SURFACE WATER AND FOUL WATER

DRAINAGE STRATEGY

for

OAKMERE HOMES

PROPOSED RESIDENTIAL DEVELOPMENT

on

LAND AT CHATBURN ROAD

CLITHEROE

SEPTEMBER 2019

REFORD

Consulting Engineers Limited

7 Hall Road, Fulwood, Preston, PR2 9QD

Mobile: 07970 265334 Email: r.e.ford@virginmedia.com

Company number: 09620365 VAT Reg. 215 5638 12

CONTENTS

1. INTRODUCTION

1.1 This surface water and foul water drainage strategy has been produced on behalf of Oakmere Homes in support of a planning application for a proposed residential development comprising 39 dwellings on land adjacent Chatburn Road, Clitheroe. A location plan is included within Appendix A.

1.2 This drainage strategy describes the existing site conditions and proposed development. It assesses the potential impact of proposals on existing sewers and includes a proposed strategy for the provision of new drainage to serve the proposed development.

1.3 A flood risk assessment has been produced in conjunction with this drainage strategy.

2. BASE INFORMATION

Existing site

2.1 The proposal relates to land (approx. 1.83 hectares) that lies to the north of Chatburn Road to the east of the centre of Clitheroe.

2.2 The existing site comprises grassland.

2.3 The adjacent site to the west has a planning permission for 30 residential dwellings, which has been granted by Ribble Valley Borough Council and is under construction.

2.4 A topographical survey has been carried out. The site has a fall to the north towards the watercourse that runs within the site and parallel to its northern boundary.

2.5 Access to the site is available from Chatburn Road.

Proposed development

2.6 The proposed development will comprise 39 residential dwellings. The masterplan is shown on drawing 067/P/01 accompanying the planning application.

Site geology

2.7 The online Soilscapes viewer has identified that the geology encountered will be slowly permeable seasonally wet acid loamy and clayey soils with impeded drainage. The ground is, therefore, not likely to be conducive to infiltration of surface water.

2.8 This is supported by a site investigation that has been carried out on the adjacent site. The exploratory holes encountered cohesive deposits of low permeability across the site and concluded that the use of soakaway drainage is not considered feasible at the site.

Understanding of existing drainage local to the site

2.9 Within the site and parallel to its northern boundary runs a watercourse that flows to the west and ultimately discharges into the River Ribble. The watercourse takes surface water runoff from the local area including the application site.

2.10 United Utilities sewer records show a public foul sewer at the south western corner of the site within Chatburn Road that lies along the site's southern boundary. The sewer records are within Appendix B.

3. PROPOSED DRAINAGE STRATEGY

3.1 The proposed surface and foul water drainage layout is included within Appendix C.

Surface Water Drainage

3.2 In accordance with the National Standards for Sustainable Drainage, the drainage strategy should incorporate the use of Sustainable Drainage (SUDS) where possible. The approach promotes the use infiltration features in the first instance. If drainage cannot be achieved solely through infiltration due to site conditions or contamination risks, the preferred options are (in order of preference):

(i) a controlled discharge to a local waterbody or watercourse, or
(ii) a controlled discharge into the public sewer network (depending on availability and capacity).

3.3 The rate and volume of discharge should be restricted to the pre-development values as far as practicable.

Surface water drainage discharges from the developed site

3.4 The nature of the geology of the site means that infiltration back into the ground is not feasible. This is supported by a site investigation that has been carried out on the adjacent site. The exploratory holes encountered cohesive deposits of low permeability across the site and concluded that the use of soakaway drainage is not considered feasible at the site.

3.5 In line with common practice, surface water runoff from the proposed development should mimic those from the existing site. It is therefore intended that surface water runoff from the developed site will be attenuated and discharge into the watercourse that flows parallel to the northern boundary of the site.

3.6 The surface water flow from the development will be controlled such that the peak surface water runoff for the 1 in 1 and the 1 in 100 year rainfall events will not exceed the pre-development runoff rate for the same event, allowing surface water runoff generated by all rainfall events up to the 100 year critical rain storm plus 30% on

stored volumes to discharge into the watercourse. The additional 30% is to allow for climate change and has been included in the surface water volume.

3.7 To determine the restricted surface water discharge rates from the developed site, the pre-development runoff has been calculated using the 'Causeway Flow' programme. The calculations are based upon the developed area of the site of 1.63ha, having removed the area of public open space measured at 0.20ha. The pre-development discharge rates have been calculated as follows:

- Qbar 15.4 l/s
- Q1 13.4 l/s
- Q100 32.0 l/s

3.8 The following design criteria have been applied to the surface water drainage design:

- An additional 10% has been added to the residential areas when designing the pipe network to allow for development creep;
- The surface water drainage network has been designed such that the peak surface water runoff for the 1 in 1 and the 1 in 100 year rainfall event will not exceed the pre-development runoff rate for the same event.
- No flooding from sewers for 1 in 30 year.
- No risk of flooding to the site or downstream from the site between 1 in 1 year and up to 1 in 100 year plus 30% for climate change.

3.9 A preliminary surface water drainage design has been carried out for the proposed development. Attenuation will be provide within the development site using oversized pipes and manholes.

3.10 The surface water drainage design is included within Appendix D.

Foul Water Drainage

3.11 Foul water discharges from the site will be to an onsite foul pumping station located at the end of the access spine road and the foul water pumped to the public foul sewer that runs within Chatburn Road.

4. SUMMARY AND CONCLUSIONS

4.1 This surface water and foul water drainage strategy has been produced on behalf of Oakmere Homes in support of a planning application for a proposed residential development comprising 39 dwellings on land adjacent Chatburn Road, Clitheroe.

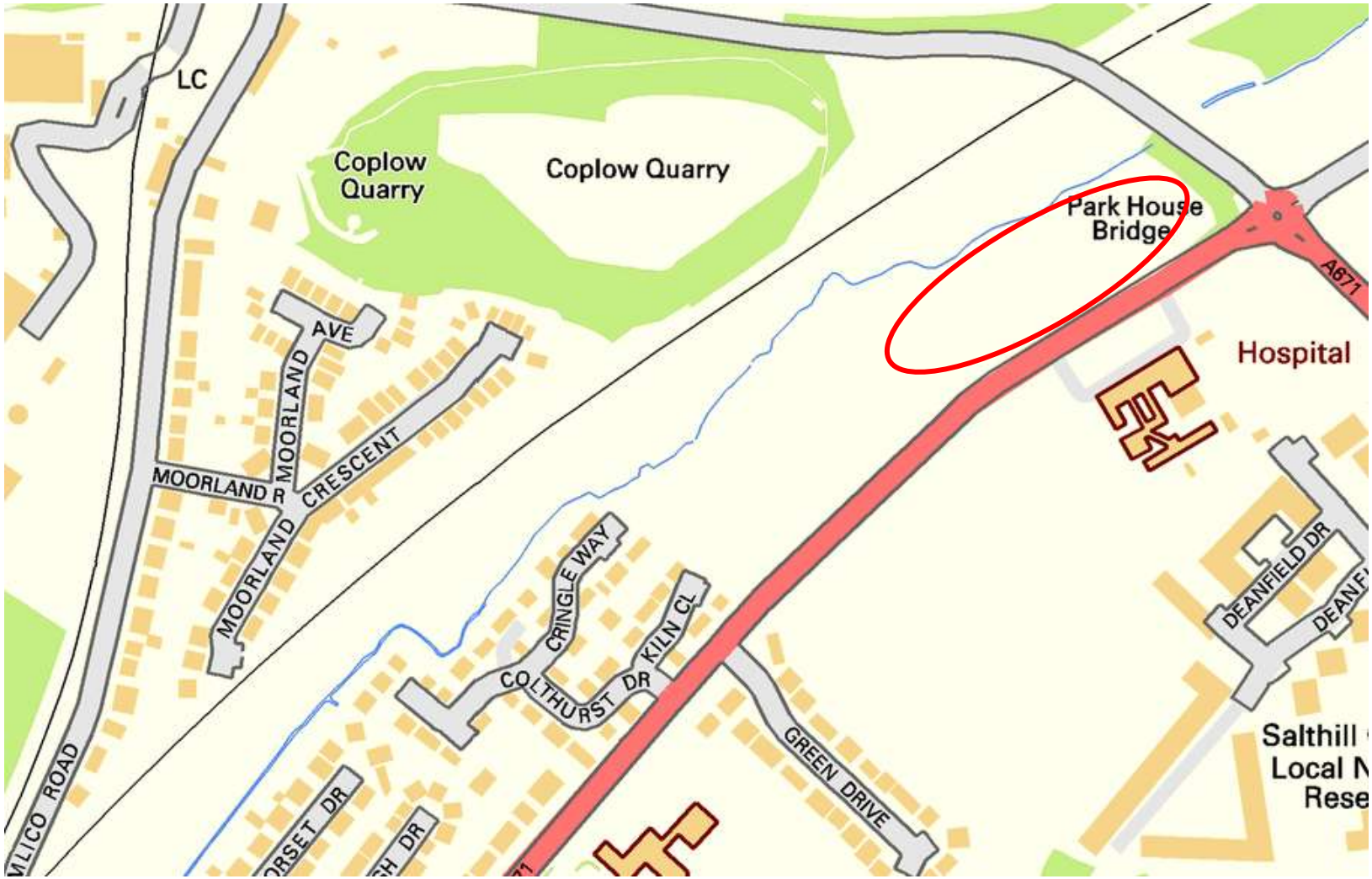
4.2 The nature of the local geology means that infiltration of surface water runoff back into the ground is not feasible on this site.

4.3 Surface water runoff from the developed site will be attenuated and discharge into the watercourse that flows parallel to the northern boundary of the site. Attenuation will be provided by oversized pipes and manholes.

4.4 The surface water drainage network has been designed such that the peak surface water runoff for the 1 in 1 and the 1 in 100 year rainfall event will not exceed the pre-development runoff rate for the same event.

4.5 Foul water discharges from the site will be to an onsite foul pumping station located at the end of the access spine road and the foul water pumped to the public foul sewer that runs within Chatburn Road.

APPENDIX A



CHATBURN ROAD – LOCATION PLAN

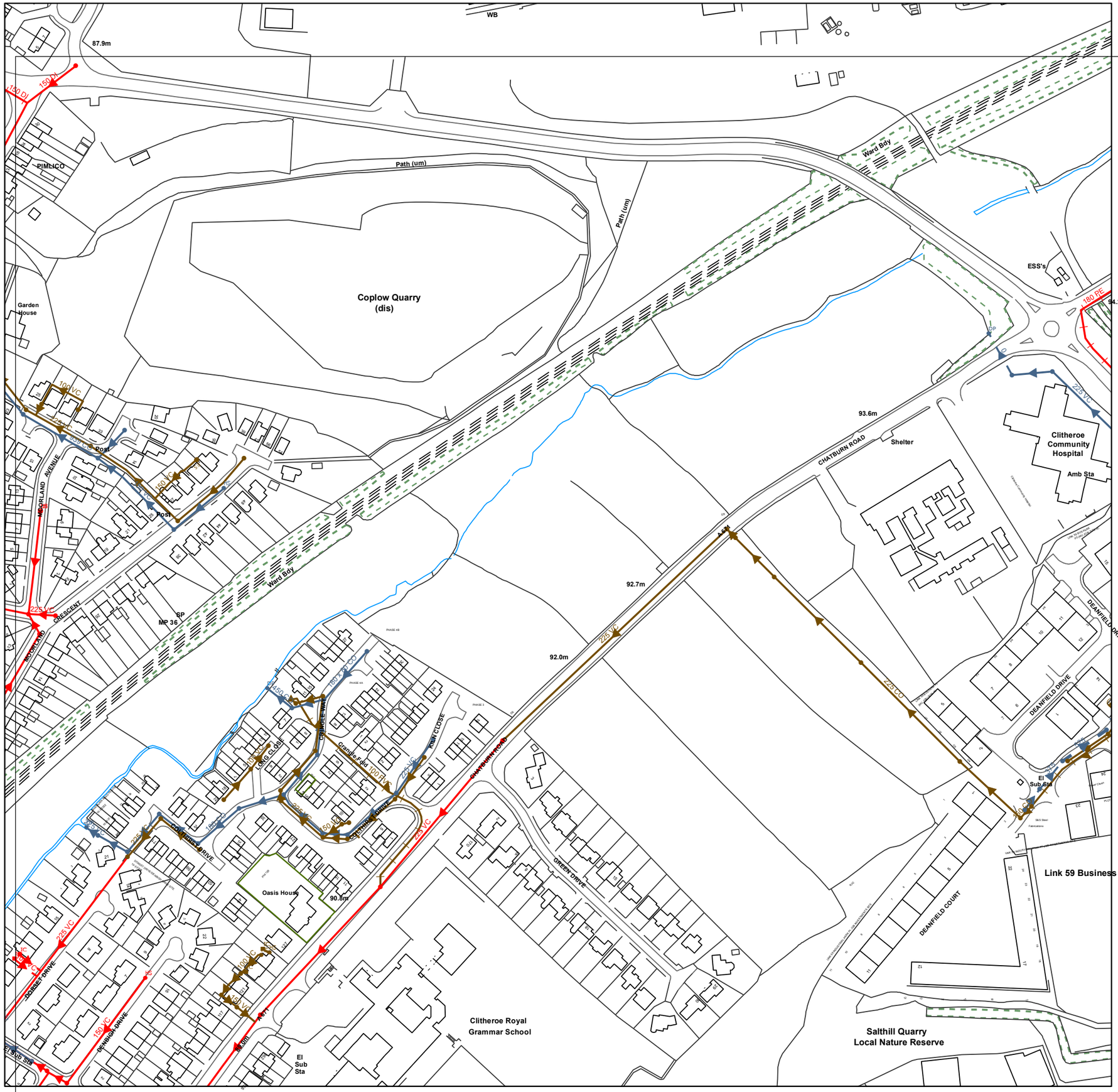
APPENDIX B

Extract from Map of Public Sewers

The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available.

