

APPENDIX 7

GREENFIELD RUNOFF CALCULATION

Calculated by:	Rory Harris
Site name:	Club Street
Site location:	Openshaw

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.47345° N
Longitude:	2.15338° W
Reference:	3055082252
Date:	Nov 22 2023 13:08

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	0.855
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Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

	Default	Edited
SAAR (mm):	918	918
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	5.67	5.67
1 in 1 year (l/s):	4.93	4.93
1 in 30 years (l/s):	9.64	9.64
1 in 100 year (l/s):	11.79	11.79

1 in 200 years (l/s):	13.43	13.43
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This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

APPENDIX 8

SURFACE WATER ATTENUATION CALCULATIONS

Integra Consulting Engineers						Job No	Date
						3387	Nov-23
						Sheet	By
Calculations						01	RH
Job Title CLUB STREET, OPENSHAW 1 in 30							
Storm Water Flood Model							
M5-60 = 18		r = 0.353		Return, T = 30		Area (m²) = 6131	
				CC/UC Factor = 0		Limit (l/s) = 5.67	
				Totals		173 173	
D (mins)	M5-D (mm)	MT-D (mm)	Rate (mm/hr)	Flow (l/s)	CC Flow (l/s)	Storage (m³)	CC Storage (m³)
10.00	9.07	13.38	80.29	135.87	135.87	78.12	78.12
15.00	10.89	16.36	65.43	110.72	110.72	94.54	94.54
20.00	12.25	18.46	55.38	93.72	93.72	105.66	105.66
25.00	13.34	20.21	48.50	82.07	82.07	114.60	114.60
30.00	14.26	21.68	43.36	73.37	73.37	121.86	121.86
35.00	15.06	22.95	39.35	66.59	66.59	127.92	127.92
40.00	15.76	24.08	36.12	61.13	61.13	133.10	133.10
45.00	16.40	25.10	33.46	56.62	56.62	137.58	137.58
50.00	16.97	26.02	31.22	52.84	52.84	141.50	141.50
55.00	17.51	26.87	29.31	49.60	49.60	144.96	144.96
60.00	18.00	27.65	27.65	46.79	46.79	148.05	148.05
65.00	18.46	28.38	26.20	44.34	44.34	150.80	150.80
70.00	18.89	29.07	24.92	42.16	42.16	153.28	153.28
75.00	19.30	29.72	23.77	40.23	40.23	155.50	155.50
80.00	19.69	30.33	22.74	38.49	38.49	157.52	157.52
85.00	20.06	30.90	21.81	36.91	36.91	159.34	159.34
90.00	20.41	31.45	20.97	35.48	35.48	160.99	160.99
95.00	20.75	31.98	20.20	34.18	34.18	162.48	162.48
100.00	21.07	32.48	19.49	32.98	32.98	163.84	163.84
105.00	21.38	32.96	18.83	31.87	31.87	165.06	165.06
110.00	21.68	33.42	18.23	30.85	30.85	166.17	166.17
115.00	21.97	33.87	17.67	29.90	29.90	167.18	167.18
120.00	22.25	34.29	17.15	29.01	29.01	168.08	168.08
125.00	22.51	34.71	16.66	28.19	28.19	168.89	168.89
130.00	22.78	35.10	16.20	27.42	27.42	169.62	169.62
135.00	23.03	35.49	15.77	26.69	26.69	170.27	170.27
140.00	23.28	35.86	15.37	26.01	26.01	170.84	170.84
145.00	23.52	36.22	14.99	25.36	25.36	171.34	171.34
150.00	23.75	36.58	14.63	24.76	24.76	171.78	171.78
155.00	23.98	36.92	14.29	24.18	24.18	172.16	172.16
160.00	24.20	37.25	13.97	23.64	23.64	172.48	172.48
165.00	24.42	37.57	13.66	23.12	23.12	172.74	172.74
170.00	24.63	37.89	13.37	22.63	22.63	172.96	172.96
175.00	24.83	38.19	13.09	22.16	22.16	173.12	173.12
180.00	25.04	38.49	12.83	21.71	21.71	173.24	173.24
185.00	25.24	38.78	12.58	21.28	21.28	173.31	173.31
190.00	25.43	39.07	12.34	20.88	20.88	173.34	173.34
195.00	25.62	39.34	12.11	20.48	20.48	173.33	173.33
200.00	25.81	39.62	11.88	20.11	20.11	173.29	173.29
205.00	25.99	39.88	11.67	19.75	19.75	173.20	173.20

