

PROJECT	WAREHOUSE 1 REMOTE ROOF AND RACK	JOB NUMBER	1
CLIENT	Velari Technologies	REVISION	1
ADDRESS	1 Main street, Durban, KZN	PREPARED BY	Michael
DRAWING NUMBER	1	CHECKED BY	Michael

Source duty – Node 100	6652 L/min @ 237.249 kPa
Node 2380 DELUGE 1	3415 L/min @ 217.370 kPa
Node 130 ROOF ICV	3237 L/min @ 218.219 kPa
Node 2330 RACK ICV	0 L/min @ 223.213 kPa

Design Parameters

Report type	Roof remote + Deluge valve 2370 → 2380	Design density	11.5 mm/min
Assumed max area (AMAO)	260.000 m²	Actual area of operation	360.755 m²
Min sprinkler pressure	68.063 kPa	Min pressure area basis	8.250 m²
Total operating sprinklers	46	Largest sprinkler area	8.400 m²
Roof sprinklers operating	30	Rack sprinklers operating	0
Deluge nozzles operating	16	Hydrants/hose reels operating	0
Highest sprinkler elevation	8932 mm	Controlling sprinkler demand	95 L/min @ 68.063 kPa
Notes	Sample project with roof, rack, Deluge and hydrant systems		

Hydraulically Significant Nodes

Node	Flow downstream (L/min)	Required pressure (kPa)
100	6652	237.249
110	6652	233.856
120	3237	224.426
130	3237	218.219
140	3237	212.118
150	3237	161.968
160	3237	159.567
170	3237	136.581
180	3237	135.281
190	3237	132.486
200	3237	129.691
210	3237	126.896
220	3237	124.102
230	3237	121.307
240	2372	119.735
250	1185	119.299
990	865	114.511
1000	522	110.797
1010	522	108.001
1020	405	102.292
1030	298	86.962
1040	196	79.383
1050	98	72.228
1060	0	72.398
1070	344	113.648
1080	344	112.788
1090	228	101.788
1100	114	98.635
1110	0	97.663
1120	1187	111.047
1130	623	106.054

Node	Flow downstream (L/min)	Required pressure (kPa)
1140	507	101.532
1150	394	96.294
1160	290	81.927
1170	190	74.916
1180	95	68.297
1190	0	68.638
1200	446	106.504
1210	329	102.941
1220	218	93.073
1230	109	90.440
1240	0	89.827
1250	1185	110.626
1260	621	105.647
1270	506	101.146
1280	393	95.936
1290	289	81.627
1300	190	74.650
1310	95	68.063
1320	0	68.414
1330	445	106.103
1340	329	102.563
1350	218	92.739
1360	109	90.126
1370	0	89.527
2290	3415	233.023
2300	3415	232.541
2370	3415	222.642
2380	3415	217.370
2390	3415	207.397
2400	3415	184.539
2410	3415	174.578
2420	3415	173.993

Node	Flow downstream (L/min)	Required pressure (kPa)
2430	1707	169.387
2440	1707	169.387
2450	1707	160.336
2460	1276	154.916
2470	851	152.353
2480	430	151.736
2490	216	152.464
2500	0	156.595
2510	212	146.087
2520	0	150.424
2530	214	148.487
2540	0	152.746
2550	217	153.560
2560	0	157.655
2570	1707	160.336
2580	1276	154.916
2590	851	152.353
2600	430	151.736
2610	216	152.464
2620	0	156.595
2630	212	146.087
2640	0	150.424
2650	214	148.487
2660	0	152.746
2670	217	153.560
2680	0	157.655

Hydraulically Significant Sprinklers

Line	Node	Head	K	Area (m ²)	Flow out (L/min)	Pressure (kPa)	Density (mm/min)	Status
87	1020	Roof	11.50	7.500	116	102.292	15.5	OK
88	1030	Roof	11.50	7.875	107	86.962	13.6	OK
89	1040	Roof	11.50	8.100	102	79.383	12.6	OK