The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded.

United Utilities will not accept any liability for any damage caused by the actual positions being different from those shown.



LEGEND

- Water Course
- Overflow Pipe
- Sludge Main
- Highway Drain

Combined	Surface Water	Foul	Abandoned	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main

CHATBURN ROAD, CLITHEROE,

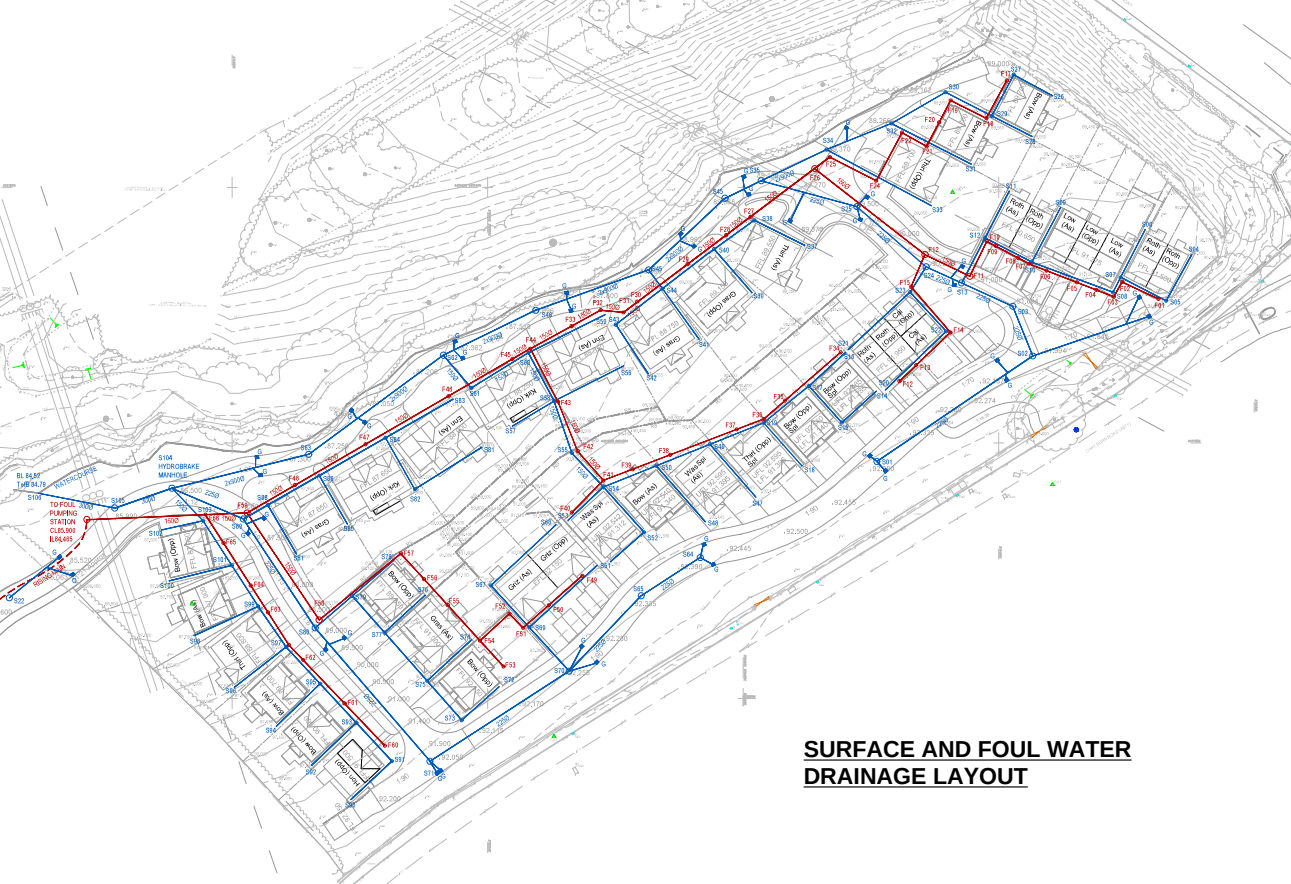
Printed By : Property Searches Date: 27/09/2016

DO NOT SCALE

Approximate Scale: 1:2500

United Utilities
helping life flow smoothly

APPENDIX C



SURFACE AND FOUL WATER DRAINAGE LAYOUT

APPENDIX D

Drainage Design Report

Flow

v8.1

Network	Storm Network
Filename	C:\Users\Bob\Documents\reford\19.619 chatburn road north\drainage design\chatburn road north v6.pfd
Username	Bob Ford (r.e.ford@virginmedia.com)
Last analysed	12/09/2019 21:14:45
Report produced on	12/09/2019 21:35:14

Causeway Sales

Tel:	+44(0) 1628 552000
Fax:	+44(0) 1628 552001
Email:	marketing@causeway.com
Web:	www.causeway.com

Technical support web portal:

http://support.causeway.com

Rainfall Methodology	FSR
Return Period (years)	2
Additional Flow (%)	0
FSR Region	England and Wales
M5-60 (mm)	20.000
Ratio-R	0.200
CV	0.750
Time of Entry (mins)	5.00
Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	75.0
Minimum Velocity (m/s)	1.00
Connection Type	Level Soffits
Minimum Backdrop Height (m)	3.000
Preferred Cover Depth (m)	0.450
Include Intermediate Ground	
Enforce best practice design rules	

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Node Type	Diameter (mm)	Depth (m)
1	0.043	5.00		92.300	Manhole	1200	1.425
2	0.028	5.00		91.950	Manhole	1200	1.425
3	0.010	5.00		91.600	Manhole	1200	1.425
4	0.006	5.00		91.350	Manhole	100	0.550
5	0.002	5.00		91.350	Manhole	450	0.719
6	0.006	5.00		91.125	Manhole	100	0.550
7	0.006	5.00		91.125	Manhole	450	0.719
8				91.125	Manhole	450	0.820
9	0.006	5.00		90.500	Manhole	100	0.550
10	0.006	5.00		90.500	Manhole	450	0.752
11	0.002	5.00		90.500	Manhole	100	0.550
12	0.002	5.00		90.500	Manhole	450	0.921
13	0.004	5.00		91.000	Manhole	1200	1.848
14	0.005	5.00		92.335	Manhole	100	0.550
15	0.004	5.00		92.335	Manhole	450	0.685
16	0.002	5.00		91.135	Manhole	100	0.550
17	0.004	5.00		91.135	Manhole	450	0.685
18	0.010	5.00		92.390	Manhole	100	0.550
19	0.004	5.00		91.190	Manhole	450	0.942
20	0.007	5.00		91.800	Manhole	100	0.550
21	0.004	5.00		91.800	Manhole	100	0.550
22	0.004	5.00		91.800	Manhole	450	0.819
23	0.004	5.00		91.800	Manhole	450	1.021
24	0.009	5.00		90.600	Manhole	1200	1.490
25	0.019	5.00		89.650	Manhole	1200	1.425
26	0.002	5.00		89.550	Manhole	100	0.550
27	0.002	5.00		89.550	Manhole	450	0.719
28	0.002	5.00		89.550	Manhole	100	0.550
29	0.006	5.00		89.550	Manhole	450	0.871

30	0.009	5.00		89.400	Manhole	450	1.056
31	0.008	5.00		89.550	Manhole	100	0.550
32	0.012	5.00		89.300	Manhole	450	1.158
33	0.004	5.00		89.550	Manhole	100	0.550
34				89.200	Manhole	3000	4.265
35	0.003	5.00		89.100	Manhole	3000	4.187
36	0.007	5.00		88.900	Manhole	3000	4.001
37	0.002	5.00		89.400	Manhole	100	0.550
38	0.002	5.00		89.400	Manhole	450	0.735
39	0.007	5.00		89.000	Manhole	100	0.550
40	0.006	5.00		89.000	Manhole	450	0.769
41	0.005	5.00		88.600	Manhole	100	0.550
42	0.002	5.00		88.600	Manhole	100	0.550
43	0.002	5.00		88.600	Manhole	450	0.735
44	0.012	5.00		88.600	Manhole	450	0.920
45	0.008	5.00		88.450	Manhole	3000	3.586
46	0.004	5.00		87.900	Manhole	3000	3.075
47	0.010	5.00		92.455	Manhole	100	0.550
48	0.009	5.00		92.390	Manhole	450	0.550
49	0.002	5.00		91.255	Manhole	450	1.209
50	0.002	5.00		91.190	Manhole	450	1.329
51	0.002	5.00		92.362	Manhole	100	0.550
52	0.009	5.00		92.362	Manhole	450	0.719
53	0.002	5.00		91.162	Manhole	100	0.550
54	0.002	5.00		91.162	Manhole	450	1.520
55				89.800	Manhole	450	1.050
56	0.003	5.00		88.200	Manhole	100	0.550
57	0.003	5.00		88.100	Manhole	100	0.550
58	0.006	5.00		88.100	Manhole	450	0.769
59	0.003	5.00		88.200	Manhole	100	0.550
60	0.008	5.00		88.100	Manhole	450	0.879
61	0.006	5.00		88.100	Manhole	450	1.019

62	0.011	5.00		87.450	Manhole	3000	2.659
63	0.008	5.00		86.850	Manhole	3000	2.113
64	0.022	5.00		92.300	Manhole	1200	1.425
65	0.020	5.00		92.200	Manhole	1200	1.425
66	0.004	5.00		92.000	Manhole	100	0.550
67	0.004	5.00		92.000	Manhole	450	0.853
68	0.004	5.00		92.000	Manhole	100	0.550
69	0.004	5.00		92.000	Manhole	450	1.038
70	0.022	5.00		92.050	Manhole	1200	1.565
71	0.034	5.00		91.850	Manhole	1200	1.548
72	0.002	5.00		92.000	Manhole	100	0.550
73	0.002	5.00		92.000	Manhole	450	0.735
74	0.004	5.00		90.850	Manhole	100	0.550
75	0.007	5.00		90.850	Manhole	450	0.735
76	0.004	5.00		89.700	Manhole	100	0.550
77	0.009	5.00		89.700	Manhole	450	0.735
78	0.002	5.00		89.700	Manhole	100	0.550
79	0.006	5.00		89.700	Manhole	450	0.887
80	0.025	5.00		88.850	Manhole	1200	1.850
81	0.003	5.00		87.850	Manhole	100	0.550
82	0.006	5.00		87.500	Manhole	450	0.550
83	0.003	5.00		87.850	Manhole	100	0.550
84	0.009	5.00		87.500	Manhole	450	0.735
85	0.005	5.00		87.500	Manhole	100	0.550
86	0.011	5.00		87.500	Manhole	450	0.988
87	0.002	5.00		87.500	Manhole	100	0.550
88	0.002	5.00		87.500	Manhole	450	1.190
89	0.011	5.00		87.200	Manhole	1200	1.425
90	0.006	5.00		91.350	Manhole	100	0.550
91	0.002	5.00		91.350	Manhole	450	0.719
92	0.004	5.00		90.450	Manhole	100	0.550
93	0.004	5.00		90.450	Manhole	450	0.735