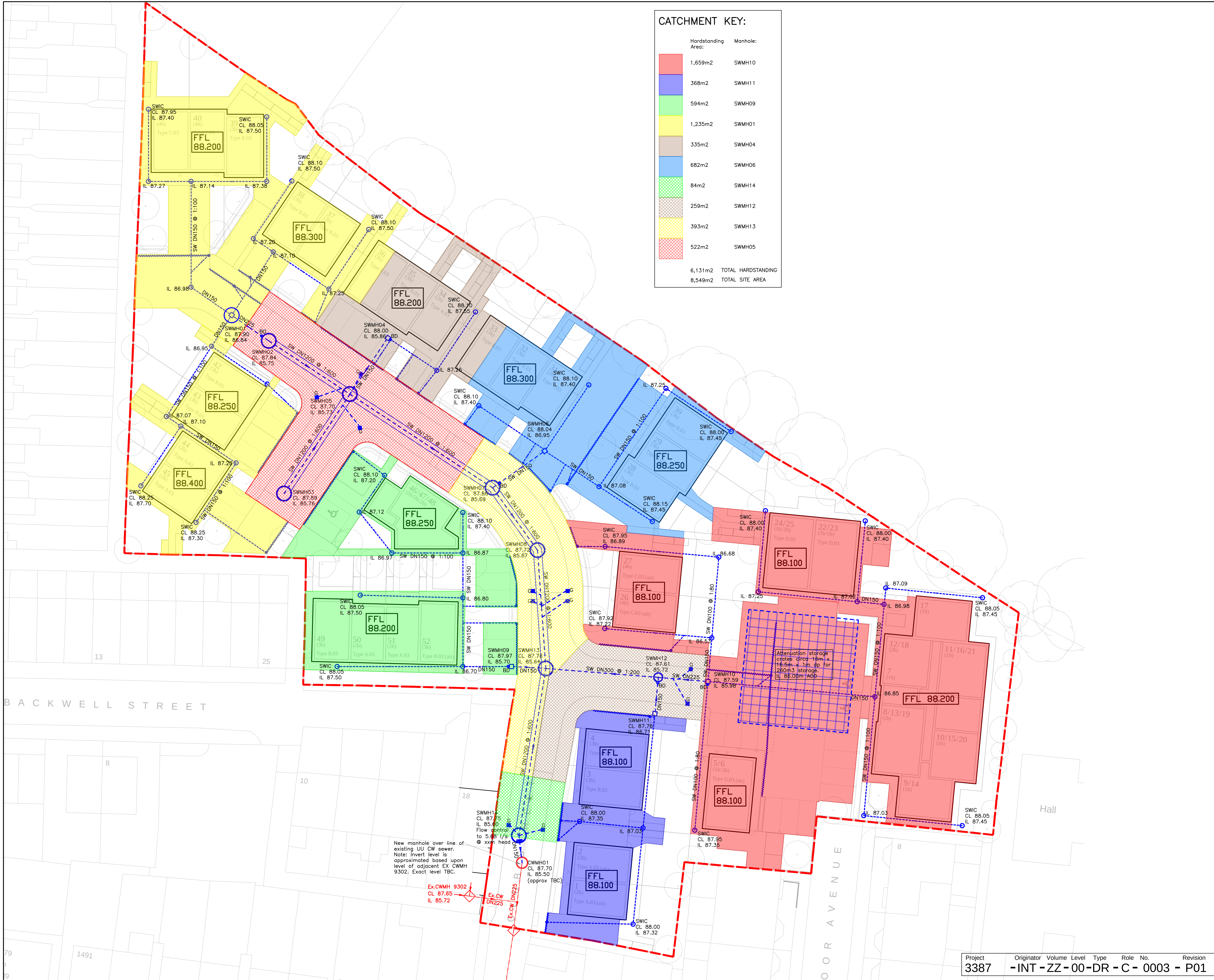
Integra Consulting Engineers						Job No	Date
						3387	Nov-23
						Sheet	By
Calculations						01	RH
Job Title CLUB STREET, OPENSHAW 1 in 100 + 50%							
Storm Water Flood Model							
M5-60 = 18		r = 0.353		Return, T = 100		Area (m²) = 6131	
				CC/UC Factor = 0.5		Limit (l/s) = 5.67	
				Totals		250 426	
D (mins)	M5-D (mm)	MT-D (mm)	Rate (mm/hr)	Flow (l/s)	CC Flow (l/s)	Storage (m³)	CC Storage (m³)
10.00	9.07	17.12	102.73	173.83	260.75	100.90	153.05
15.00	10.89	21.16	84.65	143.24	214.87	123.82	188.28
20.00	12.25	23.94	71.81	121.51	182.26	139.01	211.91
25.00	13.34	26.28	63.08	106.74	160.10	151.60	231.65
30.00	14.26	28.26	56.52	95.65	143.47	161.96	248.04
35.00	15.06	29.98	51.39	86.96	130.44	170.71	262.02
40.00	15.76	31.50	47.25	79.95	119.92	178.27	274.20
45.00	16.40	32.86	43.82	74.14	111.22	184.88	284.97
50.00	16.97	34.10	40.92	69.25	103.87	190.74	294.61
55.00	17.51	35.24	38.45	65.06	97.58	195.97	303.31
60.00	18.00	36.29	36.29	61.42	92.12	200.68	311.23
65.00	18.46	37.27	34.41	58.22	87.33	204.95	318.48
70.00	18.89	38.19	32.73	55.39	83.09	208.83	325.15
75.00	19.30	39.05	31.24	52.86	79.30	212.37	331.32
80.00	19.69	39.86	29.90	50.59	75.89	215.62	337.04
85.00	20.06	40.63	28.68	48.53	72.80	218.60	342.36
90.00	20.41	41.36	27.57	46.66	69.99	221.35	347.33
95.00	20.75	42.06	26.56	44.95	67.42	223.88	351.98
100.00	21.07	42.72	25.63	43.37	65.06	226.22	356.34
105.00	21.38	43.35	24.77	41.92	62.88	228.39	360.44
110.00	21.68	43.96	23.98	40.58	60.87	230.39	364.29
115.00	21.97	44.55	23.24	39.33	58.99	232.24	367.92
120.00	22.25	45.11	22.55	38.16	57.25	233.96	371.34
125.00	22.51	45.65	21.91	37.08	55.61	235.54	374.58
130.00	22.78	46.17	21.31	36.06	54.08	237.01	377.63
135.00	23.03	46.67	20.74	35.10	52.65	238.37	380.52
140.00	23.28	47.16	20.21	34.20	51.30	239.63	383.26
145.00	23.52	47.62	19.71	33.35	50.02	240.79	385.85
150.00	23.75	48.08	19.23	32.54	48.81	241.86	388.30
155.00	23.98	48.52	18.78	31.78	47.67	242.84	390.63
160.00	24.20	48.95	18.36	31.06	46.59	243.75	392.84
165.00	24.42	49.36	17.95	30.37	45.56	244.57	394.93
170.00	24.63	49.77	17.56	29.72	44.58	245.33	396.91
175.00	24.83	50.16	17.20	29.10	43.65	246.02	398.79
180.00	25.04	50.54	16.85	28.51	42.76	246.64	400.57
185.00	25.24	50.91	16.51	27.94	41.91	247.20	402.27
190.00	25.43	51.27	16.19	27.40	41.10	247.70	403.87
195.00	25.62	51.62	15.88	26.88	40.32	248.15	405.39
200.00	25.81	51.97	15.59	26.38	39.57	248.54	406.83
205.00	25.99	52.30	15.31	25.90	38.86	248.88	408.19