Line	Node	Head	K	Area (m²)	Flow out (L/min)	Pressure (kPa)	Density (mm/min)	Status
90	1050	Roof	11.50	8.100	98	72.228	12.1	OK
91	1060	Roof	11.50	7.950	98	72.398	12.3	OK
94	1090	Roof	11.50	8.100	116	101.788	14.3	OK
95	1100	Roof	11.50	8.250	114	98.635	13.8	OK
96	1110	Roof	11.50	8.100	114	97.663	14.0	OK
99	1140	Roof	11.50	7.650	116	101.532	15.1	OK
100	1150	Roof	11.50	7.500	113	96.294	15.0	OK
101	1160	Roof	11.50	7.875	104	81.927	13.2	OK
102	1170	Roof	11.50	8.100	100	74.916	12.3	OK
103	1180	Roof	11.50	8.100	95	68.297	11.7	OK
104	1190	Roof	11.50	7.950	95	68.638	12.0	OK
105	1200	Roof	11.50	7.800	119	106.504	15.2	OK
106	1210	Roof	11.50	7.875	117	102.941	14.8	OK
107	1220	Roof	11.50	8.100	111	93.073	13.7	OK
108	1230	Roof	11.50	8.250	109	90.440	13.3	OK
109	1240	Roof	11.50	8.100	109	89.827	13.5	OK
112	1270	Roof	11.50	7.140	116	101.146	16.2	OK
113	1280	Roof	11.50	7.000	113	95.936	16.1	OK
114	1290	Roof	11.50	7.350	104	81.627	14.1	OK
115	1300	Roof	11.50	7.560	99	74.650	13.1	OK
116	1310	Roof	11.50	7.560	95	68.063	12.5	OK
117	1320	Roof	11.50	7.420	95	68.414	12.8	OK
118	1330	Roof	11.50	7.280	118	106.103	16.3	OK
119	1340	Roof	11.50	7.350	116	102.563	15.8	OK
120	1350	Roof	11.50	7.560	111	92.739	14.6	OK
121	1360	Roof	11.50	7.700	109	90.126	14.2	OK
122	1370	Roof	11.50	7.560	109	89.527	14.4	OK
435	2490	Deluge	17.30	8.000	214	152.464	26.7	OK
436	2500	Deluge	17.30	8.000	216	156.595	27.1	OK
437	2510	Deluge	17.30	8.000	209	146.087	26.1	OK
438	2520	Deluge	17.30	8.000	212	150.424	26.5	OK
439	2530	Deluge	17.30	8.000	211	148.487	26.3	OK

Pipe	Start	End	Dir	Plan mm	Slope	Actual mm	Equiv mm	Nom	ID mm	Frictio n kPa	Static kPa	Flow L/min	Press kPa
11	200	210	W	3000	0.00	3000	4862	150	155,20	2.795	0.000	3237	126.896
Heavy steel – BS3601/ISO4200 – Grooved tee													
12	210	220	W	3000	0.00	3000	4862	150	155,20	2.795	0.000	3237	124.102
Heavy steel – BS3601/ISO4200 – Grooved tee													
13	220	230	W	3000	0.00	3000	4862	150	155,20	2.795	0.000	3237	121.307
Heavy steel – BS3601/ISO4200 – Grooved tee													
14	230	240	W	3000	0.00	3000	4862	150	155,20	1.572	0.000	2372	119.735
Heavy steel – BS3601/ISO4200 – Grooved tee													
15	240	250	W	3000	0.00	3000	4862	150	155,20	0.435	0.000	1185	119.299
Heavy steel – BS3601/ISO4200 – Grooved tee													
16	230	990	U	450	0.00	375	1981	80	80,80	2.381	4.415	865	114.511
Heavy steel – BS3601/ISO4200 – Grooved tee													
17	990	1000	N	300	8.00	263	899	50	53,00	3.300	0.414	522	110.797
Heavy steel – BS3601/ISO4200 – Grooved coupling													
18	1000	1010	N	1200	-8.00	1212	1212	50	53,00	4.451	-1.654	522	108.001
Heavy steel – BS3601/ISO4200 – Grooved coupling													
19	1010	1020	N	2450	-8.00	2474	2474	50	53,00	9.087	-3.378	522	102.292
Heavy steel – BS3601/ISO4200 – Grooved coupling													
20	1020	1030	N	2550	-8.00	2575	2575	40	41,80	18.846	-3.516	405	86.962
Heavy steel – BS3601/ISO4200 – Threaded coupling													
21	1030	1040	N	2700	-8.00	2727	2727	40	41,80	11.302	-3.723	298	79.383
Heavy steel – BS3601/ISO4200 – Threaded coupling													
22	1040	1050	N	2700	-8.00	2727	2727	32	35,90	10.878	-3.723	196	72.228
Heavy steel – BS3601/ISO4200 – Threaded coupling													
23	1050	1060	N	2700	-8.00	2727	3207	32	35,90	3.552	-3.723	98	72.398
Heavy steel – BS3601/ISO4200 – Threaded short elbow													
24	990	1070	S	1150	-8.00	1121	1441	50	53,00	2.449	-1.586	344	113.648
Heavy steel – BS3601/ISO4200 – Threaded coupling													
25	1070	1080	S	2550	-8.00	2575	2575	50	53,00	4.376	-3.516	344	112.788
Heavy steel – BS3601/ISO4200 – Threaded coupling													
26	1080	1090	S	2700	-8.00	2727	2727	40	41,80	14.722	-3.723	344	101.788
Heavy steel – BS3601/ISO4200 – Threaded coupling													
27	1090	1100	S	2700	-8.00	2727	2727	40	41,80	6.876	-3.723	228	98.635
Heavy steel – BS3601/ISO4200 – Threaded coupling													
28	1100	1110	S	2800	-8.00	2828	3308	32	35,90	4.833	-3.860	114	97.663
Heavy steel – BS3601/ISO4200 – Threaded short elbow													
29	240	1120	U	450	0.00	375	1981	80	80,80	4.273	4.415	1187	111.047
Heavy steel – BS3601/ISO4200 – Grooved tee													