94	0.004	5.00		89.550	Manhole	100	0.550
95	0.007	5.00		89.550	Manhole	450	0.735
96	0.004	5.00		88.650	Manhole	100	0.550
97	0.007	5.00		88.650	Manhole	450	0.735
98	0.004	5.00		87.750	Manhole	100	0.550
99	0.007	5.00		87.750	Manhole	450	0.752
100	0.004	5.00		87.500	Manhole	100	0.550
101	0.011	5.00		87.500	Manhole	450	0.769
102	0.002	5.00		87.500	Manhole	100	0.550
103	0.002	5.00		87.500	Manhole	450	0.869
104	0.013	5.00		86.500	Manhole	3000	1.810
105				86.000	Manhole	1200	1.350
106				85.100	Manhole	1200	0.500

Name	US Node	DS Node	Length (m)	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)	Min DS IL (m)	Lateral Area (ha)	Lateral Ins Point (%)	Lateral T of E (mins)
5.000	1	2	37.000	90.875	90.525	0.350	105.7	225	Circular	5.49	47.7				
5.001	2	3	11.000	90.525	90.175	0.350	31.4	225	Circular	5.56	47.5				
5.002	3	13	10.000	90.175	89.152	1.023	9.8	225	Circular	5.60	47.4				
1.000	4	5	10.000	90.800	90.631	0.169	59.2	100	Circular	5.17	48.6				
1.001	5	7	10.000	90.631	90.406	0.225	44.4	100	Circular	5.31	48.2				
2.000	6	7	10.000	90.575	90.406	0.169	59.2	100	Circular	5.17	48.6				
1.002	7	8	6.000	90.406	90.305	0.101	59.4	100	Circular	5.41	47.9				
1.003	8	10	17.000	90.305	89.748	0.557	30.5	100	Circular	5.61	47.3				
3.000	9	10	12.000	89.950	89.748	0.202	59.4	100	Circular	5.20	48.5				
1.004	10	12	10.000	89.748	89.579	0.169	59.2	100	Circular	5.78	46.9				
4.000	11	12	10.000	89.950	89.579	0.371	27.0	100	Circular	5.11	48.8				
1.005	12	13	9.000	89.579	89.277	0.302	29.8	100	Circular	5.88	46.6				
1.006	13	24	7.000	89.152	89.110	0.042	166.7	225	Circular	6.00	46.3				
6.000	20	22	16.000	91.250	90.981	0.269	59.5	100	Circular	5.27	48.3				
6.001	22	23	12.000	90.981	90.779	0.202	59.4	100	Circular	5.47	47.7				
7.000	21	23	16.000	91.250	90.779	0.471	34.0	100	Circular	5.20	48.5				
6.002	23	24	5.000	90.779	89.235	1.544	3.2	100	Circular	5.49	47.7				
1.007	24	25	17.000	89.110	88.225	0.885	19.2	225	Circular	6.09	46.0				
1.008	25	35	21.000	88.225	87.579	0.646	32.5	225	Circular	6.25	45.6				
8.000	26	27	10.000	89.000	88.831	0.169	59.2	100	Circular	5.17	48.6				
8.001	27	29	9.000	88.831	88.679	0.152	59.2	100	Circular	5.32	48.2				
9.000	28	29	10.000	89.000	88.679	0.321	31.2	100	Circular	5.12	48.8				
8.002	29	30	11.000	88.679	88.344	0.335	32.8	100	Circular	5.45	47.8				
8.003	30	32	12.000	88.344	88.142	0.202	59.4	100	Circular	5.65	47.2				
10.000	31	32	19.000	89.000	88.142	0.858	22.1	100	Circular	5.19	48.6				
8.004	32	34	13.000	88.142	87.923	0.219	59.4	100	Circular	5.87	46.6				
11.000	33	34	23.000	89.000	87.923	1.077	21.4	100	Circular	5.23	48.5				
8.005	34	35	13.000	84.935	84.913	0.022	590.9	900	double	6.04	46.2				
1.009	35	36	8.000	84.913	84.899	0.014	571.4	900	double	6.35	45.3				
1.010	36	45	21.000	84.899	84.864	0.035	600.0	900	double	6.62	44.7				
12.000	37	38	11.000	88.850	88.665	0.185	59.5	100	Circular	5.18	48.6				
12.001	38	40	10.000	88.665	88.231	0.434	23.0	100	Circular	5.29	48.3				
13.000	39	40	13.000	88.450	88.231	0.219	59.4	100	Circular	5.22	48.5				
12.002	40	44	13.000	88.231	87.680	0.551	23.6	100	Circular	5.42	47.9				
15.000	41	44	12.000	88.050	87.680	0.370	32.4	100	Circular	5.15	48.7				
14.000	42	43	11.000	88.050	87.865	0.185	59.5	100	Circular	5.18	48.6				

14.001	43	44	11.000	87.865	87.680	0.185	59.5	100	Circular	5.37	48.0				
12.003	44	45	5.000	87.680	87.150	0.530	9.4	100	Circular	5.46	47.8				
1.011	45	46	23.000	84.864	84.825	0.039	589.7	900	double	6.92	44.0				
1.012	46	62	20.000	84.825	84.791	0.034	588.2	900	double	7.18	43.4				
16.000	14	15	8.000	91.785	91.650	0.135	59.3	100	Circular	5.13	48.7				
16.001	15	17	12.000	91.650	90.450	1.200	10.0	100	Circular	5.21	48.5				
17.000	16	17	8.000	90.585	90.450	0.135	59.3	100	Circular	5.13	48.7				
16.002	17	19	12.000	90.450	90.248	0.202	59.4	100	Circular	5.41	47.9				
18.000	18	19	12.000	91.840	90.248	1.592	7.5	100	Circular	5.07	48.9				
16.003	19	49	12.000	90.248	90.046	0.202	59.4	100	Circular	5.61	47.3				
19.000	47	49	15.000	91.905	90.046	1.859	8.1	100	Circular	5.09	48.9				
16.004	49	50	11.000	90.046	89.861	0.185	59.5	100	Circular	5.80	46.8				
20.000	48	50	15.000	91.840	89.861	1.979	7.6	100	Circular	5.09	48.9				
16.005	50	54	10.000	89.861	89.692	0.169	59.2	100	Circular	5.96	46.4				
21.000	51	52	10.000	91.812	91.643	0.169	59.2	100	Circular	5.17	48.6				
21.001	52	54	13.000	91.643	89.692	1.951	6.7	100	Circular	5.24	48.4				
22.000	53	54	10.000	90.612	89.692	0.920	10.9	100	Circular	5.07	48.9				
16.006	54	55	8.000	89.642	88.750	0.892	9.0	150	Circular	6.00	46.2				
16.007	55	58	11.000	88.750	87.331	1.419	7.8	150	Circular	6.05	46.1				
23.000	56	58	15.000	87.650	87.381	0.269	55.8	100	Circular	5.24	48.4				
24.000	57	58	10.000	87.550	87.381	0.169	59.2	100	Circular	5.17	48.6				
16.008	58	60	11.000	87.331	87.221	0.110	100.0	150	Circular	6.24	45.6				
25.000	59	60	16.000	87.650	87.271	0.379	42.2	100	Circular	5.22	48.5				
16.009	60	61	14.000	87.221	87.081	0.140	100.0	150	Circular	6.47	45.0				
16.010	61	62	8.000	87.081	86.100	0.981	8.2	150	Circular	6.51	45.0				
1.013	62	63	32.000	84.791	84.737	0.054	592.6	900	double	7.60	42.4				
1.014	63	104	28.000	84.737	84.690	0.047	595.7	900	double	7.96	41.7				
28.000	64	65	13.000	90.875	90.775	0.100	130.0	225	Circular	5.19	48.6				
28.001	65	70	22.000	90.775	90.485	0.290	75.9	225	Circular	5.43	47.8				
26.000	66	67	18.000	91.450	91.147	0.303	59.4	100	Circular	5.30	48.2				
26.001	67	69	11.000	91.147	90.962	0.185	59.5	100	Circular	5.48	47.7				
27.000	68	69	18.000	91.450	90.962	0.488	36.9	100	Circular	5.24	48.4				
26.002	69	70	12.000	90.962	90.610	0.352	34.1	100	Circular	5.63	47.3				
26.003	70	71	31.000	90.485	90.302	0.183	169.4	225	Circular	6.15	45.9				
26.004	71	80	34.000	90.302	87.000	3.302	10.3	225	Circular	6.29	45.5				
29.000	72	73	11.000	91.450	91.265	0.185	59.5	100	Circular	5.18	48.6				
29.001	73	75	10.000	91.265	90.115	1.150	8.7	100	Circular	5.25	48.4				
30.000	74	75	11.000	90.300	90.115	0.185	59.5	100	Circular	5.18	48.6				
29.002	75	77	13.000	90.115	88.965	1.150	11.3	100	Circular	5.34	48.1				

31.000	76	77	11.000	89.150	88.965	0.185	59.5	100	Circular	5.18	48.6				
29.003	77	79	9.000	88.965	88.813	0.152	59.2	100	Circular	5.49	47.7				
32.000	78	79	11.000	89.150	88.813	0.337	32.6	100	Circular	5.14	48.7				
29.004	79	80	10.000	88.813	87.125	1.688	5.9	100	Circular	5.54	47.5				
26.005	80	89	36.000	87.000	85.775	1.225	29.4	225	Circular	6.54	44.9				
33.000	81	82	16.000	87.300	86.950	0.350	45.7	100	Circular	5.23	48.4				
33.001	82	84	11.000	86.950	86.765	0.185	59.5	100	Circular	5.42	47.9				
34.000	83	84	15.000	87.300	86.765	0.535	28.0	100	Circular	5.17	48.6				
33.002	84	86	15.000	86.765	86.512	0.253	59.3	100	Circular	5.67	47.2				
35.000	85	86	11.000	86.950	86.512	0.438	25.1	100	Circular	5.12	48.8				
33.003	86	88	12.000	86.512	86.310	0.202	59.4	100	Circular	5.87	46.6				
36.000	87	88	11.000	86.950	86.310	0.640	17.2	100	Circular	5.10	48.9				
33.004	88	89	5.000	86.310	85.900	0.410	12.2	100	Circular	5.90	46.5				
26.006	89	104	15.000	85.775	85.075	0.700	21.4	225	Circular	6.62	44.7				
37.000	90	91	11.000	90.800	90.631	0.169	65.1	100	Circular	5.19	48.6				
37.001	91	93	10.000	90.631	89.715	0.916	10.9	100	Circular	5.26	48.3				
38.000	92	93	12.000	89.900	89.715	0.185	64.9	100	Circular	5.21	48.5				
37.002	93	95	10.000	89.715	88.815	0.900	11.1	100	Circular	5.33	48.1				
39.000	94	95	12.000	89.000	88.815	0.185	64.9	100	Circular	5.21	48.5				
37.003	95	97	10.000	88.815	87.915	0.900	11.1	100	Circular	5.41	47.9				
40.000	96	97	13.000	88.100	87.915	0.185	70.3	100	Circular	5.24	48.4				
37.004	97	99	10.000	87.915	86.998	0.917	10.9	100	Circular	5.48	47.7				
41.000	98	99	14.000	87.200	86.998	0.202	69.3	100	Circular	5.25	48.4				
37.005	99	101	10.000	86.998	86.781	0.217	46.1	100	Circular	5.62	47.3				
42.000	100	101	13.000	86.950	86.781	0.169	76.9	100	Circular	5.25	48.4				
37.006	101	103	10.000	86.731	86.631	0.100	100.0	150	Circular	5.79	46.8				
43.000	102	103	10.000	86.950	86.681	0.269	37.2	100	Circular	5.13	48.8				
37.007	103	104	9.000	86.631	85.150	1.481	6.1	150	Circular	5.83	46.7				
1.015	104	105	12.000	84.690	84.650	0.040	300.0	300	Circular	8.19	41.3				
1.016	105	106	15.000	84.650	84.600	0.050	300.0	300	Circular	8.46	40.7				

Rainfall Methodology	FSR		**Return Period (years)**	**Climate Change (%)**
FSR Region	England and Wales		1	0
M5-60 (mm)	20.000		30	0
Ratio-R	0.200		100	0
Summer CV	0.750		100	30
Winter CV	0.840			
Analysis Speed	Normal			
Skip Steady State	x			
Drain Down Time (mins)	240			
Additional Storage (m³/ha)	20.0			
Storm Durations (mins)	15			
	30			
	60			
	120			
	180			
	240			
	360			
	480			
	600			
	720			
	960			
	1440			
Check Discharge Rate(s)	x			
1 year (l/s)	13.4			
30 year (l/s)	26.2			
100 year (l/s)	32.0			
Check Discharge Volume	x			
100 year 360 minute (m³)				