210.00	26.17	52.63	15.04	25.45	38.17	249.17	409.48
215.00	26.35	52.95	14.78	25.00	37.51	249.41	410.69
220.00	26.52	53.26	14.53	24.58	36.87	249.61	411.84
225.00	26.69	53.57	14.28	24.17	36.26	249.77	412.93
230.00	26.86	53.87	14.05	23.78	35.67	249.89	413.95
235.00	27.02	54.16	13.83	23.40	35.10	249.96	414.92
240.00	27.18	54.44	13.61	23.03	34.55	250.00	415.82
245.00	27.34	54.72	13.40	22.68	34.02	250.00	416.67
250.00	27.50	54.99	13.20	22.33	33.50	249.96	417.47
255.00	27.66	55.26	13.00	22.00	33.00	249.89	418.22
260.00	27.81	55.52	12.81	21.68	32.52	249.79	418.91
265.00	27.96	55.78	12.63	21.37	32.06	249.65	419.56
270.00	28.11	56.03	12.45	21.07	31.61	249.49	420.16
275.00	28.25	56.28	12.28	20.78	31.17	249.29	420.72
280.00	28.40	56.52	12.11	20.50	30.74	249.07	421.23
285.00	28.54	56.76	11.95	20.22	30.33	248.81	421.70
290.00	28.68	56.99	11.79	19.95	29.93	248.53	422.13
295.00	28.82	57.22	11.64	19.69	29.54	248.23	422.52
300.00	28.95	57.45	11.49	19.44	29.16	247.89	422.87
305.00	29.09	57.67	11.34	19.20	28.79	247.54	423.18
310.00	29.22	57.88	11.20	18.96	28.44	247.15	423.46
315.00	29.36	58.10	11.07	18.73	28.09	246.75	423.70
320.00	29.49	58.31	10.93	18.50	27.75	246.32	423.91
325.00	29.61	58.51	10.80	18.28	27.42	245.87	424.09
330.00	29.74	58.71	10.68	18.06	27.10	245.40	424.23
335.00	29.87	58.91	10.55	17.85	26.78	244.91	424.34
340.00	29.99	59.11	10.43	17.65	26.48	244.39	424.42
345.00	30.11	59.30	10.31	17.45	26.18	243.86	424.48
350.00	30.24	59.49	10.20	17.26	25.88	243.31	424.50
355.00	30.36	59.67	10.09	17.07	25.60	242.74	424.49
360.00	30.48	59.85	9.98	16.88	25.32	242.15	424.46
365.00	30.59	60.03	9.87	16.70	25.05	241.54	424.40
370.00	30.71	60.21	9.76	16.52	24.78	240.92	424.31
375.00	30.83	60.38	9.66	16.35	24.52	240.27	424.20
380.00	30.94	60.56	9.56	16.18	24.27	239.62	424.06
385.00	31.05	60.94	9.50	16.07	24.11	240.25	425.86
390.00	31.17	61.13	9.40	15.91	23.87	239.70	425.89
395.00	31.28	61.32	9.31	15.76	23.64	239.15	425.91
400.00	31.39	61.50	9.23	15.61	23.42	238.58	425.91
405.00	31.50	61.69	9.14	15.46	23.20	238.00	425.89
410.00	31.61	61.87	9.05	15.32	22.98	237.41	425.85
415.00	31.71	62.05	8.97	15.18	22.77	236.81	425.80
420.00	31.82	62.23	8.89	15.04	22.56	236.19	425.73
425.00	31.92	62.40	8.81	14.91	22.36	235.57	425.65
430.00	32.03	62.58	8.73	14.78	22.16	234.93	425.54
435.00	32.13	62.75	8.66	14.65	21.97	234.29	425.43
440.00	32.23	62.92	8.58	14.52	21.78	233.64	425.30
445.00	32.34	63.10	8.51	14.40	21.59	232.97	425.15
450.00	32.44	63.26	8.44	14.27	21.41	232.30	424.99
455.00	32.54	63.43	8.36	14.15	21.23	231.62	424.82
460.00	32.64	63.60	8.30	14.04	21.06	230.92	424.63

465.00	32.73	63.76	8.23	13.92	20.88	230.22	424.43
470.00	32.83	63.92	8.16	13.81	20.71	229.51	424.21
475.00	32.93	64.08	8.09	13.70	20.55	228.79	423.99
480.00	33.02	64.24	8.03	13.59	20.38	228.07	423.75
485.00	33.12	64.40	7.97	13.48	20.22	227.33	423.49
490.00	33.21	64.56	7.91	13.38	20.07	226.59	423.23
495.00	33.31	64.72	7.84	13.27	19.91	225.84	422.95
500.00	33.40	64.87	7.78	13.17	19.76	225.08	422.66
505.00	33.49	65.02	7.73	13.07	19.61	224.31	422.36
510.00	33.59	65.18	7.67	12.98	19.46	223.53	422.05
515.00	33.68	65.33	7.61	12.88	19.32	222.75	421.73
520.00	33.77	65.48	7.55	12.78	19.18	221.96	421.40
525.00	33.86	65.62	7.50	12.69	19.04	221.17	421.05
530.00	33.95	65.77	7.45	12.60	18.90	220.36	420.70
535.00	34.04	65.92	7.39	12.51	18.76	219.55	420.33
540.00	34.12	66.06	7.34	12.42	18.63	218.73	419.95
545.00	34.21	66.21	7.29	12.33	18.50	217.91	419.57
550.00	34.30	66.35	7.24	12.25	18.37	217.08	419.17
555.00	34.38	66.49	7.19	12.16	18.25	216.24	418.77
560.00	34.47	66.63	7.14	12.08	18.12	215.40	418.35
565.00	34.55	66.77	7.09	12.00	18.00	214.55	417.93
570.00	34.64	66.91	7.04	11.92	17.88	213.69	417.49
575.00	34.72	67.05	7.00	11.84	17.76	212.83	417.05
580.00	34.81	67.19	6.95	11.76	17.64	211.96	416.60
585.00	34.89	67.32	6.90	11.68	17.53	211.09	416.14
590.00	34.97	67.46	6.86	11.61	17.41	210.21	415.67
595.00	35.05	67.59	6.82	11.53	17.30	209.32	415.19
600.00	35.13	67.72	6.77	11.46	17.19	208.43	414.70
605.00	35.22	67.85	6.73	11.39	17.08	207.53	414.21
610.00	35.30	67.99	6.69	11.32	16.97	206.63	413.71
615.00	35.38	68.12	6.65	11.25	16.87	205.72	413.19
620.00	35.46	68.25	6.60	11.18	16.76	204.81	412.67
625.00	35.53	68.37	6.56	11.11	16.66	203.89	412.15
630.00	35.61	68.50	6.52	11.04	16.56	202.97	411.61
635.00	35.69	68.63	6.48	10.97	16.46	202.04	411.07
640.00	35.77	68.75	6.45	10.91	16.36	201.10	410.52
645.00	35.84	68.88	6.41	10.84	16.26	200.17	409.96
650.00	35.92	69.00	6.37	10.78	16.17	199.22	409.40
655.00	36.00	69.13	6.33	10.72	16.07	198.27	408.83
660.00	36.07	69.25	6.30	10.65	15.98	197.32	408.25
665.00	36.15	69.37	6.26	10.59	15.89	196.36	407.66
670.00	36.22	69.49	6.22	10.53	15.80	195.40	407.07
675.00	36.30	69.61	6.19	10.47	15.71	194.44	406.47
680.00	36.37	69.73	6.15	10.41	15.62	193.46	405.87
685.00	36.45	69.85	6.12	10.35	15.53	192.49	405.25
690.00	36.52	69.97	6.08	10.30	15.44	191.51	404.63
695.00	36.59	70.09	6.05	10.24	15.36	190.53	404.01
700.00	36.67	70.21	6.02	10.18	15.27	189.54	403.38
705.00	36.74	70.32	5.98	10.13	15.19	188.54	402.74
710.00	36.81	70.44	5.95	10.07	15.11	187.55	402.09
715.00	36.88	70.55	5.92	10.02	15.03	186.55	401.44

APPENDIX 9

MICRO DRAINAGE ANALYSIS



Notes.

- 1 All dimensions are in millimetres unless noted otherwise.
- 2 All levels are in metres unless noted otherwise.
- 3 This drawing is to be read in conjunction with all relevant Architects and Service Engineers drawings.