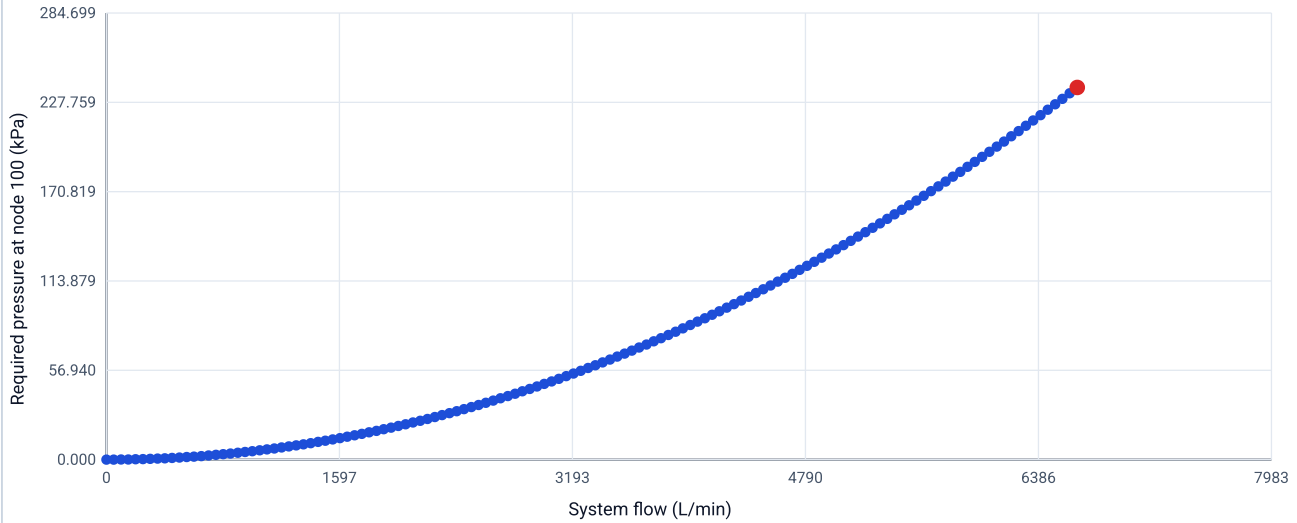
Pipe	Start	End	Dir	Plan mm	Slope	Actual mm	Equiv mm	Nom	ID mm	Friction kPa	Static kPa	Flow L/min	Pressure kPa
30	1120	1130	N	300	8.00	263	899	50	53,00	4.580	0.414	623	106.054
Heavy steel – BS3601/ISO4200 – Grooved coupling													
31	1130	1140	N	1200	-8.00	1212	1212	50	53,00	6.176	-1.654	623	101.532
Heavy steel – BS3601/ISO4200 – Grooved coupling													
32	1140	1150	N	2450	-8.00	2474	2474	50	53,00	8.616	-3.378	507	96.294
Heavy steel – BS3601/ISO4200 – Grooved coupling													
33	1150	1160	N	2550	-8.00	2575	2575	40	41,80	17.883	-3.516	394	81.927
Heavy steel – BS3601/ISO4200 – Threaded coupling													
34	1160	1170	N	2700	-8.00	2727	2727	40	41,80	10.734	-3.723	290	74.916
Heavy steel – BS3601/ISO4200 – Threaded coupling													
35	1170	1180	N	2700	-8.00	2727	2727	32	35,90	10.342	-3.723	190	68.297
Heavy steel – BS3601/ISO4200 – Threaded coupling													
36	1180	1190	N	2700	-8.00	2727	3207	32	35,90	3.381	-3.723	95	68.638
Heavy steel – BS3601/ISO4200 – Threaded short elbow													
37	1120	1200	S	1150	-8.00	1121	1441	50	53,00	6.128	-1.586	565	106.504
Heavy steel – BS3601/ISO4200 – Threaded coupling													
38	1200	1210	S	2550	-8.00	2575	2575	50	53,00	7.079	-3.516	446	102.941
Heavy steel – BS3601/ISO4200 – Threaded coupling													
39	1210	1220	S	2700	-8.00	2727	2727	40	41,80	13.590	-3.723	329	93.073
Heavy steel – BS3601/ISO4200 – Threaded coupling													
40	1220	1230	S	2700	-8.00	2727	2727	40	41,80	6.356	-3.723	218	90.440
Heavy steel – BS3601/ISO4200 – Threaded coupling													
41	1230	1240	S	2800	-8.00	2828	3308	32	35,90	4.473	-3.860	109	89.827
Heavy steel – BS3601/ISO4200 – Threaded short elbow													
42	250	1250	U	450	0.00	375	1981	80	80,80	4.259	4.415	1185	110.626
Heavy steel – BS3601/ISO4200 – Grooved tee													
43	1250	1260	N	300	8.00	263	899	50	53,00	4.564	0.414	621	105.647
Heavy steel – BS3601/ISO4200 – Grooved coupling													
44	1260	1270	N	1200	-8.00	1212	1212	50	53,00	6.156	-1.654	621	101.146
Heavy steel – BS3601/ISO4200 – Grooved coupling													
45	1270	1280	N	2450	-8.00	2474	2474	50	53,00	8.588	-3.378	506	95.936
Heavy steel – BS3601/ISO4200 – Grooved coupling													
46	1280	1290	N	2550	-8.00	2575	2575	40	41,80	17.825	-3.516	393	81.627
Heavy steel – BS3601/ISO4200 – Threaded coupling													
47	1290	1300	N	2700	-8.00	2727	2727	40	41,80	10.700	-3.723	289	74.650
Heavy steel – BS3601/ISO4200 – Threaded coupling													
48	1300	1310	N	2700	-8.00	2727	2727	32	35,90	10.310	-3.723	190	68.063
Heavy steel – BS3601/ISO4200 – Threaded coupling													

