

Natural Stone Design

**148 Jarco Drive
Fuquay Varina, NC**

Fire Sprinkler Hydraulic Calculations





Hydraulic Overview

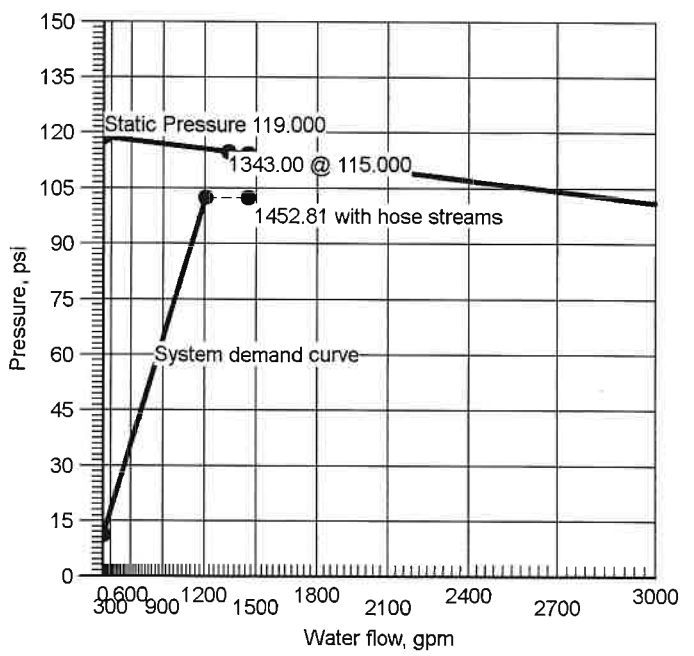
Job Number: n
Report Description: ESFR (A)

Job	
Job Number n	Design Engineer J & D Sprinkler
Job Name Natural Stone Supply Remote A	Phone FAX
Address 1	State Certification/License Number
Address 2	AHJ
Address 3	Job Site/Building

System	
Pressure 35.000	Area of Application NA
Most Demanding Sprinkler Data 16.8 K-Factor 99.39 at 35.000	Hose Streams 250.00
Coverage Per Sprinkler 100ft ²	Number Of Sprinklers Calculated 12
System Pressure Demand 102.734	System Flow Demand 1202.81
Total Demand 1452.81 @ 102.734	Pressure Result +11.640 (10.2%)

Supplies						Check Point Gauges			
<u>Node</u>	<u>Name</u>	<u>Flow(gpm)</u>	<u>Hose Flow(gpm)</u>	<u>Static(psi)</u>	<u>Residual(psi)</u>	<u>Identifier</u>	<u>Pressure(psi)</u>	<u>K-Factor(K)</u>	<u>Flow(gpm)</u>
1	Water Supply	1343.00	250.00	119.000	115.000	Basew	95.206	123.27	1202.81

Natural Stone w riser room 6-24-21.cad Water Supply at Node 1 (1343.00, 250.00, 119.000, 115.000)