Hydro-Brake®												
Node	Flap Valve	Online / Offline	Replaces Downstream Link	Loop to Node	Invert Level (m)	Design Depth (m)	Design Flow (l/s)	Objective	Sump Available	Product Number	Min Outlet Diameter (m)	Min Node Diameter (mm)
104	x	Online	x		84.690	1.810	13.4	(HE) Minimise upstream storage		CTL-SHE-0154-1340-1810-1340	0.225	1500
104	x	Online	x		85.100	1.400	18.6	(HE) Minimise upstream storage		CTL-SHE-0187-1860-1400-1860	0.225	1500

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.43%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	10	90.922	0.047	4.8	0.0807	0.0000	OK	5.000	2	4.7	0.784	0.092	0.2203	
15 minute winter	2	11	90.572	0.047	7.8	0.0719	0.0000	OK	5.001	3	7.7	1.558	0.083	0.0547	
15 minute winter	3	11	90.210	0.035	8.8	0.0445	0.0000	OK	5.002	13	8.8	0.989	0.053	0.0945	
15 minute winter	4	10	90.820	0.020	0.7	0.0045	0.0000	OK	1.000	5	0.7	0.590	0.084	0.0112	
15 minute winter	5	11	90.652	0.021	0.9	0.0045	0.0000	OK	1.001	7	0.9	0.444	0.094	0.0196	
15 minute winter	6	10	90.595	0.020	0.7	0.0045	0.0000	OK	2.000	7	0.7	0.358	0.084	0.0190	
15 minute winter	7	11	90.444	0.038	2.2	0.0125	0.0000	OK	1.002	8	2.1	0.909	0.273	0.0142	
15 minute winter	8	11	90.335	0.030	2.1	0.0048	0.0000	OK	1.003	10	2.2	0.754	0.196	0.0490	
15 minute winter	9	10	89.970	0.020	0.7	0.0044	0.0000	OK	3.000	10	0.7	0.320	0.084	0.0290	
15 minute winter	10	11	89.797	0.049	3.4	0.0155	0.0000	OK	1.004	12	3.4	0.990	0.434	0.0345	
30 minute summer	11	20	89.959	0.009	0.2	0.0007	0.0000	OK	4.000	12	0.2	0.167	0.017	0.0168	
15 minute winter	12	11	89.621	0.042	3.8	0.0085	0.0000	OK	1.005	13	3.8	1.244	0.338	0.0273	
15 minute winter	13	11	89.243	0.091	13.0	0.1065	0.0000	OK	1.006	24	13.0	1.166	0.323	0.0788	
15 minute winter	14	10	91.804	0.019	0.6	0.0036	0.0000	OK	16.000	15	0.6	0.634	0.071	0.0071	
15 minute winter	15	11	91.665	0.015	1.0	0.0042	0.0000	OK	16.001	17	1.0	0.722	0.049	0.0164	
30 minute summer	16	20	90.596	0.011	0.2	0.0009	0.0000	OK	17.000	17	0.2	0.185	0.025	0.0096	
15 minute winter	17	11	90.480	0.030	1.6	0.0083	0.0000	OK	16.002	19	1.6	0.597	0.198	0.0314	
15 minute winter	18	11	91.855	0.015	1.1	0.0056	0.0000	OK	18.000	19	1.1	0.742	0.049	0.0240	
15 minute winter	19	11	90.291	0.043	3.1	0.0106	0.0000	OK	16.003	49	3.0	0.802	0.387	0.0455	
15 minute winter	20	10	91.271	0.021	0.8	0.0055	0.0000	OK	6.000	22	0.8	0.516	0.097	0.0238	
15 minute winter	21	12	91.263	0.013	0.4	0.0021	0.0000	OK	7.000	23	0.4	0.559	0.038	0.0120	
15 minute winter	22	11	91.009	0.028	1.2	0.0073	0.0000	OK	6.001	23	1.2	0.873	0.147	0.0161	
15 minute winter	23	11	90.796	0.017	2.0	0.0040	0.0000	OK	6.002	24	2.0	2.313	0.057	0.0042	
15 minute winter	24	11	89.165	0.055	15.8	0.0691	0.0000	OK	1.007	25	15.8	1.769	0.133	0.1523	
15 minute winter	25	11	88.294	0.069	17.8	0.0971	0.0000	OK	1.008	35	17.7	1.749	0.193	0.2125	
30 minute summer	26	20	89.011	0.011	0.2	0.0009	0.0000	OK	8.000	27	0.2	0.330	0.025	0.0061	
60 minute summer	27	35	88.846	0.015	0.4	0.0033	0.0000	OK	8.001	29	0.4	0.400	0.051	0.0091	
30 minute summer	28	20	89.009	0.009	0.2	0.0008	0.0000	OK	9.000	29	0.2	0.254	0.018	0.0086	
15 minute winter	29	10	88.702	0.023	1.3	0.0069	0.0000	OK	8.002	30	1.2	0.643	0.117	0.0214	
30 minute summer	30	18	88.380	0.036	2.2	0.0119	0.0000	OK	8.003	32	2.2	0.639	0.278	0.0415	
15 minute winter	31	10	89.018	0.018	0.9	0.0053	0.0000	OK	10.000	32	0.9	0.349	0.067	0.0506	
15 minute winter	32	11	88.197	0.055	4.3	0.0202	0.0000	OK	8.004	34	4.3	1.002	0.550	0.0561	
15 minute winter	33	12	89.012	0.012	0.4	0.0018	0.0000	OK	11.000	34	0.4	0.750	0.030	0.0123	
180 minute winter	34	128	85.071	0.136	2.0	0.9579	0.0000	OK	8.005	35	1.7	0.102	0.001	1.7416	
180 minute winter	35	128	85.071	0.158	8.7	1.1156	0.0000	OK	1.009	36	7.9	0.325	0.005	1.2660	
180 minute winter	36	128	85.070	0.171	8.2	1.2183	0.0000	OK	1.010	45	7.3	0.303	0.005	4.0642	
30 minute summer	37	20	88.861	0.011	0.2	0.0009	0.0000	OK	12.000	38	0.2	0.394	0.025	0.0056	

60 minute summer	38	35	88.677	0.012	0.4	0.0026	0.0000	OK	12.001	40	0.4	0.429	0.032	0.0097	
15 minute winter	39	10	88.471	0.021	0.8	0.0055	0.0000	OK	13.000	40	0.8	0.551	0.097	0.0181	
15 minute winter	40	10	88.257	0.026	1.9	0.0081	0.0000	OK	12.002	44	1.8	0.954	0.143	0.0246	
15 minute winter	41	10	88.066	0.016	0.6	0.0030	0.0000	OK	15.000	44	0.6	0.394	0.053	0.0178	
30 minute summer	42	20	88.061	0.011	0.2	0.0009	0.0000	OK	14.000	43	0.2	0.331	0.025	0.0068	
60 minute summer	43	35	87.880	0.015	0.4	0.0033	0.0000	OK	14.001	44	0.4	0.314	0.051	0.0150	
15 minute winter	44	11	87.713	0.033	4.0	0.0137	0.0000	OK	12.003	45	4.0	1.906	0.204	0.0106	
180 minute winter	45	128	85.070	0.206	9.1	1.4687	0.0000	OK	1.011	46	7.1	0.288	0.004	5.7361	
180 minute winter	46	128	85.070	0.245	7.2	1.7417	0.0000	OK	1.012	62	5.8	0.227	0.004	6.1488	
15 minute winter	47	11	91.920	0.015	1.1	0.0057	0.0000	OK	19.000	49	1.1	0.896	0.051	0.0383	
30 minute summer	48	18	91.855	0.015	1.0	0.0071	0.0000	OK	20.000	50	1.0	0.868	0.045	0.0451	
15 minute winter	49	11	90.100	0.054	4.3	0.0104	0.0000	OK	16.004	50	4.3	0.888	0.548	0.0533	
30 minute summer	50	19	89.926	0.065	5.4	0.0122	0.0000	OK	16.005	54	5.4	1.045	0.686	0.0517	
30 minute summer	51	20	91.823	0.011	0.2	0.0009	0.0000	OK	21.000	52	0.2	0.357	0.025	0.0062	
30 minute summer	52	18	91.659	0.016	1.2	0.0064	0.0000	OK	21.001	54	1.2	1.565	0.051	0.0100	
60 minute summer	53	34	90.619	0.007	0.2	0.0006	0.0000	OK	22.000	54	0.2	0.767	0.011	0.0026	
30 minute summer	54	19	89.678	0.036	6.9	0.0067	0.0000	OK	16.006	55	6.9	2.240	0.116	0.0248	
30 minute summer	55	19	88.783	0.033	6.9	0.0053	0.0000	OK	16.007	58	7.0	1.208	0.108	0.0653	
15 minute summer	56	12	87.663	0.013	0.3	0.0015	0.0000	OK	23.000	58	0.3	0.480	0.037	0.0154	
15 minute summer	57	12	87.563	0.013	0.3	0.0016	0.0000	OK	24.000	58	0.3	0.473	0.038	0.0103	
30 minute summer	58	19	87.407	0.076	8.2	0.0240	0.0000	OK	16.008	60	8.2	0.851	0.460	0.1055	
15 minute summer	59	12	87.662	0.012	0.3	0.0014	0.0000	OK	25.000	60	0.3	0.491	0.032	0.0222	
30 minute summer	60	19	87.305	0.084	9.3	0.0288	0.0000	OK	16.009	61	9.2	1.302	0.518	0.1000	
30 minute summer	61	19	87.123	0.042	9.8	0.0117	0.0000	OK	16.010	62	9.8	2.493	0.156	0.0314	
180 minute winter	62	128	85.071	0.279	8.6	1.9987	0.0000	OK	1.013	63	7.8	0.190	0.005	12.1954	
180 minute winter	63	128	85.070	0.333	7.9	2.3824	0.0000	OK	1.014	104	9.9	0.037	0.006	13.1131	
15 minute winter	64	10	90.911	0.036	2.5	0.0513	0.0000	OK	28.000	65	2.4	0.538	0.054	0.0590	
15 minute winter	65	11	90.817	0.042	4.6	0.0590	0.0000	OK	28.001	70	4.5	0.559	0.076	0.1845	
15 minute winter	66	12	91.465	0.015	0.4	0.0024	0.0000	OK	26.000	67	0.4	0.405	0.051	0.0180	
15 minute winter	67	12	91.169	0.022	0.8	0.0055	0.0000	OK	26.001	69	0.8	0.545	0.102	0.0162	
15 minute winter	68	12	91.464	0.014	0.4	0.0021	0.0000	OK	27.000	69	0.4	0.370	0.040	0.0212	
15 minute winter	69	12	90.989	0.027	1.6	0.0064	0.0000	OK	26.002	70	1.6	0.947	0.154	0.0203	
15 minute winter	70	11	90.561	0.076	8.6	0.1069	0.0000	OK	26.003	71	8.5	1.040	0.214	0.2591	
15 minute winter	71	11	90.343	0.041	12.1	0.0651	0.0000	OK	26.004	80	12.1	1.661	0.074	0.2521	
30 minute summer	72	20	91.461	0.011	0.2	0.0009	0.0000	OK	29.000	73	0.2	0.456	0.025	0.0048	
30 minute summer	73	20	91.275	0.010	0.4	0.0021	0.0000	OK	29.001	75	0.4	0.603	0.019	0.0073	
15 minute winter	74	12	90.315	0.015	0.4	0.0024	0.0000	OK	30.000	75	0.4	0.451	0.051	0.0103	
15 minute winter	75	10	90.135	0.020	1.6	0.0070	0.0000	OK	29.002	77	1.6	0.692	0.086	0.0302	
15 minute winter	76	12	89.165	0.015	0.4	0.0024	0.0000	OK	31.000	77	0.4	0.218	0.051	0.0237	
30 minute summer	77	18	89.011	0.046	2.9	0.0188	0.0000	OK	29.003	79	2.9	1.116	0.367	0.0235	
30 minute summer	78	20	89.160	0.010	0.2	0.0008	0.0000	OK	32.000	79	0.2	0.227	0.019	0.0113	
15 minute winter	79	11	88.840	0.027	3.8	0.0079	0.0000	OK	29.004	80	3.7	2.251	0.148	0.0165	