Pipe	Start	End	Dir	Plan mm	Slope	Actual mm	Equiv mm	Nom	ID mm	Friction kPa	Static kPa	Flow L/min	Press kPa
49	1310	1320	N	2700	-8.00	2727	3207	32	35,90	3.371	-3.723	95	68.414
Heavy steel – BS3601/ISO4200 – Threaded short elbow													
50	1250	1330	S	1150	-8.00	1121	1441	50	53,00	6.108	-1.586	564	106.103
Heavy steel – BS3601/ISO4200 – Threaded coupling													
51	1330	1340	S	2550	-8.00	2575	2575	50	53,00	7.056	-3.516	445	102.563
Heavy steel – BS3601/ISO4200 – Threaded coupling													
52	1340	1350	S	2700	-8.00	2727	2727	40	41,80	13.547	-3.723	329	92.739
Heavy steel – BS3601/ISO4200 – Threaded coupling													
53	1350	1360	S	2700	-8.00	2727	2727	40	41,80	6.336	-3.723	218	90.126
Heavy steel – BS3601/ISO4200 – Threaded coupling													
54	1360	1370	S	2800	-8.00	2828	3308	32	35,90	4.459	-3.860	109	89.527
Heavy steel – BS3601/ISO4200 – Threaded short elbow													
55	110	2290	W	800	0.00	700	5742	200	210,10	0.833	0.000	3415	233.023
Large bore heavy steel 4.5mm wall – SANS719 – Grooved tee													
56	2290	2300	W	800	0.00	800	3321	200	210,10	0.482	0.000	3415	232.541
Large bore heavy steel 4.5mm wall – SANS719 – Grooved tee													
57	2300	2370	U	500	0.00	400	6800	150	150,60	4.994	4.905	3415	222.642
Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Butterfly valve													
58	2370	2380	U	500	0.00	500	500	150	150,60	0.367	4.905	3415	217.370
Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Deluge valve													
59	2380	2390	U	500	0.00	500	6900	150	150,60	5.068	4.905	3415	207.397
Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Butterfly valve													
60	2390	2400	U	2000	0.00	2000	4410	150	150,60	3.239	19.620	3415	184.539
Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved short elbow													
61	2400	2410	W	12000	0.00	11925	13562	150	150,60	9.960	0.000	3415	174.578
Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved short elbow													
62	2410	2420	D	1000	0.00	925	2153	100	102,30	10.395	-9.810	3415	173.993
Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved tee													
63	2420	2430	S	1000	0.00	950	3438	100	102,30	4.606	0.000	1707	169.387
Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved short elbow													
64	2420	2440	N	1000	0.00	950	3438	100	102,30	4.606	0.000	1707	169.387
Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved short elbow													
65	2440	2450	W	1000	0.00	950	1896	80	78,80	9.052	0.000	1707	160.336
Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved tee													
66	2450	2460	W	1000	0.00	1000	1946	80	78,80	5.419	0.000	1276	154.916
Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved tee													
67	2460	2470	W	1000	0.00	1000	1946	80	78,80	2.564	0.000	851	152.353

