K
2160 min Summer	107.073	0.873	9.9	848.9	O K
2880 min Summer	106.997	0.797	9.9	757.0	O K
4320 min Summer	106.855	0.655	9.9	594.4	O K
5760 min Summer	106.737	0.537	9.9	468.7	O K
7200 min Summer	106.645	0.445	9.9	376.7	O K
8640 min Summer	106.571	0.371	9.9	306.2	O K
10080 min Summer	106.512	0.312	9.9	252.7	O K
15 min Winter	106.786	0.586	9.9	519.3	O K
30 min Winter	106.933	0.733	9.9	681.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.460	0.0	477.4	30
30 min Summer	91.070	0.0	628.0	45
60 min Summer	56.875	0.0	784.4	74
120 min Summer	35.332	0.0	974.5	132
180 min Summer	26.592	0.0	1100.5	192
240 min Summer	21.604	0.0	1191.9	250
360 min Summer	15.907	0.0	1316.7	368
480 min Summer	12.670	0.0	1398.1	486
600 min Summer	10.563	0.0	1457.6	604
720 min Summer	9.077	0.0	1502.6	722
960 min Summer	7.106	0.0	1543.7	926
1440 min Summer	4.989	0.0	1494.8	1144
2160 min Summer	3.489	0.0	1733.0	1524
2880 min Summer	2.715	0.0	1798.4	1940
4320 min Summer	1.930	0.0	1917.4	2728
5760 min Summer	1.531	0.0	2028.2	3464
7200 min Summer	1.296	0.0	2145.0	4184
8640 min Summer	1.141	0.0	2266.4	4928
10080 min Summer	1.032	0.0	2391.1	5640
15 min Winter	138.460	0.0	534.5	30
30 min Winter	91.070	0.0	703.4	44

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	107.067	0.867	9.9	842.4	O K
120 min Winter	107.209	1.009	9.9	1024.6	O K
180 min Winter	107.289	1.089	9.9	1133.7	O K
240 min Winter	107.339	1.139	9.9	1204.3	O K
360 min Winter	107.392	1.192	9.9	1279.9	O K
480 min Winter	107.410	1.210	9.9	1307.7	O K
600 min Winter	107.413	1.213	9.9	1311.0	O K
720 min Winter	107.405	1.205	9.9	1300.2	O K
960 min Winter	107.375	1.175	9.9	1255.0	O K
1440 min Winter	107.288	1.088	9.9	1132.2	O K
2160 min Winter	107.179	0.979	9.9	984.8	O K
2880 min Winter	107.081	0.881	9.9	859.5	O K
4320 min Winter	106.885	0.685	9.9	627.0	O K
5760 min Winter	106.698	0.498	9.9	429.0	O K
7200 min Winter	106.556	0.356	9.9	292.7	O K
8640 min Winter	106.450	0.250	9.9	198.4	O K
10080 min Winter	106.376	0.176	9.7	136.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	56.875	0.0	878.9	74
120 min Winter	35.332	0.0	1091.7	130
180 min Winter	26.592	0.0	1232.8	188
240 min Winter	21.604	0.0	1335.6	246
360 min Winter	15.907	0.0	1475.3	362
480 min Winter	12.670	0.0	1566.1	478
600 min Winter	10.563	0.0	1579.0	592
720 min Winter	9.077	0.0	1575.1	704
960 min Winter	7.106	0.0	1558.1	924
1440 min Winter	4.989	0.0	1509.3	1298
2160 min Winter	3.489	0.0	1940.8	1636
2880 min Winter	2.715	0.0	2013.8	2104
4320 min Winter	1.930	0.0	2147.4	2984
5760 min Winter	1.531	0.0	2271.6	3688
7200 min Winter	1.296	0.0	2402.9	4392
8640 min Winter	1.141	0.0	2538.4	5024
10080 min Winter	1.032	0.0	2677.9	5656

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 450501 306499 SK 50501 06499
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.840

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.460	4	8	0.460	8	12	0.460	12	16	0.460

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Model Details

Storage is Online Cover Level (m) 107.800

Tank or Pond Structure

Invert Level (m) 106.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	727.0	1.600	1775.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0141-9900-1300-9900
Design Head (m)	1.300
Design Flow (l/s)	9.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	141
Invert Level (m)	106.100
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	9.9
Flush-Flo™	0.382	9.9
Kick-Flo®	0.825	8.0
Mean Flow over Head Range	-	8.6

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.1	1.200	9.5	3.000	14.7	7.000	22.1
0.200	9.2	1.400	10.3	3.500	15.8	7.500	22.8
0.300	9.8	1.600	10.9	4.000	16.9	8.000	23.5
0.400	9.9	1.800	11.5	4.500	17.8	8.500	24.2
0.500	9.8	2.000	12.1	5.000	18.8	9.000	24.9
0.600	9.5	2.200	12.7	5.500	19.6	9.500	25.6
0.800	8.3	2.400	13.2	6.000	20.5		
1.000	8.8	2.600	13.7	6.500	21.3		

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Appendix E Detailed Wetland Basin Layout