L.P. ENGINEERING INC.
PROFESSIONAL FIRE PROTECTION ENGINEERS
11 KATERINA AVENUE THORNHILL, ONTARIO L4J 8H5 (905) 709-5627

H Y D R A U L I C C A L C U L A T I O N S

C O V E R S H E E T

RIOCAN BLDG. 5 (PETSMART) - OSHAWA 23080 DESIGN AREA '1B'(REV) JUNE 21, 2024

W A T E R S U P P L Y

STATIC PRESSURE	(psi)	60
RESIDUAL PRESSURE	(psi)	52
RESIDUAL FLOW	(gpm)	1424

B O O S T E R P U M P S

NUMBER OF BOOSTER PUMPS 0

S P R I N K L E R S

MAXIMUM SPACING OF SPRINKLERS	(ft)	10
MAXIMUM SPACING OF SPRINKLER LINES	(ft)	12
SPECIFIED DISCHARGE DENSITY	(gpm/sq. ft.)	.2

THIS SPRINKLER SYSTEM WILL DELIVER A DENSITY OF .2 gpm/sq. ft.
FOR A DESIGN AREA OF 1500.00 SQ. FT. OF FLOOR AREA

THIS SYSTEM OPERATES AT A FLOW OF 349.38 gpm AT A PRESSURE OF 33.66 psi
AT THE BASE OF THE RISER (REF. PT. 11)

PIPES USED FOR THIS SYSTEM
==========

107 PVC BLUE BRUTE (150)
002 SCHEDULE 10

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PROVINCE OF ONTARIO

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HYDRAULIC CALCULATIONS AT SPECIFIED DENSITY

THE FOLLOWING SPRINKLERS ARE OPERATING IN:
[ ] TEST AREA 1 [ ] TEST AREA 2 [ ] TEST AREA 3 [ ] REMOTE AREA

Elevation of sprinklers = Elevation above water test.

REF. PT.	K	ELEV. ft	FLOW gpm	PRESSURE psi
301	8.00	17.00	26.43	10.91
302	8.00	17.00	25.79	10.39
303	8.00	17.00	25.65	10.28
304	8.00	17.00	25.69	10.31
305	8.00	17.00	25.61	10.25
306	8.00	17.00	24.54	9.41
307	8.00	17.00	24.22	9.16
308	8.00	17.00	24.21	9.16
309	8.00	17.00	24.40	9.30
310	8.00	17.00	25.83	10.42
311	8.00	17.00	24.80	9.61
312	8.00	17.00	23.99	8.99
313	8.00	17.00	24.00	9.00
314	8.00	17.00	24.22	9.16

THE SPRINKLER SYSTEM FLOW IS 349.38 gpm

THE OUTSIDE HOSE FLOW AT REFERENCE POINT NO. 1 IS 0.00 gpm
[ ] THE INSIDE HOSE [ ] RACK SPKLR'S.
[ ] YARD HYDT. FLOW IS 250.00 gpm
THE MINIMUM DENSITY PROVIDED BY THIS SYSTEM IS 0.200 gpm/sq. ft.

THE FOLLOWING PRESSURES & FLOWS OCCUR
---> AT REF. PT. 1 <---

STATIC PRESSURE	60.00 psi		
RESIDUAL PRESSURE	52.00 psi	AT	1424.00 gpm
TOTAL SYSTEM FLOW	599.38 gpm		
AVAILABLE PRESSURE	59.69 psi	AT	599.38 gpm
OPERATING PRESSURE	42.10 psi	AT	599.38 gpm
PRESSURE REMAINING	17.59 psi		

THE ABOVE RESULTS INCLUDE 5.00 psi FRICTION LOSS AT REF. PT. # 11 FOR A

[ ] BACKFLOW PREVENTER [ ] METER
[ ] DETECTOR CHECK VALVE [ ] OTHER DEVICE

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FITTING Equivalent Length per NFPA 13 1994, 6-4.3
'-' Indicates Equivalent Length. 'T' Indicates Threaded Fitting
1=45 Elbow, 2=90 Elbow, 3='T'/Cross, 4=Butterfly Valve, 5=Gate Valve, 6=Swing Check Valve