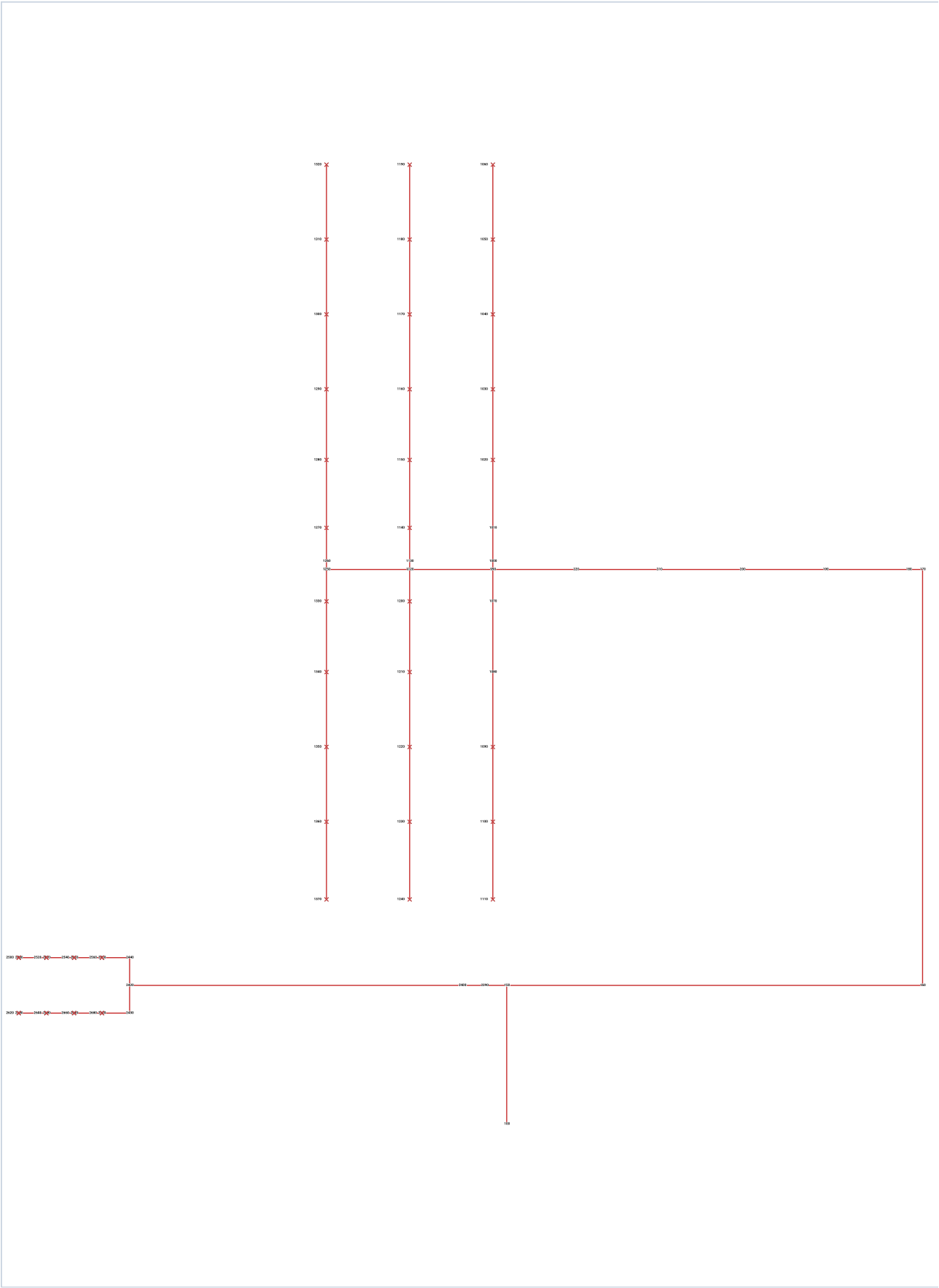
Pipe	Start	End	Dir	Plan mm	Slope	Actual mm	Equiv mm	Nom	ID mm	Friction kPa	Static kPa	Flow L/min	Press kPa
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved tee												
68	2470	2480	W	1000	0.00	1000	1654	80	78,80	0.616	0.000	430	151.736
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved short elbow												
69	2480	2490	D	500	0.00	460	460	40	40,90	4.177	-4.905	430	152.464
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded coupling												
70	2490	2500	D	1000	0.00	1000	2227	40	40,90	5.680	-9.810	216	156.595
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded short elbow												
71	2470	2510	D	500	0.00	460	1278	40	40,90	11.171	-4.905	421	146.087
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded coupling												
72	2510	2520	D	1000	0.00	1000	2227	40	40,90	5.473	-9.810	212	150.424
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded short elbow												
73	2460	2530	D	500	0.00	460	1278	40	40,90	11.334	-4.905	425	148.487
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded coupling												
74	2530	2540	D	1000	0.00	1000	2227	40	40,90	5.551	-9.810	214	152.746
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded short elbow												
75	2450	2550	D	500	0.00	460	1278	40	40,90	11.680	-4.905	432	153.560
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded coupling												
76	2550	2560	D	1000	0.00	1000	2227	40	40,90	5.715	-9.810	217	157.655
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded short elbow												
77	2430	2570	W	1000	0.00	950	1896	80	78,80	9.052	0.000	1707	160.336
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved tee												
78	2570	2580	W	1000	0.00	1000	1946	80	78,80	5.419	0.000	1276	154.916