15 minute winter	80	11	87.067	0.067	18.5	0.0934	0.0000	OK	26.005	89	18.6	1.748	0.193	0.3823	
15 minute summer	81	12	87.313	0.013	0.3	0.0015	0.0000	OK	33.000	82	0.3	0.331	0.033	0.0153	
15 minute winter	82	10	86.974	0.024	1.0	0.0089	0.0000	OK	33.001	84	0.9	0.490	0.121	0.0216	
15 minute summer	83	12	87.311	0.011	0.3	0.0013	0.0000	OK	34.000	84	0.3	0.242	0.026	0.0223	
15 minute winter	84	11	86.801	0.036	2.2	0.0145	0.0000	OK	33.002	86	2.2	0.638	0.277	0.0518	
15 minute winter	85	10	86.965	0.015	0.6	0.0028	0.0000	OK	35.000	86	0.6	0.244	0.047	0.0278	
15 minute winter	86	11	86.567	0.055	3.9	0.0208	0.0000	OK	33.003	88	3.9	1.140	0.502	0.0416	
60 minute summer	87	34	86.958	0.008	0.2	0.0007	0.0000	OK	36.000	88	0.2	0.186	0.014	0.0143	
15 minute winter	88	11	86.346	0.036	4.3	0.0070	0.0000	OK	33.004	89	4.3	1.763	0.248	0.0123	
15 minute winter	89	11	85.849	0.074	24.1	0.0955	0.0000	OK	26.006	104	24.0	2.187	0.213	0.1648	
15 minute winter	90	10	90.822	0.022	0.7	0.0049	0.0000	OK	37.000	91	0.7	0.688	0.088	0.0106	
15 minute winter	91	11	90.646	0.015	0.9	0.0032	0.0000	OK	37.001	93	0.9	0.925	0.046	0.0093	
15 minute winter	92	12	89.916	0.016	0.4	0.0024	0.0000	OK	38.000	93	0.4	0.430	0.053	0.0116	
15 minute winter	93	11	89.735	0.020	1.7	0.0055	0.0000	OK	37.002	95	1.7	1.192	0.091	0.0140	
15 minute winter	94	12	89.016	0.016	0.4	0.0024	0.0000	OK	39.000	95	0.4	0.346	0.053	0.0146	
15 minute winter	95	11	88.841	0.026	2.8	0.0093	0.0000	OK	37.003	97	2.8	1.486	0.152	0.0187	
15 minute winter	96	12	88.116	0.016	0.4	0.0025	0.0000	OK	40.000	97	0.4	0.297	0.055	0.0189	
15 minute winter	97	10	87.946	0.031	4.0	0.0110	0.0000	OK	37.004	99	3.9	1.188	0.212	0.0335	
15 minute winter	98	12	87.216	0.016	0.4	0.0024	0.0000	OK	41.000	99	0.4	0.181	0.055	0.0378	
15 minute winter	99	11	87.055	0.057	5.1	0.0197	0.0000	OK	37.005	101	5.1	1.137	0.567	0.0446	
30 minute winter	100	18	86.966	0.016	0.4	0.0025	0.0000	OK	42.000	101	0.4	0.472	0.058	0.0117	
15 minute winter	101	11	86.802	0.071	6.7	0.0314	0.0000	OK	37.006	103	6.7	1.243	0.377	0.0550	
60 minute summer	102	35	86.960	0.010	0.2	0.0008	0.0000	OK	43.000	103	0.2	0.500	0.020	0.0040	
15 minute winter	103	11	86.664	0.033	7.1	0.0067	0.0000	OK	37.007	104	7.1	2.555	0.097	0.0250	
180 minute winter	104	128	85.070	0.380	14.2	2.7440	0.0000	SURCHARGED	1.015	105	12.6	0.658	0.197	0.2292	
180 minute winter	105	128	84.744	0.094	12.6	0.1059	0.0000	OK	1.016	106	12.6	0.718	0.197	0.2626	125.0
180 minute winter	106	128	84.684	0.084	12.6	0.0000	0.0000	OK							

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.43%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	10	90.949	0.074	11.8	0.1287	0.0000	OK	5.000	2	11.6	0.995	0.229	0.4310	
15 minute winter	2	10	90.602	0.077	19.3	0.1167	0.0000	OK	5.001	3	19.0	1.980	0.204	0.1060	
15 minute winter	3	10	90.229	0.054	21.7	0.0691	0.0000	OK	5.002	13	21.6	1.254	0.129	0.1757	
30 minute summer	4	18	90.831	0.031	1.6	0.0070	0.0000	OK	1.000	5	1.6	0.745	0.203	0.0215	
30 minute summer	5	18	90.664	0.033	2.1	0.0070	0.0000	OK	1.001	7	2.1	0.544	0.230	0.0386	
30 minute summer	6	18	90.606	0.031	1.6	0.0069	0.0000	OK	2.000	7	1.6	0.432	0.203	0.0376	
30 minute summer	7	18	90.472	0.066	5.3	0.0215	0.0000	OK	1.002	8	5.3	1.134	0.670	0.0278	
30 minute summer	8	18	90.354	0.049	5.3	0.0077	0.0000	OK	1.003	10	5.2	0.882	0.476	0.0984	
30 minute summer	9	18	89.981	0.031	1.6	0.0069	0.0000	OK	3.000	10	1.6	0.344	0.203	0.0590	
30 minute summer	10	19	89.865	0.117	8.4	0.0372	0.0000	SURCHARGED	1.004	12	7.8	1.141	0.995	0.0697	
30 minute summer	11	19	89.964	0.014	0.5	0.0011	0.0000	OK	4.000	12	0.5	0.196	0.043	0.0341	
30 minute summer	12	18	89.652	0.073	8.8	0.0148	0.0000	OK	1.005	13	8.8	1.498	0.790	0.0529	
15 minute winter	13	11	89.300	0.148	31.2	0.1743	0.0000	OK	1.006	24	31.5	1.485	0.784	0.1481	
15 minute winter	14	10	91.815	0.030	1.4	0.0057	0.0000	OK	16.000	15	1.4	0.806	0.175	0.0137	
15 minute winter	15	10	91.674	0.024	2.5	0.0067	0.0000	OK	16.001	17	2.4	0.926	0.126	0.0351	
30 minute summer	16	19	90.602	0.017	0.5	0.0014	0.0000	OK	17.000	17	0.5	0.233	0.064	0.0199	
15 minute winter	17	13	90.506	0.056	4.0	0.0156	0.0000	OK	16.002	19	3.9	0.717	0.500	0.0743	
15 minute winter	18	10	91.864	0.024	2.7	0.0087	0.0000	OK	18.000	19	2.7	0.923	0.121	0.0554	
15 minute winter	19	12	90.482	0.234	7.7	0.0571	0.0000	SURCHARGED	16.003	49	6.6	0.887	0.840	0.0939	
15 minute winter	20	10	91.283	0.033	1.9	0.0087	0.0000	OK	6.000	22	1.9	0.646	0.238	0.0465	
15 minute winter	21	10	91.272	0.022	1.1	0.0033	0.0000	OK	7.000	23	1.1	0.719	0.103	0.0239	
15 minute winter	22	10	91.027	0.046	3.0	0.0119	0.0000	OK	6.001	23	2.9	1.110	0.367	0.0317	
15 minute winter	23	10	90.806	0.027	5.1	0.0065	0.0000	OK	6.002	24	5.0	3.002	0.147	0.0083	
15 minute winter	24	11	89.199	0.089	38.7	0.1112	0.0000	OK	1.007	25	38.9	2.201	0.326	0.3008	
15 minute winter	25	11	88.342	0.117	43.8	0.1635	0.0000	OK	1.008	35	44.0	2.205	0.481	0.4196	
30 minute summer	26	19	89.017	0.017	0.5	0.0014	0.0000	OK	8.000	27	0.5	0.432	0.063	0.0117	
30 minute summer	27	19	88.855	0.024	1.0	0.0052	0.0000	OK	8.001	29	1.0	0.504	0.127	0.0184	
30 minute summer	28	19	89.015	0.015	0.5	0.0012	0.0000	OK	9.000	29	0.5	0.325	0.046	0.0167	
30 minute summer	29	18	88.716	0.037	3.1	0.0110	0.0000	OK	8.002	30	3.1	0.813	0.292	0.0536	
15 minute winter	30	12	88.449	0.105	5.5	0.0345	0.0000	SURCHARGED	8.003	32	5.1	0.716	0.643	0.0939	
15 minute winter	31	10	89.028	0.028	2.2	0.0083	0.0000	OK	10.000	32	2.2	0.435	0.168	0.0912	
15 minute winter	32	12	88.364	0.222	10.5	0.0813	0.0000	SURCHARGED	8.004	34	9.3	1.184	1.178	0.1002	
15 minute winter	33	10	89.019	0.019	1.1	0.0030	0.0000	OK	11.000	34	1.1	0.999	0.080	0.0243	
180 minute winter	34	128	85.336	0.401	4.4	2.8353	0.0000	OK	8.005	35	2.2	0.101	0.001	7.3565	
180 minute winter	35	128	85.336	0.423	18.4	2.9966	0.0000	OK	1.009	36	14.8	0.329	0.009	4.7845	
180 minute winter	36	128	85.336	0.437	15.5	3.1049	0.0000	OK	1.010	45	11.6	0.275	0.007	13.4822	
30 minute summer	37	19	88.867	0.017	0.5	0.0014	0.0000	OK	12.000	38	0.5	0.519	0.064	0.0106	

30 minute summer	38	19	88.684	0.019	1.0	0.0041	0.0000	OK	12.001	40	1.0	0.519	0.079	0.0203
15 minute winter	39	10	88.483	0.033	1.9	0.0087	0.0000	OK	13.000	40	1.9	0.708	0.238	0.0345
15 minute winter	40	10	88.272	0.041	4.5	0.0129	0.0000	OK	12.002	44	4.4	1.174	0.351	0.0488
15 minute winter	41	10	88.074	0.024	1.4	0.0046	0.0000	OK	15.000	44	1.4	0.471	0.129	0.0357
30 minute summer	42	19	88.067	0.017	0.5	0.0014	0.0000	OK	14.000	43	0.5	0.431	0.064	0.0129
30 minute summer	43	19	87.889	0.024	1.0	0.0051	0.0000	OK	14.001	44	1.0	0.359	0.127	0.0323
15 minute winter	44	10	87.736	0.056	10.1	0.0234	0.0000	OK	12.003	45	9.9	2.361	0.499	0.0210
180 minute winter	45	128	85.336	0.472	15.4	3.3576	0.0000	OK	1.011	46	12.1	0.286	0.007	16.2897
180 minute winter	46	128	85.336	0.511	12.2	3.6259	0.0000	OK	1.012	62	14.2	0.260	0.009	15.4622
15 minute winter	47	10	91.929	0.024	2.7	0.0089	0.0000	OK	19.000	49	2.7	1.100	0.125	0.0695
15 minute winter	48	10	91.863	0.023	2.5	0.0110	0.0000	OK	20.000	50	2.5	1.134	0.112	0.0686
15 minute winter	49	13	90.350	0.304	9.6	0.0583	0.0000	SURCHARGED	16.004	50	8.0	1.023	1.019	0.0861
15 minute winter	50	12	90.116	0.255	10.5	0.0482	0.0000	SURCHARGED	16.005	54	10.1	1.289	1.280	0.0774
30 minute summer	51	19	91.829	0.017	0.5	0.0014	0.0000	OK	21.000	52	0.5	0.448	0.063	0.0115
15 minute winter	52	10	91.667	0.024	3.0	0.0100	0.0000	OK	21.001	54	3.0	2.030	0.125	0.0190
30 minute summer	53	19	90.624	0.012	0.5	0.0009	0.0000	OK	22.000	54	0.5	1.012	0.027	0.0049
15 minute winter	54	11	89.694	0.052	13.6	0.0097	0.0000	OK	16.006	55	13.6	2.674	0.227	0.0406
15 minute winter	55	11	88.797	0.047	13.6	0.0074	0.0000	OK	16.007	58	13.6	1.316	0.211	0.1224
15 minute winter	56	11	87.671	0.021	0.8	0.0025	0.0000	OK	23.000	58	0.8	0.442	0.099	0.0667
15 minute winter	57	11	87.572	0.022	0.8	0.0025	0.0000	OK	24.000	58	0.8	0.439	0.102	0.0445
15 minute winter	58	12	87.490	0.159	16.7	0.0501	0.0000	SURCHARGED	16.008	60	15.9	0.950	0.898	0.1937
15 minute winter	59	11	87.670	0.020	0.8	0.0023	0.0000	OK	25.000	60	0.8	0.491	0.086	0.0714
15 minute winter	60	12	87.380	0.159	18.8	0.0541	0.0000	SURCHARGED	16.009	61	18.0	1.459	1.013	0.1716
30 minute summer	61	18	87.144	0.063	19.8	0.0174	0.0000	OK	16.010	62	19.8	2.982	0.315	0.0530
180 minute winter	62	128	85.336	0.545	17.1	3.8976	0.0000	OK	1.013	63	19.1	0.180	0.012	27.1924
180 minute winter	63	128	85.336	0.599	19.3	4.2793	0.0000	OK	1.014	104	22.4	-0.040	0.014	26.1886
15 minute winter	64	10	90.932	0.057	6.0	0.0816	0.0000	OK	28.000	65	5.9	0.679	0.130	0.1136
15 minute winter	65	10	90.841	0.066	11.4	0.0930	0.0000	OK	28.001	70	11.3	0.713	0.189	0.3527
15 minute winter	66	10	91.475	0.025	1.1	0.0038	0.0000	OK	26.000	67	1.1	0.538	0.135	0.0358
15 minute winter	67	10	91.182	0.035	2.2	0.0089	0.0000	OK	26.001	69	2.1	0.708	0.266	0.0328
15 minute winter	68	10	91.472	0.022	1.1	0.0034	0.0000	OK	27.000	69	1.1	0.460	0.107	0.0428
15 minute winter	69	11	91.008	0.046	4.3	0.0108	0.0000	OK	26.002	70	4.2	1.226	0.403	0.0411
15 minute winter	70	11	90.609	0.124	21.4	0.1757	0.0000	OK	26.003	71	21.3	1.340	0.535	0.4969
15 minute winter	71	11	90.367	0.065	30.1	0.1025	0.0000	OK	26.004	80	30.2	2.106	0.185	0.4916
30 minute summer	72	19	91.468	0.018	0.5	0.0014	0.0000	OK	29.000	73	0.5	0.599	0.064	0.0092
30 minute summer	73	19	91.280	0.015	1.0	0.0032	0.0000	OK	29.001	75	1.0	0.746	0.048	0.0141
15 minute winter	74	10	90.325	0.025	1.1	0.0038	0.0000	OK	30.000	75	1.1	0.588	0.136	0.0201
15 minute winter	75	10	90.147	0.032	4.0	0.0111	0.0000	OK	29.002	77	3.9	0.827	0.216	0.0613
15 minute winter	76	10	89.175	0.025	1.1	0.0038	0.0000	OK	31.000	77	1.1	0.248	0.136	0.0485
15 minute winter	77	11	89.054	0.089	7.5	0.0358	0.0000	OK	29.003	79	7.3	1.331	0.931	0.0481
30 minute summer	78	19	89.165	0.015	0.5	0.0012	0.0000	OK	32.000	79	0.5	0.277	0.047	0.0221
15 minute winter	79	11	88.857	0.044	9.3	0.0131	0.0000	OK	29.004	80	9.4	2.876	0.373	0.0326