Note: Drainage routes shown are indicative only and subject to further detailed design. Drainage strategy opposite demonstrates a viable scheme with SW and FW connectivity provided to each plot. Final inspection chamber positions and drainage routing is subject to further detailed design once FW positions & rwp positions are established. Note that any variation to SW and FW catchment areas may require revalidation of the MD simulation model

Note: External levels & FFL's are indicative only for the purpose of informing the drainage strategy, and subject to change following detailed design including cut & fill assessment, road design and part M access requirements.

Rev	Drawn	Date	Description



First Floor
Suite 4
14-32 Hewitt Street
Manchester
M15 4GB

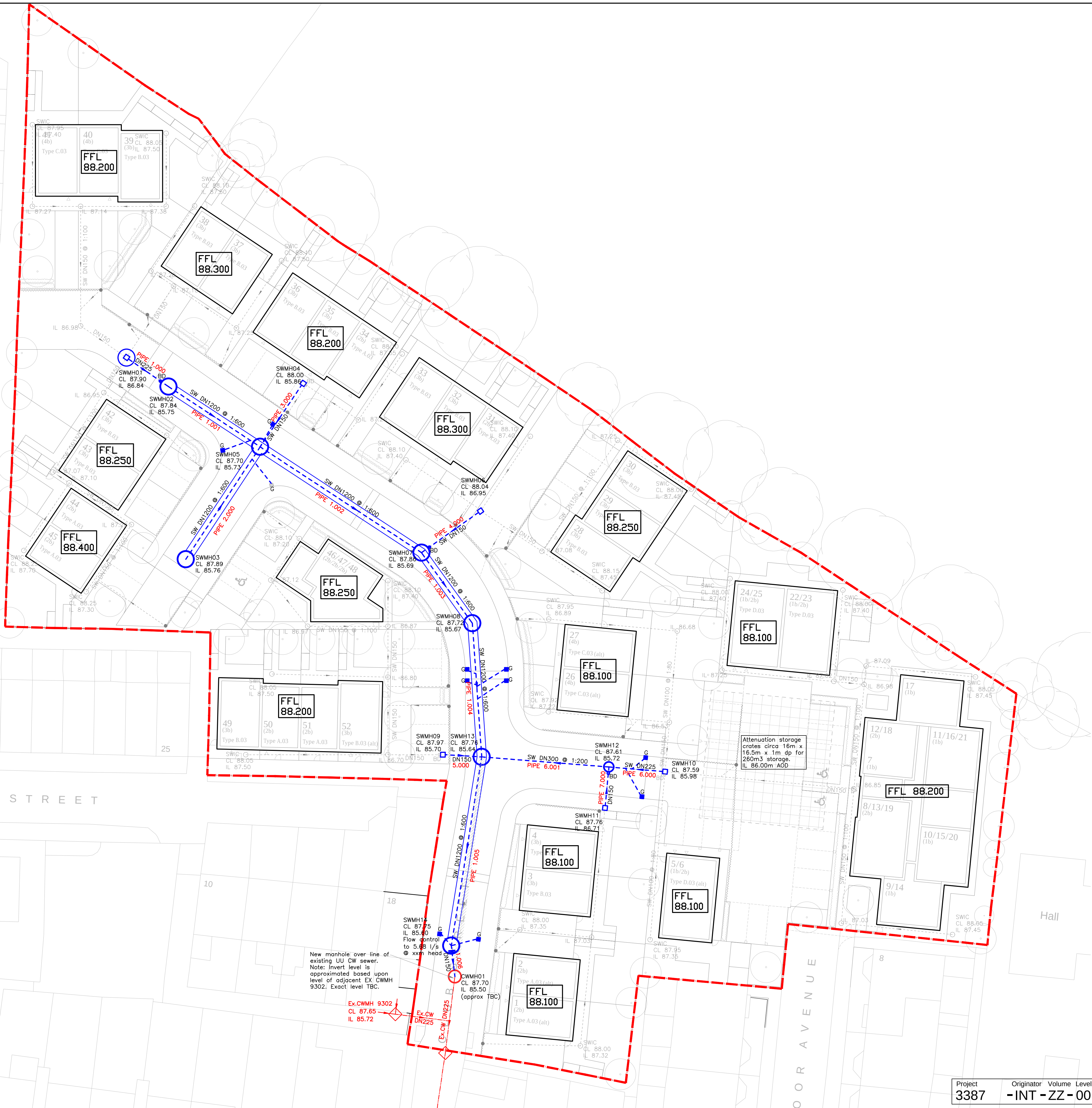
Civil & Structural Engineers

Tel : 0161 237 3400
Fax : 0161 923 4787
Email : manchester@integraconsulting.co.uk
Web : www.integraconsulting.co.uk

Drawing status: PRELIMINARY		
Contract: CLUB STREET OPENSHAW		
Drawing title: SW CATCHMENT PLAN		
Scales 1:250@A1	Date 11/23	
Drawn RH	Checked NS	
Contract No 3387	Drawing No 0003	Rev P01

Project 3387	Originator -INT -ZZ -00-DR -C -	Volume 0003	Level - P01	Type -	Role -	No. -	Revision -
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- Notes.
- 1 All dimensions are in millimetres unless noted otherwise.
 - 2 All levels are in metres unless noted otherwise.
 - 3 This drawing is to be read in conjunction with all relevant Architects and Service Engineers drawings.



Rev	Drawn	Date	Description



First Floor
Suite 4
14-32 Hewitt Street
Manchester
M15 4GB

Civil & Structural Engineers

Tel : 0161 237 3400
Fax : 0161 923 4787
Email : manchester@integraconsulting.co.uk
Web : www.integraconsulting.co.uk

Drawing status:
PRELIMINARY

Contract:
**CLUB STREET
OPENSHAW**

Drawing title:
MICRODRAINAGE INPUT

Scales	Date
1:250@A1	11/23

Drawn	Checked
RH	NS

Contract No	Drawing No	Rev
3387	0006	P01

Project	Originator	Volume	Level	Type	Role	No.	Revision
3387	-INT	-ZZ	-00	-DR	-C-	0006	- P01

Integra Consulting (Engineers) Limited

2nd Floor, Fountain House
83 Fountain Street
Manchester M2 2EE

Date 18/12/2023 13:48
File Fairfield MD (FEH...