FROM	TO	FLOW (gpm)	PIPE (ft)	FITS	EQV. (ft)	H-W C	PIPE TYPE	DIA. (in)	FRIC. (psi)	ELEV. (psi)	FROM (psi)	TO (psi)	DIFF (psi)
1	2	599.38	66.91	3	52.91	150	107	7.980	0.002	0.000	42.10	41.81	0.29
2	3	599.38	146.37	32511	105.82	150	107	7.980	0.002	0.000	41.81	41.21	0.60
3	4	599.38	305.37	2	19.65	150	107	7.980	0.002	0.000	41.21	40.44	0.77
4	5	599.38	83.16	2522	65.00	150	107	7.980	0.002	0.433	40.44	39.65	0.35
5	6	599.38	4.83	464	65.26	120	2	6.357	0.011	0.867	39.65	38.02	0.76
6	7	599.38	7.67	3212	62.90	120	2	6.357	0.011	-0.867	38.02	38.12	0.77
7	8	599.38	92.95	22	39.31	150	107	7.980	0.002	0.433	38.12	37.37	0.32
8	9	599.38	228.17	35	58.96	150	107	7.980	0.002	0.000	37.37	36.69	0.68
9	10	599.38	126.75	3	45.44	150	107	6.090	0.009	0.000	36.69	35.16	1.53
10	11	449.38	143.66	52222	60.14	150	107	6.090	0.005	0.433	35.16	33.66	1.06
11	12	349.38	14.00	446	65.26	120	2	6.357	0.004	6.067	33.66	22.28	5.32
12	13	349.38	4.71	2	8.98	120	2	4.260	0.028	0.000	22.28	21.89	0.39
13	21	349.38	2.00	2	8.98	120	2	4.260	0.028	0.000	21.89	21.59	0.30
21	22	349.38	8.33	0	0.00	120	2	4.260	0.028	0.000	21.59	21.35	0.23
22	23	349.38	11.62	22	17.96	120	2	4.260	0.028	0.000	21.35	20.52	0.83
23	24	349.38	8.33	0	0.00	120	2	4.260	0.028	0.000	20.52	20.29	0.23
24	25	349.38	6.83	0	0.00	120	2	4.260	0.028	0.000	20.29	20.09	0.19
25	26	349.38	3.25	0	0.00	120	2	4.260	0.028	0.000	20.09	20.00	0.09
26	27	349.38	3.08	0	0.00	120	2	4.260	0.028	0.000	20.00	19.92	0.09
27	28	349.38	1.00	2	8.98	120	2	4.260	0.028	-0.433	19.92	20.07	0.28
28	29	349.38	6.92	2	8.98	120	2	4.260	0.028	0.000	20.07	19.62	0.45
31	32	-41.93	11.50	0	0.00	120	2	4.260	0.001	0.000	19.60	19.61	-0.01
32	29	-84.09	7.29	0	0.00	120	2	4.260	0.002	0.000	19.61	19.62	-0.01
29	33	265.29	4.21	3	21.12	120	2	4.260	0.017	0.000	19.62	19.19	0.43
33	34	228.28	11.42	0	0.00	120	2	4.260	0.013	0.000	19.19	19.04	0.15
34	35	158.77	12.00	0	0.00	120	2	4.260	0.007	0.000	19.04	18.95	0.10
35	36	78.89	12.00	0	0.00	120	2	4.260	0.002	0.000	18.95	18.93	0.02
41	42	41.93	11.50	0	0.00	120	2	2.635	0.006	0.000	12.94	12.87	0.07
42	43	84.09	11.50	0	0.00	120	2	2.635	0.021	0.000	12.87	12.63	0.24
43	44	121.10	11.42	0	0.00	120	2	2.635	0.041	0.000	12.63	12.16	0.47
44	45	87.05	12.00	0	0.00	120	2	2.635	0.022	0.000	12.16	11.93	0.23
45	46	43.95	12.00	0	0.00	120	2	2.635	0.006	0.000	11.93	11.87	0.06
31	131	41.93	1.00	3	7.94	120	2	1.682	0.051	0.433	19.60	18.71	0.46
32	132	42.16	1.00	3	7.94	120	2	1.682	0.052	0.433	19.61	18.71	0.46
33	133	37.01	1.00	3	7.94	120	2	1.682	0.041	0.433	19.19	18.39	0.36
34	134	69.51	1.00	3	7.94	120	2	1.682	0.131	0.433	19.04	17.44	1.17
35	135	79.88	1.00	3	7.94	120	2	1.682	0.169	0.433	18.95	17.00	1.51
36	136	78.89	1.00	3	7.94	120	2	1.682	0.165	0.433	18.93	17.02	1.48
41	141	-41.93	1.00	3	7.94	120	2	1.682	0.051	0.433	12.94	12.96	-0.46
42	142	-42.16	1.00	3	7.94	120	2	1.682	0.052	0.433	12.87	12.90	-0.46
43	143	-37.01	1.00	3	7.94	120	2	1.682	0.041	0.433	12.63	12.56	-0.36
44	144	34.05	1.00	3	7.94	120	2	1.682	0.035	0.433	12.16	11.41	0.31