15 minute winter	80	11	87.110	0.110	46.0	0.1547	0.0000	OK	26.005	89	46.2	2.183	0.480	0.7621	
15 minute winter	81	11	87.320	0.020	0.8	0.0024	0.0000	OK	33.000	82	0.8	0.430	0.089	0.0304	
30 minute summer	82	18	86.988	0.038	2.4	0.0143	0.0000	OK	33.001	84	2.4	0.618	0.304	0.0426	
15 minute winter	83	11	87.318	0.018	0.8	0.0021	0.0000	OK	34.000	84	0.8	0.283	0.070	0.0473	
15 minute winter	84	11	86.830	0.065	5.6	0.0262	0.0000	OK	33.002	86	5.5	0.767	0.696	0.0989	
15 minute winter	85	10	86.973	0.023	1.4	0.0043	0.0000	OK	35.000	86	1.4	0.280	0.114	0.0504	
15 minute winter	86	12	86.716	0.204	9.9	0.0779	0.0000	SURCHARGED	33.003	88	8.8	1.244	1.120	0.0761	
30 minute summer	87	19	86.963	0.013	0.5	0.0010	0.0000	OK	36.000	88	0.5	0.217	0.034	0.0299	
30 minute summer	88	19	86.370	0.060	9.7	0.0115	0.0000	OK	33.004	89	9.7	2.123	0.553	0.0228	
15 minute winter	89	11	85.901	0.126	58.6	0.1625	0.0000	OK	26.006	104	58.6	2.711	0.519	0.3241	
30 minute summer	90	18	90.834	0.034	1.6	0.0076	0.0000	OK	37.000	91	1.6	0.880	0.213	0.0202	
30 minute summer	91	18	90.654	0.023	2.1	0.0049	0.0000	OK	37.001	93	2.1	1.198	0.114	0.0176	
15 minute winter	92	10	89.926	0.026	1.1	0.0039	0.0000	OK	38.000	93	1.1	0.567	0.142	0.0227	
15 minute winter	93	10	89.748	0.033	4.2	0.0087	0.0000	OK	37.002	95	4.2	1.527	0.228	0.0274	
15 minute winter	94	10	89.026	0.026	1.1	0.0039	0.0000	OK	39.000	95	1.1	0.447	0.142	0.0290	
15 minute winter	95	10	88.858	0.043	7.1	0.0152	0.0000	OK	37.003	97	7.1	1.906	0.385	0.0370	
15 minute winter	96	10	88.126	0.026	1.1	0.0040	0.0000	OK	40.000	97	1.1	0.375	0.148	0.0375	
15 minute winter	97	10	87.967	0.052	10.0	0.0183	0.0000	OK	37.004	99	9.9	1.457	0.537	0.0599	
15 minute winter	98	12	87.298	0.098	1.1	0.0149	0.0000	OK	41.000	99	1.6	0.206	0.214	0.1092	
15 minute winter	99	12	87.287	0.289	12.5	0.0998	0.0000	SURCHARGED	37.005	101	11.3	1.442	1.262	0.0775	
15 minute winter	100	10	86.977	0.027	1.1	0.0041	0.0000	OK	42.000	101	1.1	0.444	0.155	0.0456	
15 minute winter	101	11	86.846	0.115	14.8	0.0512	0.0000	OK	37.006	103	14.8	1.489	0.833	0.0984	
30 minute summer	102	19	86.965	0.015	0.5	0.0013	0.0000	OK	43.000	103	0.5	0.658	0.050	0.0076	
15 minute winter	103	11	86.681	0.050	15.8	0.0103	0.0000	OK	37.007	104	15.8	3.168	0.217	0.0449	
180 minute winter	104	128	85.336	0.646	32.7	4.6588	0.0000	SURCHARGED	1.015	105	30.9	0.820	0.485	0.4529	
180 minute winter	105	128	84.804	0.154	30.9	0.1746	0.0000	OK	1.016	106	30.9	0.921	0.485	0.5042	285.6
180 minute winter	106	128	84.735	0.135	30.9	0.0000	0.0000	OK							

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.43%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	10	90.960	0.085	15.1	0.1472	0.0000	OK	5.000	2	14.9	1.058	0.294	0.5205	
15 minute winter	2	10	90.613	0.088	24.8	0.1346	0.0000	OK	5.001	3	24.4	2.111	0.262	0.1281	
15 minute winter	3	10	90.237	0.062	27.9	0.0786	0.0000	OK	5.002	13	27.8	1.348	0.166	0.2074	
15 minute winter	4	10	90.836	0.036	2.1	0.0081	0.0000	OK	1.000	5	2.1	0.795	0.264	0.0261	
15 minute winter	5	10	90.669	0.038	2.8	0.0081	0.0000	OK	1.001	7	2.7	0.572	0.302	0.0473	
15 minute winter	6	10	90.610	0.035	2.1	0.0079	0.0000	OK	2.000	7	2.1	0.450	0.264	0.0460	
15 minute winter	7	11	90.487	0.081	6.9	0.0263	0.0000	OK	1.002	8	6.8	1.188	0.871	0.0346	
15 minute winter	8	11	90.364	0.059	6.8	0.0093	0.0000	OK	1.003	10	6.8	0.967	0.619	0.1071	
15 minute winter	9	12	90.001	0.051	2.1	0.0116	0.0000	OK	3.000	10	2.1	0.367	0.264	0.0712	
15 minute winter	10	12	89.994	0.246	10.9	0.0785	0.0000	SURCHARGED	1.004	12	9.8	1.247	1.238	0.0782	
15 minute winter	11	11	89.967	0.017	0.7	0.0013	0.0000	OK	4.000	12	0.7	0.206	0.060	0.0431	
15 minute winter	12	13	89.695	0.116	11.2	0.0234	0.0000	SURCHARGED	1.005	13	10.8	1.514	0.970	0.0697	
15 minute winter	13	11	89.325	0.173	39.7	0.2028	0.0000	OK	1.006	24	39.9	1.570	0.994	0.1759	
15 minute winter	14	10	91.819	0.034	1.8	0.0065	0.0000	OK	16.000	15	1.8	0.866	0.226	0.0165	
15 minute winter	15	10	91.677	0.027	3.2	0.0076	0.0000	OK	16.001	17	3.1	0.964	0.163	0.0571	
30 minute summer	16	21	90.689	0.104	1.3	0.0084	0.0000	SURCHARGED	17.000	17	1.2	0.236	0.150	0.0626	
30 minute summer	17	21	90.688	0.238	5.2	0.0658	0.0000	SURCHARGED	16.002	19	4.0	0.702	0.514	0.0939	
15 minute winter	18	10	91.867	0.027	3.5	0.0100	0.0000	OK	18.000	19	3.5	0.923	0.156	0.0571	
15 minute winter	19	13	90.648	0.400	9.1	0.0976	0.0000	SURCHARGED	16.003	49	6.7	0.896	0.855	0.0939	
15 minute winter	20	10	91.288	0.038	2.5	0.0101	0.0000	OK	6.000	22	2.4	0.696	0.312	0.0564	
30 minute summer	21	18	91.275	0.025	1.4	0.0038	0.0000	OK	7.000	23	1.4	0.769	0.134	0.0292	
30 minute summer	22	18	91.035	0.054	3.8	0.0139	0.0000	OK	6.001	23	3.8	1.179	0.482	0.0388	
30 minute summer	23	18	90.811	0.032	6.6	0.0075	0.0000	OK	6.002	24	6.6	3.229	0.194	0.0102	
15 minute winter	24	11	89.212	0.102	49.3	0.1280	0.0000	OK	1.007	25	49.5	2.308	0.415	0.3640	
15 minute winter	25	11	88.362	0.137	55.8	0.1914	0.0000	OK	1.008	35	56.0	2.322	0.612	0.5062	
15 minute winter	26	11	89.020	0.020	0.7	0.0016	0.0000	OK	8.000	27	0.7	0.476	0.089	0.0148	
15 minute winter	27	11	88.860	0.029	1.4	0.0061	0.0000	OK	8.001	29	1.4	0.553	0.178	0.0230	
15 minute winter	28	11	89.017	0.017	0.7	0.0014	0.0000	OK	9.000	29	0.7	0.353	0.064	0.0208	
15 minute winter	29	12	88.723	0.044	4.2	0.0130	0.0000	OK	8.002	30	4.1	0.810	0.391	0.0612	
15 minute winter	30	12	88.672	0.328	7.3	0.1078	0.0000	SURCHARGED	8.003	32	5.9	0.760	0.756	0.0939	
15 minute winter	31	10	89.032	0.032	2.8	0.0094	0.0000	OK	10.000	32	2.8	0.469	0.215	0.0945	
15 minute winter	32	12	88.536	0.394	12.3	0.1442	0.0000	SURCHARGED	8.004	34	11.3	1.442	1.435	0.1007	
30 minute summer	33	18	89.022	0.022	1.4	0.0034	0.0000	OK	11.000	34	1.4	1.085	0.106	0.0296	
120 minute winter	34	92	85.517	0.582	7.1	4.1144	0.0000	OK	8.005	35	2.7	0.104	0.002	11.5208	
120 minute winter	35	92	85.517	0.604	29.4	4.2792	0.0000	OK	1.009	36	23.3	0.356	0.014	7.3349	
120 minute winter	36	92	85.517	0.618	24.4	4.3916	0.0000	OK	1.010	45	16.5	0.307	0.010	20.1021	
15 minute winter	37	11	88.870	0.020	0.7	0.0016	0.0000	OK	12.000	38	0.7	0.573	0.089	0.0134	