Micro Drainage

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Network W.12.6.1

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Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)
1.000	6.565	0.066	99.5	0.124	5.00	0.600	o	225
1.001	14.116	0.024	588.2	0.000	0.00	0.600	o	-2
2.000	17.357	0.029	598.5	0.000	5.00	0.600	o	-2
3.000	9.848	0.130	76.0	0.034	5.00	0.600	o	150
1.002	24.819	0.041	600.0	0.052	0.00	0.600	o	-2
4.000	9.265	0.093	99.6	0.068	5.00	0.600	o	150
1.003	11.208	0.019	600.0	0.000	0.00	0.600	o	-2
1.004	17.245	0.032	532.6	0.000	0.00	0.600	o	-2
5.000	5.026	0.050	100.0	0.059	5.00	0.600	o	150
6.000	7.257	0.123	59.0	0.166	5.00	0.600	o	225
7.000	5.305	0.091	58.3	0.037	5.00	0.600	o	150
6.001	16.421	0.082	200.3	0.026	0.00	0.600	o	300
PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl US/MH (mm)
1.000	01	87.900	86.840	0.835	87.840	86.774	0.841	1050
1.001	02	87.840	85.750	0.890	87.700	85.726	0.774	3000
2.000	03	87.890	85.760	0.930	87.700	85.731	0.769	2000
3.000	04	88.000	85.860	1.990	87.700	85.730	1.820	1050
1.002	05	87.700	85.726	0.774	87.860	85.685	0.975	2000
4.000	06	88.040	86.950	0.940	87.860	86.857	0.853	1050
1.003	07	87.860	85.685	0.975	87.720	85.666	0.854	2000
1.004	08	87.720	85.666	0.854	87.760	85.634	0.926	2000
5.000	09	87.970	85.700	2.120	87.760	85.650	1.960	1050
6.000	10	87.590	86.000	1.365	87.610	85.877	1.508	1200
7.000	11	87.760	86.710	0.900	87.610	86.619	0.841	1050
6.001	12	87.610	85.720	1.590	87.760	85.638	1.822	1200

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Micro Drainage		Network W.12.6.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	
	1.005	24.616	0.041	600.4	0.039	0.00	0.600	o	-2
	1.006	4.002	0.100	40.0	0.008	0.00	0.600	o	300
PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
1.005	13	87.760	85.634	0.926	87.750	85.593	0.957		2000
1.006	14	87.750	85.593	1.857	87.700	85.493	1.907	Hydro-Brake®	3000

Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \ / open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m ²)
-2	o	1200	1200			1.200	1.131



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MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out Invert Level (m) Diameter (mm)			Pipes In Invert Level (m) Diameter (mm)			Backdrop (mm)
01	87.900	1.060	Open Manhole	1050	1.000	86.840	225				
02	87.840	2.090	Open Manhole	3000	1.001	85.750	-2	1.000	86.774	225	49
03	87.890	2.130	Open Manhole	2000	2.000	85.760	-2				
04	88.000	2.140	Open Manhole	1050	3.000	85.860	150				
05	87.700	1.974	Open Manhole	2000	1.002	85.726	-2	1.001	85.726	-2	5
								2.000	85.731	-2	
								3.000	85.730	150	
06	88.040	1.090	Open Manhole	1050	4.000	86.950	150				
07	87.860	2.175	Open Manhole	2000	1.003	85.685	-2	1.002	85.685	-2	
								4.000	86.857	150	122
08	87.720	2.054	Open Manhole	2000	1.004	85.666	-2	1.003	85.666	-2	
09	87.970	2.270	Open Manhole	1050	5.000	85.700	150				
10	87.590	1.590	Open Manhole	1200	6.000	86.000	225				
11	87.760	1.050	Open Manhole	1050	7.000	86.710	150				
12	87.610	1.890	Open Manhole	1200	6.001	85.720	300	6.000	85.877	225	82
								7.000	86.619	150	749
13	87.760	2.126	Open Manhole	2000	1.005	85.634	-2	1.004	85.634	-2	
								5.000	85.650	150	
								6.001	85.638	300	
14	87.750	2.157	Open Manhole	3000	1.006	85.593	300	1.005	85.593	-2	
	87.700	2.207	Open Manhole	0		OUTFALL		1.006	85.493	300	

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Micro Drainage	Network W.12.6.1																											
<u>Synthetic Rainfall Details</u> <table> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>Site Location GB 390000 397050 SJ 90000 97050</td> <td></td> </tr> <tr> <td>C (1km)</td> <td>-0.026</td> </tr> <tr> <td>D1 (1km)</td> <td>0.346</td> </tr> <tr> <td>D2 (1km)</td> <td>0.396</td> </tr> <tr> <td>D3 (1km)</td> <td>0.280</td> </tr> <tr> <td>E (1km)</td> <td>0.303</td> </tr> <tr> <td>F (1km)</td> <td>2.469</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> </tr> <tr> <td>Winter Storms</td> <td>No</td> </tr> <tr> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>Storm Duration (mins)</td> <td>30</td> </tr> </table>			Return Period (years)	100	Site Location GB 390000 397050 SJ 90000 97050		C (1km)	-0.026	D1 (1km)	0.346	D2 (1km)	0.396	D3 (1km)	0.280	E (1km)	0.303	F (1km)	2.469	Summer Storms	Yes	Winter Storms	No	Cv (Summer)	0.750	Cv (Winter)	0.840	Storm Duration (mins)	30
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Micro Drainage	Network W.12.6.1																																																																									
Online Controls for Storm Hydro-Brake® Manhole: 14, DS/PN: 1.006, Volume (m³): 40.3 Design Head (m) 1.350 Hydro-Brake® Type Md4 Invert Level (m) 85.593 Design Flow (l/s) 5.7 Diameter (mm) 79 <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>2.4</td><td>1.200</td><td>5.3</td><td>3.000</td><td>8.4</td><td>7.000</td><td>12.9</td></tr><tr><td>0.200</td><td>3.3</td><td>1.400</td><td>5.8</td><td>3.500</td><td>9.1</td><td>7.500</td><td>13.3</td></tr><tr><td>0.300</td><td>2.9</td><td>1.600</td><td>6.2</td><td>4.000</td><td>9.7</td><td>8.000</td><td>13.8</td></tr><tr><td>0.400</td><td>3.1</td><td>1.800</td><td>6.5</td><td>4.500</td><td>10.3</td><td>8.500</td><td>14.2</td></tr><tr><td>0.500</td><td>3.4</td><td>2.000</td><td>6.9</td><td>5.000</td><td>10.9</td><td>9.000</td><td>14.6</td></tr><tr><td>0.600</td><td>3.8</td><td>2.200</td><td>7.2</td><td>5.500</td><td>11.4</td><td>9.500</td><td>15.0</td></tr><tr><td>0.800</td><td>4.3</td><td>2.400</td><td>7.5</td><td>6.000</td><td>11.9</td><td></td><td></td></tr><tr><td>1.000</td><td>4.9</td><td>2.600</td><td>7.8</td><td>6.500</td><td>12.4</td><td></td><td></td></tr></table>			Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	2.4	1.200	5.3	3.000	8.4	7.000	12.9	0.200	3.3	1.400	5.8	3.500	9.1	7.500	13.3	0.300	2.9	1.600	6.2	4.000	9.7	8.000	13.8	0.400	3.1	1.800	6.5	4.500	10.3	8.500	14.2	0.500	3.4	2.000	6.9	5.000	10.9	9.000	14.6	0.600	3.8	2.200	7.2	5.500	11.4	9.500	15.0	0.800	4.3	2.400	7.5	6.000	11.9			1.000	4.9	2.600	7.8	6.500	12.4		
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																			
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Storage Structures for Storm Tank or Pond Manhole: 10, DS/PN: 6.000 Invert Level (m) 86.000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>260.0</td><td>1.000</td><td>260.0</td><td>1.001</td><td>0.0</td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	260.0	1.000	260.0	1.001	0.0
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)									
0.000	260.0	1.000	260.0	1.001	0.0									
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Storm