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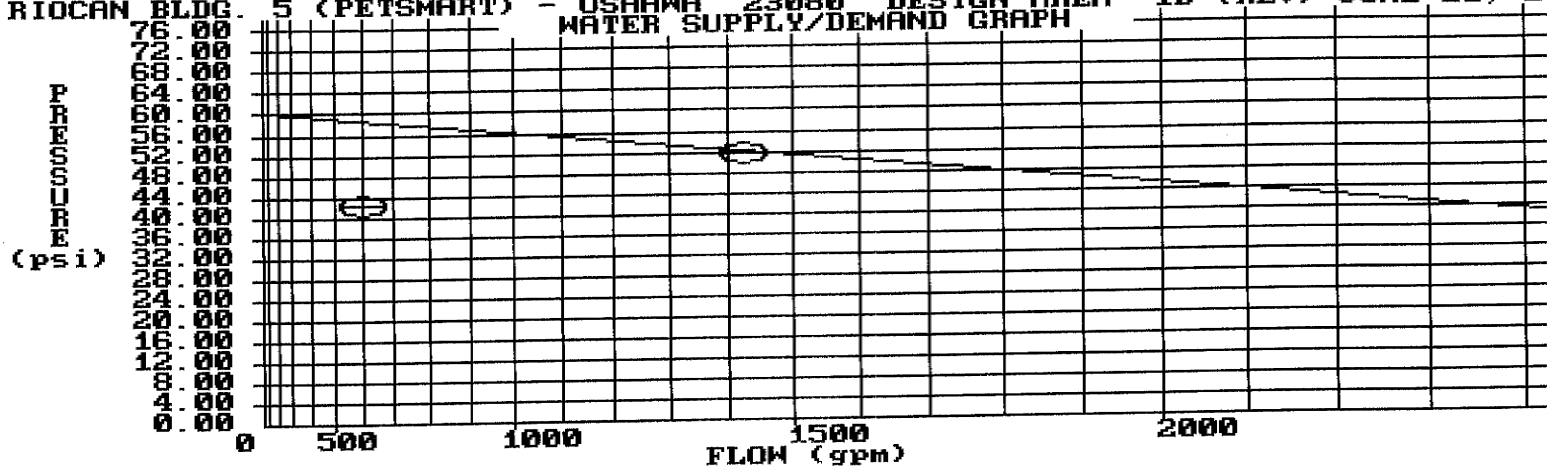
FROM	TO	FLOW (gpm)	PIPE (ft)	FITS	EQV. (ft)	H-W C	PIPE TYPE	DIA. (in)	FRIC. (psi)	ELEV. (psi)	FROM (psi)	TO (psi)	DIFF (psi)
45	145	43.10	1.00	3	7.94	120	2	1.682	0.054	0.433	11.93	11.01	0.48
46	146	43.95	1.00	3	7.94	120	2	1.682	0.056	0.433	11.87	10.94	0.50
131	141	41.93	95.00	33	15.88	120	2	1.682	0.051	0.000	18.71	12.96	5.75
132	142	42.16	95.00	33	15.88	120	2	1.682	0.052	0.000	18.71	12.90	5.81
133	143	37.01	103.00	33333	39.70	120	2	1.682	0.041	0.000	18.39	12.56	5.83
134	301	69.51	41.96	3	7.94	120	2	1.682	0.131	0.000	17.44	10.91	6.53
301	302	43.08	9.25	0	0.00	120	2	1.682	0.054	0.000	10.91	10.39	0.52
302	303	17.29	10.00	0	0.00	120	2	1.682	0.010	0.000	10.39	10.28	0.11
303	304	-8.36	10.00	0	0.00	120	2	1.682	0.003	0.000	10.28	10.31	-0.03
304	144	-34.05	23.79	3	7.94	120	2	1.682	0.035	0.000	10.31	11.41	-1.11
135	305	79.88	31.96	3	7.94	120	2	1.682	0.169	0.000	17.00	10.25	6.75
305	306	54.27	10.00	0	0.00	120	2	1.682	0.083	0.000	10.25	9.41	0.84
306	307	29.73	9.25	0	0.00	120	2	1.682	0.027	0.000	9.41	9.16	0.24
307	308	5.51	10.00	0	0.00	120	2	1.682	0.001	0.000	9.16	9.16	0.00
308	309	-18.70	10.00	0	0.00	120	2	1.682	0.011	0.000	9.16	9.30	-0.14
309	145	-43.10	23.79	3	7.94	120	2	1.682	0.054	0.000	9.30	11.01	-1.71
136	310	78.89	31.96	3	7.94	120	2	1.682	0.165	0.000	17.02	10.42	6.60
310	311	53.06	10.00	0	0.00	120	2	1.682	0.079	0.000	10.42	9.61	0.81
311	312	28.26	12.25	2222	12.88	120	2	1.682	0.025	0.000	9.61	8.99	0.62
312	313	4.27	10.00	0	0.00	120	2	1.682	0.001	0.000	8.99	9.00	-0.01
313	314	-19.73	10.00	0	0.00	120	2	1.682	0.013	0.000	9.00	9.16	-0.17
314	146	-43.95	23.79	3	7.94	120	2	1.682	0.056	0.000	9.16	10.94	-1.78

A MAX. VELOCITY OF 11.53 ft./sec. OCCURS BETWEEN REF. PT. 135 AND 305

Sprinkler-CALC Release 6.3
By Walsh Engineering Inc.
North Kingstown R.I. U.S.A.

RIOCAN BLDG. 5 (PETSMART) - OSHAWA 23080 DESIGN AREA '1B'(REV) JUNE 21, 2