Hydraulic Overview

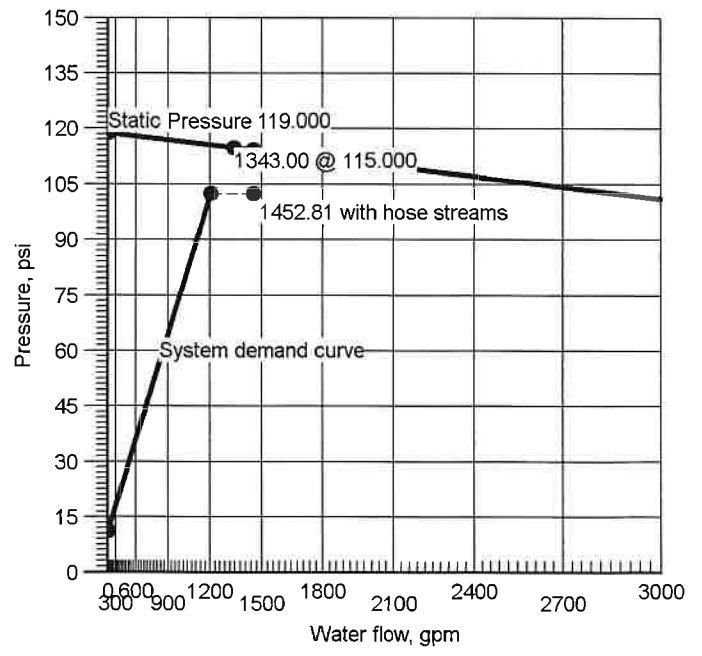
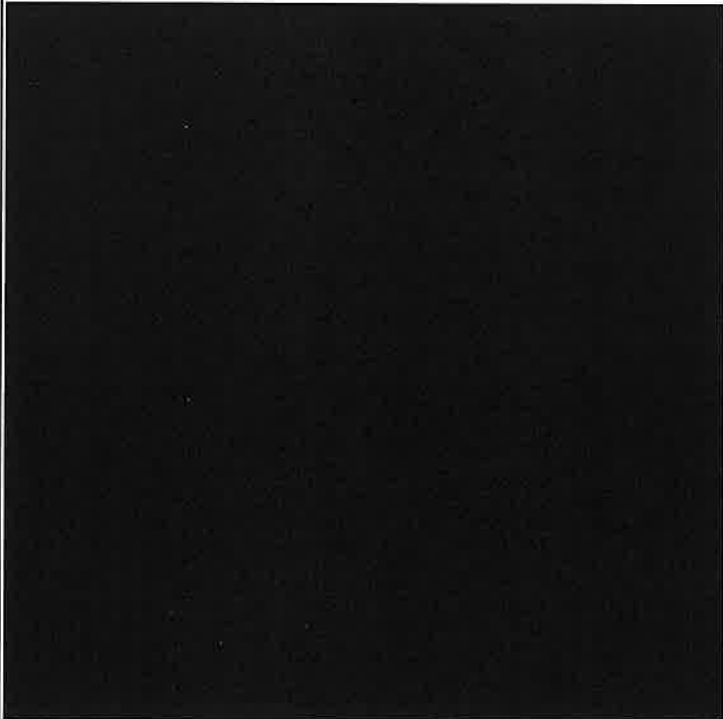
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1	Water Supply	1343.00	250.00	119.000	115.000	Basew	95.206	123.27	1202.81

Natural Stone w riser room 6-24-21.cad Water Supply at Node 1 (1343.00, 250.00, 119.000, 115.000)



Hydraulic Calculations

for

Project Name: Natural Stone Supply Remote A

Location: , ,

Drawing Name: Natural Stone w riser room 6-24-21.cad

Calculation Date: 6/25/2021

Design

Remote Area Number: A

Occupancy Classification: ESFR

Density: 35.000

Area of Application: NA

Coverage per Sprinkler: 100ft²

Type of sprinklers calculated: Upright

No. of sprinklers calculated: 12

In-rack Demand: N/A gpm at Node: N/A

Hose Streams: 250.00 at Node: 1 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 1: 1452.81 @ 102.734

Type of System:

Volume of Dry or PreAction System: N/A

for Node: 1 Date: 12-11-20

Location:

Source: Red Line Engineering

Name of Contractor: J & D Sprinkler Co.

Address: 315 W. Main St., Clayton. NC

Phone Number: 919-553-2356

Name of designer: J & D Sprinkler

Authority Having Jurisdiction:

Notes:

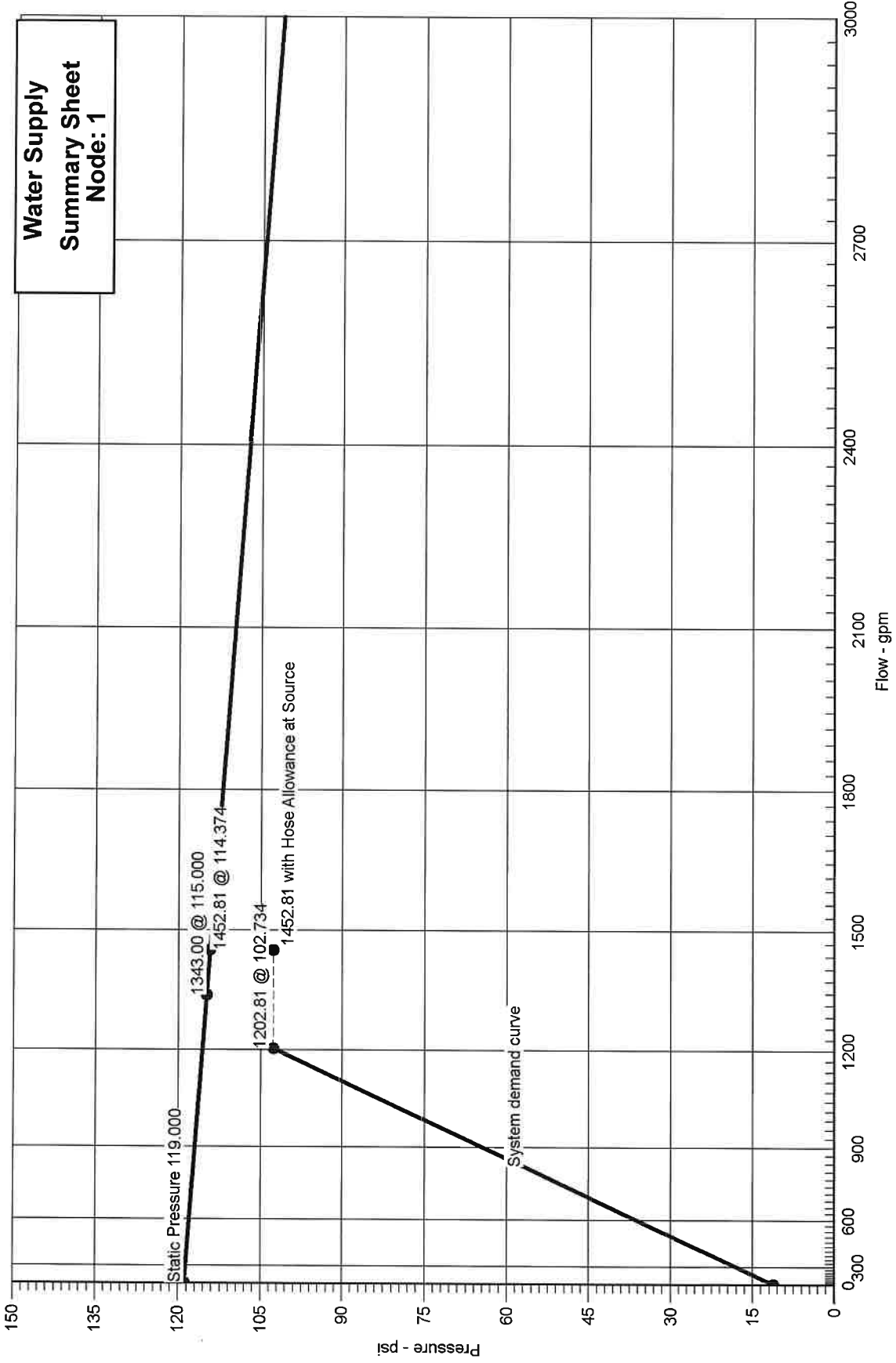
Automatic peaking results Left: 102.344 Right: 102.580