Analysis Timestep	2.5 Second Increment	(Extended)
DTS Status		ON
DVD Status		OFF
Inertia Status		OFF

Profile(s)	Summer and Winter
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			Return	Climate	First X		First Y		First Z	O/F	Lvl
PN	Storm		Period	Change	Surcharge		Flood		Overflow	Act.	Exc.
1.000	15	Winter	2	0%	30/15	Summer					
1.001	240	Winter	2	0%	100/30	Winter					
2.000	240	Winter	2	0%	100/30	Winter					
3.000	240	Winter	2	0%	2/15	Summer					
1.002	240	Winter	2	0%	100/15	Winter					
4.000	15	Winter	2	0%	30/15	Summer	100/15	Summer			2
1.003	240	Winter	2	0%	100/15	Winter					
1.004	240	Winter	2	0%	100/15	Winter					
5.000	240	Winter	2	0%	2/15	Summer					
6.000	360	Winter	2	0%	30/30	Summer	100/360	Winter			3
7.000	15	Winter	2	0%	100/15	Summer					
6.001	240	Winter	2	0%	2/15	Summer	100/480	Winter			2
1.005	240	Winter	2	0%	100/15	Winter					
1.006	240	Winter	2	0%	2/15	Summer					

PN	US/MH Name	Water		Flooded			Pipe	Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Flow (l/s)	
1.000	01	86.963	-0.102	0.000	0.56	0.0	20.4	OK
1.001	02	86.154	-0.796	0.000	0.01	0.0	3.6	OK
2.000	03	86.153	-0.807	0.000	0.00	0.0	1.8	OK
3.000	04	86.155	0.145	0.000	0.06	0.0	1.0	SURCHARGED
1.002	05	86.154	-0.772	0.000	0.01	0.0	6.2	OK
4.000	06	87.045	-0.055	0.000	0.71	0.0	11.2	OK
1.003	07	86.154	-0.731	0.000	0.01	0.0	6.9	OK
1.004	08	86.154	-0.712	0.000	0.01	0.0	6.2	OK
5.000	09	86.156	0.306	0.000	0.13	0.0	1.8	SURCHARGED
6.000	10	86.127	-0.098	0.000	0.07	0.0	3.6	OK
7.000	11	86.769	-0.091	0.000	0.32	0.0	6.1	OK

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

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 50

		Return	Climate	First X		First Y	First Z	O/F	Lvl
PN	Storm	Period	Change	Surcharge		Flood	Overflow	Act.	Exc.
1.000	15	Winter	30	0%	30/15	Summer			
1.001	360	Winter	30	0%	100/30	Winter			
2.000	360	Winter	30	0%	100/30	Winter			
3.000	360	Winter	30	0%	2/15	Summer			
1.002	360	Winter	30	0%	100/15	Winter			
4.000	15	Winter	30	0%	30/15	Summer	100/15	Summer	2
1.003	360	Winter	30	0%	100/15	Winter			
1.004	360	Winter	30	0%	100/15	Winter			
5.000	360	Winter	30	0%	2/15	Summer			
6.000	360	Winter	30	0%	30/30	Summer	100/360	Winter	3
7.000	15	Winter	30	0%	100/15	Summer			
6.001	360	Winter	30	0%	2/15	Summer	100/480	Winter	2
1.005	360	Winter	30	0%	100/15	Winter			
1.006	360	Winter	30	0%	2/15	Summer			

PN	US/MH Name	Water	Surch'd Depth (m)	Flooded	Flow / Cap.	O'flow	Pipe	Status
		Level (m)		Volume (m³)		O'flow (l/s)	Flow (l/s)	
1.000	01	87.124	0.059	0.000	1.40	0.0	50.6	SURCHARGED
1.001	02	86.413	-0.537	0.000	0.01	0.0	6.3	OK
2.000	03	86.413	-0.547	0.000	0.00	0.0	2.2	OK
3.000	04	86.414	0.404	0.000	0.09	0.0	1.7	SURCHARGED
1.002	05	86.413	-0.513	0.000	0.01	0.0	9.9	OK
4.000	06	87.291	0.191	0.000	1.75	0.0	27.5	SURCHARGED
1.003	07	86.413	-0.471	0.000	0.02	0.0	12.9	OK
1.004	08	86.414	-0.452	0.000	0.02	0.0	12.6	OK
5.000	09	86.415	0.565	0.000	0.21	0.0	3.0	SURCHARGED
6.000	10	86.416	0.191	0.000	0.10	0.0	4.8	SURCHARGED
7.000	11	86.814	-0.046	0.000	0.81	0.0	15.3	OK

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

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 50

			Return	Climate	First X		First Y		First Z	O/F	Lvl
PN	Storm		Period	Change	Surcharge		Flood		Overflow	Act.	Exc.
1.000	480	Winter	100	+50%	30/15	Summer					
1.001	480	Winter	100	+50%	100/30	Winter					
2.000	480	Winter	100	+50%	100/30	Winter					
3.000	480	Winter	100	+50%	2/15	Summer					
1.002	480	Winter	100	+50%	100/15	Winter					
4.000	15	Winter	100	+50%	30/15	Summer	100/15	Summer			2
1.003	480	Winter	100	+50%	100/15	Winter					
1.004	480	Winter	100	+50%	100/15	Winter					
5.000	480	Winter	100	+50%	2/15	Summer					
6.000	480	Winter	100	+50%	30/30	Summer	100/360	Winter			3
7.000	480	Winter	100	+50%	100/15	Summer					
6.001	480	Winter	100	+50%	2/15	Summer	100/480	Winter			2
1.005	480	Winter	100	+50%	100/15	Winter					
1.006	480	Winter	100	+50%	2/15	Summer					