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved tee												
79	2580	2590	W	1000	0.00	1000	1946	80	78,80	2.564	0.000	851	152.353
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved tee												
80	2590	2600	W	1000	0.00	1000	1654	80	78,80	0.616	0.000	430	151.736
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Grooved short elbow												
81	2600	2610	D	500	0.00	460	460	40	40,90	4.177	-4.905	430	152.464
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded coupling												
82	2610	2620	D	1000	0.00	1000	2227	40	40,90	5.680	-9.810	216	156.595
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded short elbow												
83	2590	2630	D	500	0.00	460	1278	40	40,90	11.171	-4.905	421	146.087
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded coupling												
84	2630	2640	D	1000	0.00	1000	2227	40	40,90	5.473	-9.810	212	150.424
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded short elbow												
85	2580	2650	D	500	0.00	460	1278	40	40,90	11.334	-4.905	425	148.487
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded coupling												
86	2650	2660	D	1000	0.00	1000	2227	40	40,90	5.551	-9.810	214	152.746

Pipe	Start	End	Dir	Plan mm	Slope	Actual mm	Equiv mm	Nom	ID mm	Friction kPa	Static kPa	Flow L/min	Press kPa
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded short elbow												
87	2570	2670	D	500	0.00	460	1278	40	40,90	11.680	-4.905	432	153.560
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded coupling												
88	2670	2680	D	1000	0.00	1000	2227	40	40,90	5.715	-9.810	217	157.655
	Heavy weight steel – BS1387/EN10255/SANS62-1/AS1074 – Threaded short elbow												

System Demand Curve



Plan View



Isometric View