Hydraulic Graph

Job Name: Natural Stone Supply Remote A
Remote Area Number: A

N^{1.85}

Date: 6/25/2021

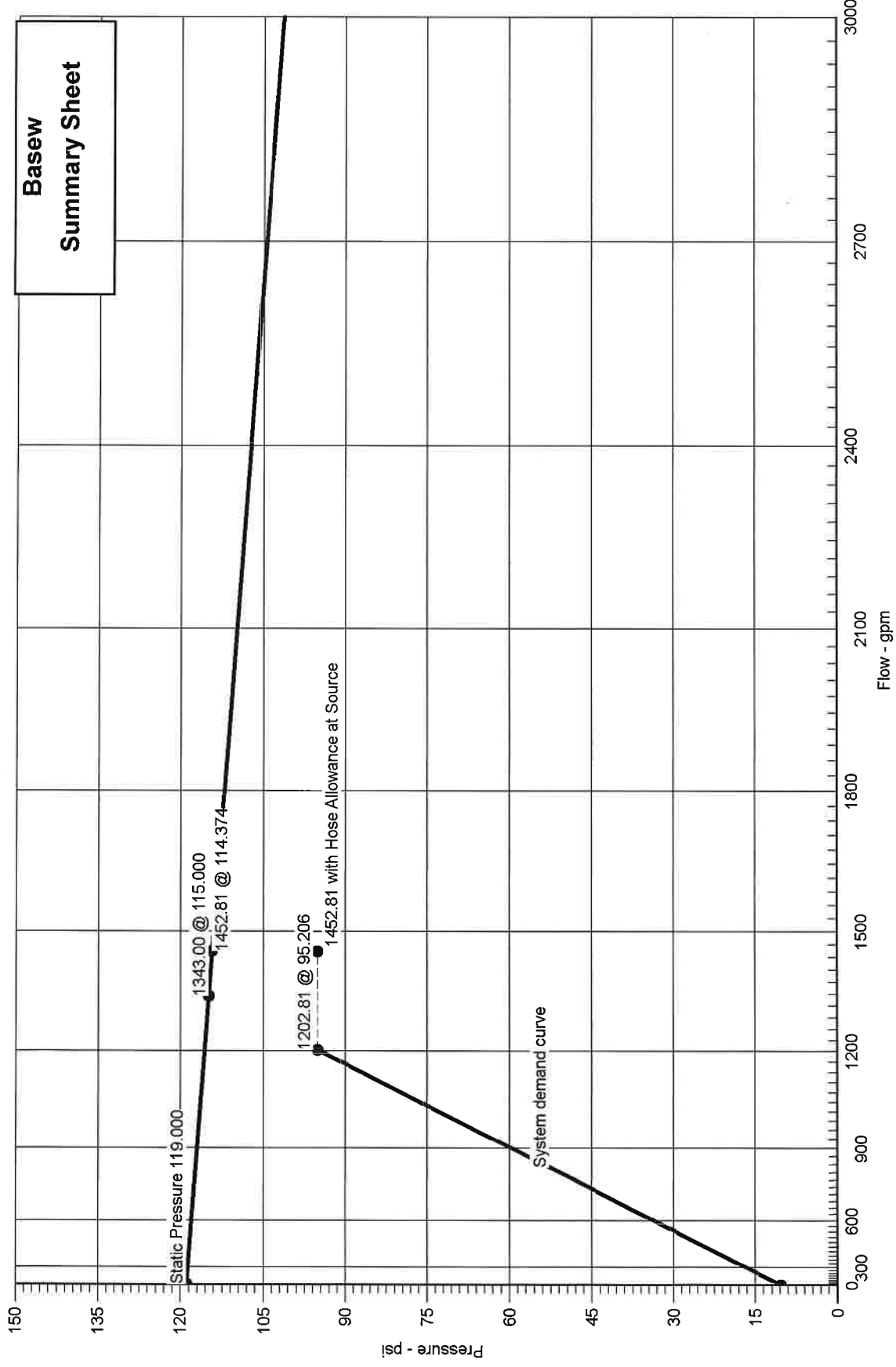


Hydraulic Graph

Job Name: Natural Stone Supply Remote A
Remote Area Number: A

N^{1.85}

Date: 6/25/2021





Summary Of Outflowing Devices

Job Number: n
Report Description: ESFR (A)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)		
Sprinkler	836	101.39	99.39	16.8	36.422		
Sprinkler	837	101.04	99.39	16.8	36.169		
Sprinkler	838	100.94	99.39	16.8	36.099		
Sprinkler	858	100.09	99.39	16.8	35.497		
Sprinkler	859	99.74	99.39	16.8	35.249		
Sprinkler	860	99.65	99.39	16.8	35.180		
Sprinkler	871	99.84	99.39	16.8	35.317		
Sprinkler	872	99.49	99.39	16.8	35.069		
⇒ Sprinkler	873	99.39	99.39	16.8	35.000		
Sprinkler	896	100.69	99.39	16.8	35.920		
Sprinkler	897	100.33	99.39	16.8	35.666		
Sprinkler	898	100.23	99.39	16.8	35.596		

⇒ Most Demanding Sprinkler Data

Supply Analysis							
Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi)	Total Demand (gpm) @	Required Pressure (psi)
1	Water Supply	119.000	115.000	1343.00	114.374	1452.81	102.734
Node Analysis							
Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes		
1	-1'-0	Supply	102.734	1202.81			
836	23'-10½	Sprinkler	36.422	101.39			
837	23'-10½	Sprinkler	36.169	101.04			
838	23'-10½	Sprinkler	36.099	100.94			
858	24'-3½	Sprinkler	35.497	100.09			
859	24'-3½	Sprinkler	35.249	99.74			
860	24'-3½	Sprinkler	35.180	99.65			
871	24'-8½	Sprinkler	35.317	99.84			
872	24'-8½	Sprinkler	35.069	99.49			
873	24'-8½	Sprinkler	35.000	99.39			
896	25'-1½	Sprinkler	35.920	100.69			
897	25'-1½	Sprinkler	35.666	100.33			
898	25'-1½	Sprinkler	35.596	100.23			
2	-1'-0		101.689				
3	1'-0	Supply	95.206				
4	23'-9½		65.619				
300	18'-10½		61.780				
301	18'-10½		61.768				
302	18'-10½		61.724				