PN	US/MH Name	Water		Flooded			Pipe	Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Flow (l/s)	
1.000	01	87.667	0.602	0.000	0.29	0.0	10.5	FLOOD RISK
1.001	02	87.665	0.715	0.000	0.02	0.0	14.0	FLOOD RISK
2.000	03	87.665	0.705	0.000	0.00	0.0	3.7	FLOOD RISK
3.000	04	87.667	1.657	0.000	0.15	0.0	2.7	SURCHARGED
1.002	05	87.665	0.739	0.000	0.01	0.0	13.8	FLOOD RISK
4.000	06	88.041	0.941	1.212	3.35	0.0	52.6	FLOOD
1.003	07	87.666	0.781	0.000	0.03	0.0	15.9	FLOOD RISK
1.004	08	87.668	0.802	0.000	0.02	0.0	13.5	FLOOD RISK
5.000	09	87.675	1.825	0.000	0.34	0.0	4.8	FLOOD RISK
6.000	10	87.613	1.388	2.706	0.15	0.0	7.6	FLOOD
7.000	11	87.612	0.752	0.000	0.17	0.0	3.1	FLOOD RISK

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Date 18/12/2023 13:48
File Fairfield MD (FEH...
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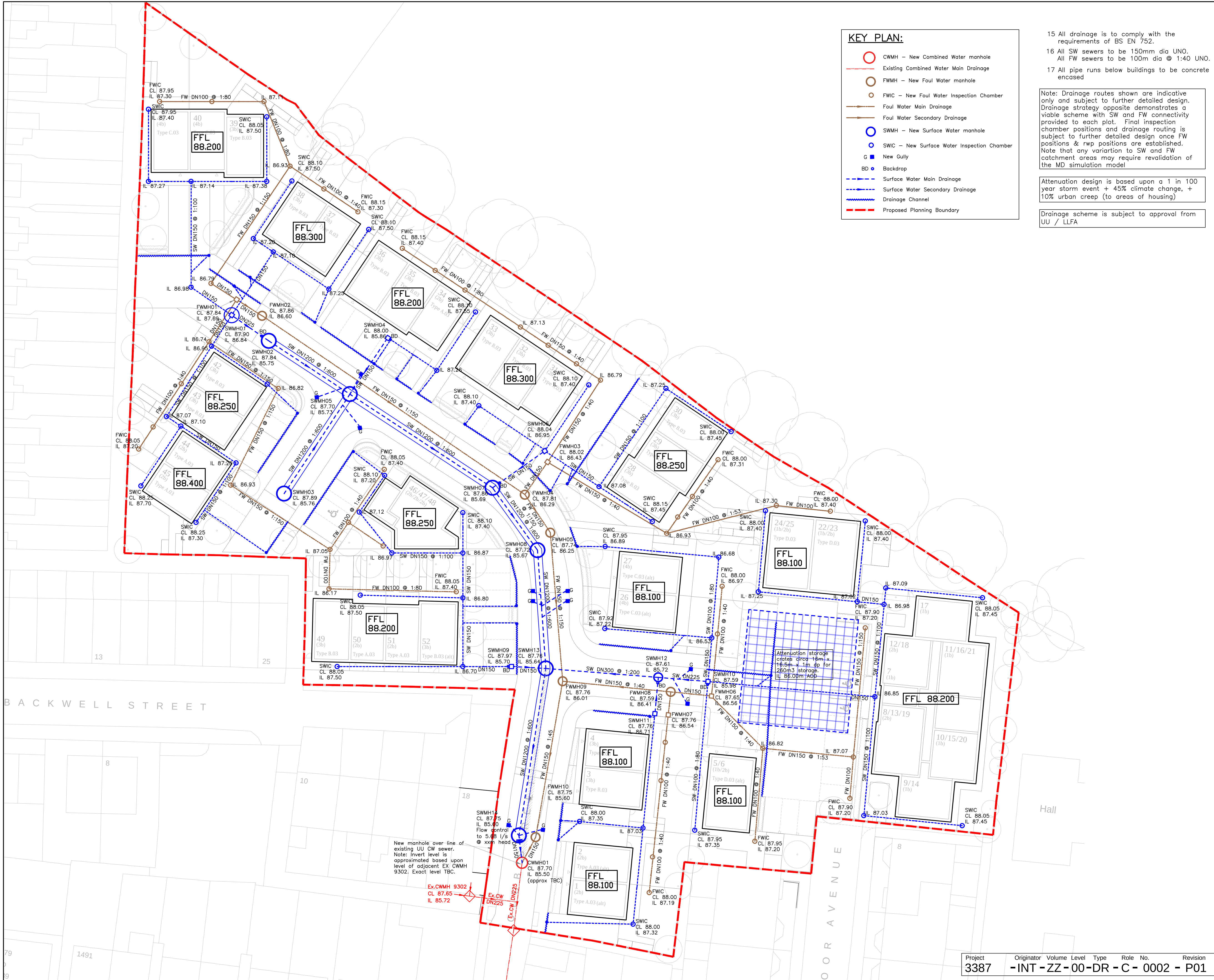
Network W.12.6.1

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

PN	US/MH Name	Water	Surch'd Depth (m)	Flooded	Flow / Cap.	O'flow (l/s)	Pipe	Status
		Level (m)		Volume (m³)			Flow (l/s)	
6.001	12	87.612	1.592	1.578	0.29	0.0	19.1	FLOOD
1.005	13	87.670	0.836	0.000	0.02	0.0	20.3	FLOOD RISK
1.006	14	87.673	1.781	0.000	0.09	0.0	7.0	FLOOD RISK

APPENDIX 10

SCHEMATIC LEVELS / DRAINAGE ARRANGEMENT DRAWINGS



- Notes.**
- All dimensions are in millimetres unless noted otherwise.
 - All levels are in metres unless noted otherwise.
 - This drawing is to be read in conjunction with all relevant Architects and Service Engineers drawings.
 - All SW drainage pipes to be Polypipe adoptable drainage system, or similar approved upto 375mm $\varnothing$ and concrete from 450mm $\varnothing$.
 - All road gullies to have Grade D400 gratings to B.S.E.N. 124 with 450 $\varnothing$ x900 deep Pre-Cast concrete or polyethylene pots.
 - Manholes to be precast concrete rings to BS 5911 dia as indicated.
 - All Manhole covers to be Grade B125 in footpaths/ soft landscaping or D400 in trafficked areas to B.S.E.N. 124. Areas within landscaping, footpaths or block paved areas to have recessed covers (TBC by Landscape Architect)
 - Manhole minimum clear opening sizes as below:
 - CL to pipe soffit <1.5m
 - pipes not larger than 150mm 750x750
 - pipes 225 and larger 1200x675
 - CL to pipe soffit >1.5m
 - All pipe sizes 600x600
 - Inspection chambers to be 450mm $\varnothing$ 'non-man entry' PPIC's.
 - Invert levels quoted are exit inverts. All pipes to run soffits level, except into the oversized attenuation pipe
 - Pipes with cover of less than 900mm under road/paved and 600mm under landscaped areas to be encased in concrete bedding class S.
 - All work to be carried out in accordance with the following documents:
 - (a) – Civil Engineering Specification for the Water Industry 7th Edition, 2011.
 - A minimum pipe velocity of 1.0 m/s to be achieved.
 - FW Sewers are to provide 0.75 m/s velocity at one third design flow.