15 minute winter	38	11	88.688	0.023	1.4	0.0048	0.0000	OK	12.001	40	1.4	0.569	0.110	0.0253
15 minute winter	39	10	88.488	0.038	2.5	0.0101	0.0000	OK	13.000	40	2.5	0.755	0.312	0.0423
15 minute winter	40	10	88.279	0.048	5.9	0.0152	0.0000	OK	12.002	44	5.9	1.246	0.468	0.0610
15 minute winter	41	10	88.078	0.028	1.8	0.0053	0.0000	OK	15.000	44	1.8	0.484	0.167	0.0445
15 minute winter	42	11	88.070	0.020	0.7	0.0016	0.0000	OK	14.000	43	0.7	0.475	0.089	0.0163
15 minute winter	43	11	87.894	0.029	1.4	0.0061	0.0000	OK	14.001	44	1.4	0.383	0.178	0.0412
15 minute winter	44	10	87.748	0.068	13.2	0.0285	0.0000	OK	12.003	45	13.1	2.492	0.657	0.0262
120 minute winter	45	92	85.517	0.653	23.6	4.6457	0.0000	OK	1.011	46	14.0	0.342	0.009	23.3784
120 minute winter	46	92	85.517	0.692	14.1	4.9127	0.0000	OK	1.012	62	18.2	0.301	0.011	21.4380
15 minute winter	47	10	91.932	0.027	3.5	0.0101	0.0000	OK	19.000	49	3.5	1.101	0.162	0.0716
15 minute winter	48	10	91.866	0.026	3.2	0.0125	0.0000	OK	20.000	50	3.2	1.134	0.143	0.0706
30 minute summer	49	20	90.506	0.460	10.0	0.0883	0.0000	SURCHARGED	16.004	50	8.9	1.135	1.130	0.0861
30 minute summer	50	20	90.221	0.360	12.0	0.0681	0.0000	SURCHARGED	16.005	54	11.6	1.481	1.471	0.0775
15 minute winter	51	11	91.832	0.020	0.7	0.0016	0.0000	OK	21.000	52	0.7	0.490	0.089	0.0146
15 minute winter	52	10	91.671	0.028	3.9	0.0115	0.0000	OK	21.001	54	3.9	2.187	0.163	0.0230
15 minute winter	53	11	90.626	0.014	0.7	0.0011	0.0000	OK	22.000	54	0.7	1.120	0.038	0.0063
15 minute winter	54	11	89.700	0.058	16.3	0.0108	0.0000	OK	16.006	55	16.3	2.798	0.272	0.0465
15 minute winter	55	11	88.801	0.051	16.3	0.0082	0.0000	OK	16.007	58	16.2	1.336	0.252	0.1261
15 minute winter	56	10	87.675	0.025	1.1	0.0029	0.0000	OK	23.000	58	1.1	0.450	0.131	0.0698
30 minute summer	57	20	87.634	0.084	1.0	0.0098	0.0000	OK	24.000	58	1.4	0.428	0.180	0.0742
15 minute winter	58	12	87.633	0.302	19.7	0.0953	0.0000	SURCHARGED	16.008	60	18.7	1.062	1.053	0.1937
15 minute winter	59	10	87.673	0.023	1.1	0.0027	0.0000	OK	25.000	60	1.1	0.486	0.114	0.0734
15 minute winter	60	12	87.474	0.253	21.8	0.0862	0.0000	SURCHARGED	16.009	61	21.5	1.455	1.209	0.1787
15 minute winter	61	12	87.150	0.069	23.2	0.0191	0.0000	OK	16.010	62	23.1	3.096	0.369	0.0598
120 minute winter	62	92	85.517	0.726	19.5	5.1946	0.0000	OK	1.013	63	23.4	0.201	0.014	36.2377
120 minute winter	63	92	85.518	0.781	23.4	5.5760	0.0000	OK	1.014	104	28.3	-0.113	0.017	33.4358
15 minute winter	64	10	90.940	0.065	7.7	0.0936	0.0000	OK	28.000	65	7.6	0.725	0.167	0.1366
15 minute winter	65	10	90.850	0.075	14.6	0.1057	0.0000	OK	28.001	70	14.4	0.757	0.241	0.4213
30 minute summer	66	18	91.479	0.029	1.4	0.0044	0.0000	OK	26.000	67	1.4	0.576	0.178	0.0439
30 minute summer	67	18	91.188	0.041	2.8	0.0104	0.0000	OK	26.001	69	2.8	0.755	0.354	0.0406
30 minute summer	68	18	91.475	0.025	1.4	0.0039	0.0000	OK	27.000	69	1.4	0.490	0.140	0.0531
30 minute summer	69	18	91.016	0.054	5.6	0.0128	0.0000	OK	26.002	70	5.5	1.307	0.530	0.0507
30 minute summer	70	18	90.629	0.144	27.3	0.2040	0.0000	OK	26.003	71	27.1	1.420	0.680	0.5934
15 minute winter	71	11	90.376	0.074	38.6	0.1166	0.0000	OK	26.004	80	38.7	2.234	0.237	0.5920
15 minute winter	72	11	91.471	0.021	0.7	0.0017	0.0000	OK	29.000	73	0.7	0.661	0.089	0.0117
15 minute winter	73	11	91.283	0.018	1.4	0.0038	0.0000	OK	29.001	75	1.4	0.823	0.068	0.0177
30 minute summer	74	18	90.329	0.029	1.4	0.0044	0.0000	OK	30.000	75	1.4	0.631	0.178	0.0245
15 minute winter	75	10	90.152	0.037	5.3	0.0129	0.0000	OK	29.002	77	5.2	0.849	0.287	0.0679
30 minute summer	76	18	89.179	0.029	1.4	0.0044	0.0000	OK	31.000	77	1.4	0.245	0.178	0.0532
30 minute summer	77	19	89.161	0.196	9.7	0.0792	0.0000	SURCHARGED	29.003	79	8.9	1.330	1.136	0.0529
15 minute winter	78	11	89.167	0.017	0.7	0.0014	0.0000	OK	32.000	79	0.7	0.312	0.066	0.0268
15 minute winter	79	11	88.863	0.050	11.6	0.0148	0.0000	OK	29.004	80	11.6	3.026	0.461	0.0382

15 minute winter	80	11	87.128	0.128	58.6	0.1799	0.0000	OK	26.005	89	58.8	2.297	0.611	0.9213	
15 minute winter	81	10	87.323	0.023	1.1	0.0027	0.0000	OK	33.000	82	1.1	0.464	0.119	0.0380	
15 minute winter	82	12	86.997	0.046	3.2	0.0175	0.0000	OK	33.001	84	3.1	0.629	0.394	0.0626	
15 minute winter	83	10	87.321	0.021	1.1	0.0024	0.0000	OK	34.000	84	1.1	0.283	0.093	0.0675	
15 minute winter	84	12	86.983	0.218	7.4	0.0882	0.0000	SURCHARGED	33.002	86	5.8	0.786	0.740	0.1174	
15 minute winter	85	10	86.976	0.026	1.8	0.0049	0.0000	OK	35.000	86	1.8	0.314	0.147	0.0519	
15 minute winter	86	12	86.824	0.312	11.0	0.1193	0.0000	SURCHARGED	33.003	88	10.2	1.391	1.299	0.0806	
15 minute winter	87	11	86.965	0.015	0.7	0.0012	0.0000	OK	36.000	88	0.7	0.257	0.048	0.0346	
15 minute winter	88	12	86.377	0.067	11.4	0.0130	0.0000	OK	33.004	89	11.5	2.193	0.656	0.0261	
15 minute winter	89	11	85.923	0.148	73.7	0.1907	0.0000	OK	26.006	104	73.6	2.837	0.652	0.3891	
15 minute winter	90	10	90.839	0.039	2.1	0.0088	0.0000	OK	37.000	91	2.1	0.941	0.276	0.0244	
15 minute winter	91	10	90.657	0.026	2.8	0.0056	0.0000	OK	37.001	93	2.8	1.285	0.149	0.0216	
30 minute summer	92	18	89.929	0.029	1.4	0.0045	0.0000	OK	38.000	93	1.4	0.610	0.186	0.0276	
30 minute summer	93	18	89.753	0.038	5.5	0.0101	0.0000	OK	37.002	95	5.5	1.650	0.300	0.0334	
30 minute summer	94	18	89.029	0.029	1.4	0.0045	0.0000	OK	39.000	95	1.4	0.480	0.186	0.0353	
30 minute summer	95	18	88.866	0.051	9.3	0.0177	0.0000	OK	37.003	97	9.3	1.958	0.507	0.0505	
30 minute summer	96	18	88.130	0.030	1.4	0.0046	0.0000	OK	40.000	97	1.4	0.380	0.194	0.0529	
30 minute summer	97	19	87.990	0.075	13.1	0.0263	0.0000	OK	37.004	99	12.8	1.706	0.692	0.0707	
30 minute summer	98	20	87.521	0.321	2.7	0.0491	0.0000	FLOOD RISK	41.000	99	2.9	0.413	0.401	0.1095	
30 minute summer	99	20	87.512	0.514	15.2	0.1772	0.0000	FLOOD RISK	37.005	101	14.0	1.793	1.569	0.0775	
30 minute summer	100	18	86.981	0.031	1.4	0.0047	0.0000	OK	42.000	101	1.4	0.454	0.203	0.0607	
30 minute summer	101	19	86.872	0.141	18.5	0.0626	0.0000	OK	37.006	103	18.4	1.517	1.036	0.1165	
15 minute winter	102	11	86.968	0.018	0.7	0.0015	0.0000	OK	43.000	103	0.7	0.724	0.070	0.0097	
30 minute summer	103	19	86.688	0.057	19.6	0.0117	0.0000	OK	37.007	104	19.6	3.348	0.270	0.0768	
120 minute winter	104	92	85.518	0.828	48.4	5.9682	0.0000	SURCHARGED	1.015	105	31.9	0.826	0.500	0.4633	
120 minute winter	105	108	84.807	0.157	31.9	0.1777	0.0000	OK	1.016	106	31.9	0.929	0.500	0.5150	319.6
120 minute winter	106	108	84.737	0.137	31.9	0.0000	0.0000	OK							

Results for 100 year +30% Critical Storm Duration. Lowest mass balance: 99.43%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	10	90.974	0.099	19.7	0.1709	0.0000	OK	5.000	2	19.4	1.126	0.383	0.6367	
15 minute winter	2	10	90.628	0.103	32.2	0.1570	0.0000	OK	5.001	3	31.7	2.248	0.341	0.1561	
15 minute winter	3	10	90.246	0.071	36.3	0.0900	0.0000	OK	5.002	13	36.2	1.459	0.216	0.2403	
15 minute winter	4	10	90.841	0.041	2.7	0.0094	0.0000	OK	1.000	5	2.7	0.848	0.340	0.0316	
15 minute winter	5	10	90.674	0.043	3.6	0.0093	0.0000	OK	1.001	7	3.6	0.586	0.390	0.0554	
15 minute winter	6	10	90.615	0.040	2.7	0.0091	0.0000	OK	2.000	7	2.7	0.464	0.340	0.0538	
15 minute winter	7	12	90.552	0.146	8.9	0.0476	0.0000	SURCHARGED	1.002	8	8.7	1.195	1.103	0.0469	
15 minute winter	8	13	90.431	0.126	8.7	0.0200	0.0000	SURCHARGED	1.003	10	8.0	1.048	0.727	0.1330	
30 minute winter	9	21	90.175	0.225	2.4	0.0508	0.0000	SURCHARGED	3.000	10	2.7	0.366	0.346	0.0939	
30 minute winter	10	21	90.163	0.415	11.4	0.1325	0.0000	SURCHARGED	1.004	12	10.6	1.350	1.341	0.0782	
15 minute winter	11	11	89.969	0.019	0.9	0.0015	0.0000	OK	4.000	12	0.9	0.263	0.077	0.0442	
30 minute winter	12	21	89.786	0.207	12.0	0.0419	0.0000	SURCHARGED	1.005	13	11.8	1.512	1.059	0.0704	
15 minute winter	13	11	89.353	0.201	48.7	0.2362	0.0000	OK	1.006	24	48.9	1.631	1.217	0.2038	
15 minute winter	14	10	91.824	0.039	2.3	0.0075	0.0000	OK	16.000	15	2.3	0.925	0.289	0.0198	
15 minute winter	15	10	91.681	0.031	4.1	0.0086	0.0000	OK	16.001	17	4.1	0.992	0.210	0.0595	
30 minute winter	16	22	90.996	0.411	1.9	0.0333	0.0000	FLOOD RISK	17.000	17	1.5	0.236	0.195	0.0626	
30 minute winter	17	22	90.995	0.545	5.6	0.1504	0.0000	FLOOD RISK	16.002	19	4.2	0.712	0.532	0.0939	
15 minute winter	18	10	91.871	0.031	4.6	0.0115	0.0000	OK	18.000	19	4.6	1.084	0.206	0.0593	
30 minute winter	19	22	90.944	0.696	8.7	0.1697	0.0000	FLOOD RISK	16.003	49	7.2	0.924	0.919	0.0939	
15 minute winter	20	10	91.294	0.044	3.2	0.0116	0.0000	OK	6.000	22	3.2	0.737	0.401	0.0683	
30 minute summer	21	18	91.278	0.028	1.8	0.0043	0.0000	OK	7.000	23	1.8	0.821	0.173	0.0352	
30 minute summer	22	18	91.045	0.064	4.9	0.0163	0.0000	OK	6.001	23	4.9	1.246	0.622	0.0470	
30 minute summer	23	18	90.816	0.037	8.5	0.0087	0.0000	OK	6.002	24	8.5	3.445	0.249	0.0123	
15 minute winter	24	11	89.227	0.117	61.1	0.1459	0.0000	OK	1.007	25	61.2	2.382	0.513	0.4350	
15 minute winter	25	11	88.386	0.161	69.4	0.2252	0.0000	OK	1.008	35	69.8	2.419	0.762	0.6053	
15 minute winter	26	11	89.023	0.023	0.9	0.0019	0.0000	OK	8.000	27	0.9	0.511	0.114	0.0309	
15 minute winter	27	13	88.894	0.063	1.8	0.0136	0.0000	OK	8.001	29	1.8	0.569	0.228	0.0586	
15 minute winter	28	11	89.020	0.020	0.9	0.0016	0.0000	OK	9.000	29	0.9	0.374	0.083	0.0445	
15 minute winter	29	13	88.890	0.211	5.4	0.0628	0.0000	SURCHARGED	8.002	30	4.8	0.787	0.452	0.0861	
15 minute winter	30	12	88.851	0.507	8.7	0.1667	0.0000	SURCHARGED	8.003	32	6.9	0.877	0.873	0.0939	
15 minute winter	31	10	89.036	0.036	3.7	0.0109	0.0000	OK	10.000	32	3.7	0.594	0.282	0.0988	
15 minute winter	32	12	88.711	0.569	14.7	0.2082	0.0000	SURCHARGED	8.004	34	13.0	1.668	1.659	0.1007	
30 minute summer	33	18	89.025	0.025	1.8	0.0039	0.0000	OK	11.000	34	1.8	1.165	0.136	0.0355	
180 minute winter	34	140	86.487	1.552	7.6	10.9689	0.0000	SURCHARGED	8.005	35	3.5	0.103	0.002	16.4781	
180 minute winter	35	140	86.487	1.574	29.7	11.1465	0.0000	SURCHARGED	1.009	36	22.9	0.348	0.014	10.1404	
180 minute winter	36	140	86.487	1.588	24.0	11.2790	0.0000	SURCHARGED	1.010	45	17.1	0.306	0.011	26.6185	
15 minute winter	37	11	88.873	0.023	0.9	0.0019	0.0000	OK	12.000	38	0.9	0.617	0.115	0.0161	