KEY PLAN:

- CWMH – New Combined Water manhole
- Existing Combined Water Main Drainage
- FWMH – New Foul Water manhole
- FWIC – New Foul Water Inspection Chamber
- Foul Water Main Drainage
- Foul Water Secondary Drainage
- SWMH – New Surface Water manhole
- SWIC – New Surface Water Inspection Chamber
- G New Gully
- BD Backdrop
- Surface Water Main Drainage
- Surface Water Secondary Drainage
- Drainage Channel
- Proposed Planning Boundary

Note: Drainage routes shown are indicative only and subject to further detailed design. Drainage strategy opposite demonstrates a viable scheme with SW and FW connectivity provided to each plot. Final inspection chamber positions and drainage routing is subject to further detailed design once FW positions & rwp positions are established. Note that any variation to SW and FW catchment areas may require revalidation of the MD simulation model

Attenuation design is based upon a 1 in 100 year storm event + 45% climate change, + 10% urban creep (to areas of housing)

Drainage scheme is subject to approval from UU / LLFA

Rev	Drawn	Date	Description

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Manchester
M15 4GB

Civil & Structural Engineers

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Web: www.integraconsulting.co.uk

Drawing status:
PRELIMINARY

Contract:
**CLUB STREET
OPENSHAW**

Drawing title:
**INDICATIVE DRAINAGE
STRATEGY**

Scales	Date
1:250@A1	11/23

Drawn	Checked
RH	NS

Contract No	Drawing No	Rev
3387	0002	P01

Project	Originator	Volume	Level	Type	Role	No.	Revision
3387	-INT	-ZZ	-00	-DR	-C-	0002	- P01

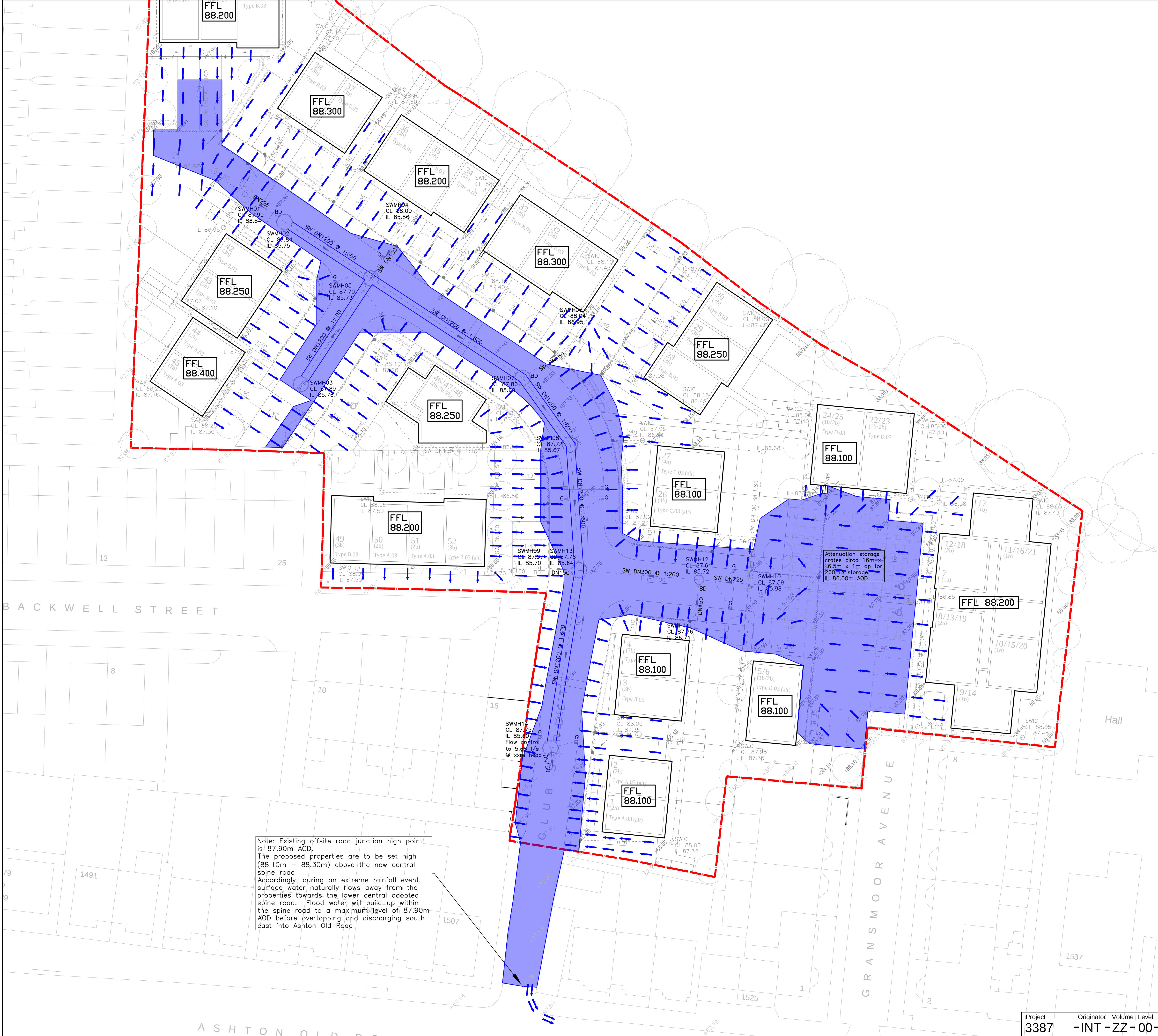
APPENDIX 11

OVERLAND FLOOD ROUTE PLAN

Notes.

- 1 All dimensions are in millimetres unless noted otherwise.
- 2 All levels are in metres unless noted otherwise.
- 3 This drawing is to be read in conjunction with all relevant Architects and Service Engineers drawings.

Note: Drainage routes shown are indicative only and subject to further detailed design. Drainage strategy opposite demonstrates a viable scheme with SW and FW connectivity provided to each plot. Final inspection chamber positions and drainage routing is subject to further detailed design once FW positions & rwp positions are established. Note that any variation to SW and FW catchment areas may require revalidation of the MD simulation model



Rev	Drawn	Date	Description



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Drawing status:

PRELIMINARY

Contract:

CLUB STREET
OPENSHAW

Drawing title:

OVERLAND FLOOD
ROUTES (EXTREME
EVENTS >1 IN 100 + CC)

Scales 1:250@A1	Date 11/23	
Drawn RH	Checked NS	
Contract No 3387	Drawing No 0004	Rev P01

Project 3387	Originator -INT -ZZ -00-DR -C -	Volume 0004	Level P01	Type 	Role 	No. 	Revision
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