15 minute winter	38	11	88.691	0.026	1.8	0.0054	0.0000	OK	12.001	40	1.8	0.601	0.142	0.0305
15 minute winter	39	10	88.494	0.044	3.2	0.0116	0.0000	OK	13.000	40	3.2	0.803	0.401	0.0511
15 minute winter	40	10	88.287	0.056	7.6	0.0177	0.0000	OK	12.002	44	7.6	1.276	0.604	0.0760
15 minute winter	41	10	88.081	0.031	2.3	0.0060	0.0000	OK	15.000	44	2.3	0.500	0.214	0.0556
15 minute winter	42	11	88.073	0.023	0.9	0.0019	0.0000	OK	14.000	43	0.9	0.510	0.115	0.0196
15 minute winter	43	11	87.898	0.033	1.8	0.0069	0.0000	OK	14.001	44	1.8	0.375	0.229	0.0516
15 minute winter	44	11	87.766	0.086	17.1	0.0362	0.0000	OK	12.003	45	16.9	2.557	0.850	0.0328
180 minute winter	45	140	86.487	1.623	22.4	11.5422	0.0000	SURCHARGED	1.011	46	29.8	0.333	0.018	29.1536
180 minute winter	46	140	86.487	1.662	29.8	11.7897	0.0000	SURCHARGED	1.012	62	24.5	0.285	0.015	25.3510
15 minute winter	47	10	91.936	0.031	4.6	0.0117	0.0000	OK	19.000	49	4.6	1.050	0.213	0.0745
15 minute winter	48	10	91.869	0.029	4.1	0.0142	0.0000	OK	20.000	50	4.1	1.086	0.184	0.0729
30 minute winter	49	22	90.745	0.699	10.9	0.1342	0.0000	SURCHARGED	16.004	50	10.3	1.313	1.307	0.0861
30 minute winter	50	21	90.365	0.504	13.8	0.0953	0.0000	SURCHARGED	16.005	54	13.4	1.709	1.698	0.0775
15 minute winter	51	11	91.835	0.023	0.9	0.0019	0.0000	OK	21.000	52	0.9	0.523	0.114	0.0175
15 minute winter	52	10	91.675	0.032	5.0	0.0131	0.0000	OK	21.001	54	5.0	2.343	0.210	0.0276
15 minute winter	53	11	90.627	0.015	0.9	0.0012	0.0000	OK	22.000	54	0.9	1.207	0.049	0.0075
15 minute winter	54	11	89.706	0.064	19.3	0.0119	0.0000	OK	16.006	55	19.3	2.916	0.322	0.0529
15 minute winter	55	11	88.806	0.056	19.3	0.0089	0.0000	OK	16.007	58	19.2	1.381	0.299	0.1299
30 minute summer	56	20	87.796	0.146	1.5	0.0171	0.0000	SURCHARGED	23.000	58	1.8	0.436	0.219	0.1174
30 minute summer	57	20	87.794	0.244	2.9	0.0286	0.0000	SURCHARGED	24.000	58	1.7	0.437	0.219	0.0782
30 minute summer	58	20	87.791	0.460	22.1	0.1450	0.0000	SURCHARGED	16.008	60	21.5	1.224	1.213	0.1937
15 minute winter	59	10	87.676	0.026	1.4	0.0030	0.0000	OK	25.000	60	1.4	0.525	0.147	0.0755
30 minute summer	60	20	87.579	0.358	25.2	0.1222	0.0000	SURCHARGED	16.009	61	25.0	1.648	1.408	0.1858
30 minute summer	61	20	87.157	0.076	26.9	0.0210	0.0000	OK	16.010	62	26.9	3.205	0.429	0.0672
180 minute winter	62	140	86.487	1.696	24.5	12.1258	0.0000	SURCHARGED	1.013	63	27.4	0.205	0.017	40.5615
180 minute winter	63	140	86.487	1.750	27.4	12.4996	0.0000	SURCHARGED	1.014	104	29.9	-0.091	0.018	35.4913
15 minute winter	64	10	90.951	0.076	10.1	0.1091	0.0000	OK	28.000	65	10.0	0.775	0.219	0.1674
15 minute winter	65	10	90.861	0.086	19.2	0.1220	0.0000	OK	28.001	70	18.9	0.804	0.317	0.5122
30 minute summer	66	18	91.483	0.033	1.8	0.0050	0.0000	OK	26.000	67	1.8	0.612	0.229	0.0531
30 minute summer	67	18	91.195	0.048	3.6	0.0121	0.0000	OK	26.001	69	3.6	0.795	0.457	0.0496
30 minute summer	68	18	91.479	0.029	1.8	0.0044	0.0000	OK	27.000	69	1.8	0.514	0.180	0.0647
30 minute summer	69	18	91.026	0.064	7.2	0.0152	0.0000	OK	26.002	70	7.1	1.381	0.685	0.0619
15 minute winter	70	11	90.658	0.173	35.9	0.2444	0.0000	OK	26.003	71	35.6	1.508	0.894	0.7225
15 minute winter	71	11	90.388	0.086	50.3	0.1342	0.0000	OK	26.004	80	50.5	2.367	0.310	0.7233
15 minute winter	72	11	91.474	0.024	0.9	0.0019	0.0000	OK	29.000	73	0.9	0.710	0.115	0.0140
15 minute winter	73	11	91.285	0.020	1.8	0.0043	0.0000	OK	29.001	75	1.8	0.877	0.087	0.0213
30 minute summer	74	18	90.333	0.033	1.8	0.0050	0.0000	OK	30.000	75	1.8	0.675	0.229	0.0294
15 minute winter	75	10	90.157	0.042	6.8	0.0148	0.0000	OK	29.002	77	6.7	1.051	0.370	0.0713
15 minute winter	76	12	89.290	0.140	2.1	0.0214	0.0000	SURCHARGED	31.000	77	2.4	0.369	0.302	0.0861
30 minute summer	77	19	89.282	0.317	11.7	0.1279	0.0000	SURCHARGED	29.003	79	10.8	1.542	1.367	0.0559
15 minute winter	78	11	89.170	0.020	0.9	0.0016	0.0000	OK	32.000	79	0.9	0.342	0.085	0.0314
15 minute winter	79	11	88.870	0.057	14.1	0.0168	0.0000	OK	29.004	80	14.0	3.160	0.558	0.0443

15 minute winter	80	11	87.153	0.153	75.3	0.2141	0.0000	OK	26.005	89	75.6	2.392	0.785	1.1348	
15 minute winter	81	10	87.326	0.026	1.4	0.0031	0.0000	OK	33.000	82	1.4	0.480	0.153	0.0755	
15 minute winter	82	13	87.180	0.230	4.1	0.0868	0.0000	SURCHARGED	33.001	84	3.6	0.639	0.462	0.0861	
15 minute winter	83	10	87.323	0.023	1.4	0.0027	0.0000	OK	34.000	84	1.4	0.301	0.120	0.0691	
30 minute summer	84	20	87.154	0.389	8.3	0.1571	0.0000	SURCHARGED	33.002	86	6.6	0.844	0.839	0.1174	
15 minute winter	85	10	86.979	0.029	2.3	0.0056	0.0000	OK	35.000	86	2.3	0.392	0.188	0.0536	
15 minute winter	86	12	86.961	0.449	12.8	0.1714	0.0000	SURCHARGED	33.003	88	11.8	1.554	1.501	0.0854	
15 minute winter	87	11	86.967	0.017	0.9	0.0014	0.0000	OK	36.000	88	0.9	0.280	0.061	0.0398	
180 minute winter	88	136	86.501	0.191	6.6	0.0368	0.0000	SURCHARGED	33.004	89	6.6	1.953	0.378	0.0391	
180 minute winter	89	136	86.494	0.719	36.0	0.9234	0.0000	SURCHARGED	26.006	104	36.0	2.150	0.319	0.5966	
15 minute winter	90	10	90.845	0.045	2.7	0.0101	0.0000	OK	37.000	91	2.7	1.007	0.356	0.0294	
15 minute winter	91	10	90.661	0.030	3.6	0.0064	0.0000	OK	37.001	93	3.6	1.375	0.193	0.0261	
30 minute summer	92	18	89.933	0.033	1.8	0.0051	0.0000	OK	38.000	93	1.8	0.652	0.239	0.0332	
30 minute summer	93	18	89.758	0.043	7.1	0.0116	0.0000	OK	37.002	95	7.1	1.743	0.388	0.0409	
30 minute summer	94	18	89.033	0.033	1.8	0.0051	0.0000	OK	39.000	95	1.8	0.507	0.239	0.0433	
15 minute winter	95	11	88.875	0.060	12.1	0.0211	0.0000	OK	37.003	97	12.0	1.982	0.654	0.0638	
30 minute summer	96	20	88.297	0.197	2.4	0.0301	0.0000	SURCHARGED	40.000	97	2.7	0.389	0.370	0.1017	
30 minute summer	97	20	88.293	0.378	16.4	0.1322	0.0000	SURCHARGED	37.004	99	13.4	1.802	0.725	0.0782	
30 minute summer	98	21	87.748	0.548	3.7	0.0839	0.0000	FLOOD RISK	41.000	99	3.7	0.467	0.503	0.1095	
30 minute summer	99	20	87.740	0.742	16.2	0.2561	0.0000	FLOOD RISK	37.005	101	15.6	1.990	1.742	0.0782	
30 minute summer	100	18	86.985	0.035	1.8	0.0053	0.0000	OK	42.000	101	1.8	0.455	0.261	0.0666	
30 minute summer	101	19	86.939	0.208	21.0	0.0927	0.0000	SURCHARGED	37.006	103	20.8	1.541	1.174	0.1221	
15 minute winter	102	11	86.971	0.021	0.9	0.0017	0.0000	OK	43.000	103	0.9	0.779	0.090	0.0116	
30 minute summer	103	19	86.693	0.062	22.5	0.0126	0.0000	OK	37.007	104	22.5	3.462	0.309	0.1038	
180 minute winter	104	140	86.487	1.797	48.7	12.9575	0.0000	FLOOD RISK	1.015	105	31.9	0.826	0.500	0.4633	
120 minute winter	105	166	84.807	0.157	31.9	0.1777	0.0000	OK	1.016	106	31.9	0.929	0.500	0.5150	406.6
120 minute winter	106	166	84.737	0.137	31.9	0.0000	0.0000	OK							