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
303	18'-10½		61.630		
304	18'-10½		61.468		
305	18'-10½		61.219		
306	18'-10½		60.886		
307	18'-10½		60.472		
308	18'-10½		59.985		
309	18'-10½		59.434		
310	18'-10½		58.827		
311	18'-10½		58.174		
312	18'-10½		57.485		
313	18'-10½		56.766		
314	18'-10½		56.025		
315	18'-10½		55.281		
316	18'-10½		54.922		
317	18'-10½		54.823		
656	23'-9½		64.686		
657	23'-9½		64.698		
658	23'-9½		64.742		
659	23'-9½		64.836		
660	23'-9½		64.998		
662	23'-9½		62.995		
663	23'-9½		61.635		
664	23'-9½		60.417		

Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes
665	23'-9½		59.312		
666	23'-9½		58.297		
667	23'-9½		57.352		
668	23'-9½		56.462		
669	23'-9½		55.613		
670	23'-9½		54.796		
671	23'-9½		54.003		
672	23'-9½		53.245		
673	23'-9½		52.880		
674	23'-9½		52.779		

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes
873	24'-8½	16.8	99.39	2	(See Notes)	10'-0	120	35.000	***** Route 1 ***** Sprinkler
898	25'-1½		100.85	2.1570		10'-0	0.077551	-0.180	
898	25'-1½	16.8	100.23	2	(See Notes)	43'-10½	120	35.596	Sprinkler, fE(3'-6), PO(12'-3½)
674	23'-9½		201.08	2.1570		15'-9½	0.277997	0.591	
						59'-8		16.592	
674	23'-9½			4		10'-0	120	52.779	
673	23'-9½		201.08	4.2600		10'-0	0.010108	0.101	
673	23'-9½		201.28	4		10'-0	120	52.880	Flow (q) from Route 2
672	23'-9½		402.36	4.2600		10'-0	0.036473	0.365	
672	23'-9½		202.01	4		9'-9½	120	53.245	Flow (q) from Route 7
671	23'-9½		604.37	4.2600		9'-9½	0.077418	0.758	
671	23'-9½		8.01	4		10'-0	120	54.003	Flow (q) from Route 23
670	23'-9½		612.38	4.2600		10'-0	0.079326	0.793	
670	23'-9½		9.90	4		10'-0	120	54.796	Flow (q) from Route 3
669	23'-9½		622.28	4.2600		10'-0	0.081716	-0.000	
669	23'-9½		12.85	4		10'-0	120	55.613	Flow (q) from Route 14
668	23'-9½		635.13	4.2600		10'-0	0.084865	0.849	
668	23'-9½		16.66	4		10'-0	120	56.462	Flow (q) from Route 16
667	23'-9½		651.80	4.2600		10'-0	0.089030	0.890	
667	23'-9½		21.27	4		10'-0	120	57.352	Flow (q) from Route 15
666	23'-9½		673.06	4.2600		10'-0	0.094478	0.945	
666	23'-9½		26.64	4		10'-0	120	58.297	Flow (q) from Route 10
665	23'-9½		699.70	4.2600		10'-0	0.101511	1.015	

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes
665	23'-9½		32.77	4		10'-0	120	59.312	Flow (q) from Route 12
664	23'-9½		732.46	4.2600		10'-0	0.110480	1.105	
664	23'-9½		39.67	4		10'-0	120	60.417	Flow (q) from Route 17
663	23'-9½		772.13	4.2600		10'-0	0.121803	1.218	
663	23'-9½		47.36	4		10'-0	120	61.635	Flow (q) from Route 24
662	23'-9½		819.49	4.2600		10'-0	0.135982	1.360	
662	23'-9½		55.84	4	(See Notes)	1'-1	120	62.995	Flow (q) from Route 11 fT(16'-0)
4	23'-9½		875.33	4.2600		16'-0	0.153619	0.000	
4	23'-9½		327.48	6		17'-1		2.624	
4	23'-9½		327.48	6	(See Notes)	29'-1	120	65.619	Flow (q) from Route 13 2E(10'-0), ALV(35'-2½), 2E(17'-7), BFP(-15.000), Basew
3	1'-0		1202.81	6.3570		90'-5	0.039371	9.882	
3	1'-0			6		119'-6		19.705	
3	1'-0			6	(See Notes)	87'-7½	140	95.206	2E(22'-1), T(47'-3½)
2	-1'-0		1202.81	6.2800		91'-5	0.031413	0.859	
2	-1'-0			8		179'-0		5.623	
2	-1'-0			8	(See Notes)	136'-5	140	101.689	Water Supply
1	-1'-0		1202.81	8.3900		136'-5	0.007664	1.046	
			250.00					102.734	Hose Allowance At Source
1			1452.81						Total(Pt) Route 1
872	24'-8½	16.8	99.49	2	(See Notes)	10'-0	120	35.069	••••• Route 2 ••••• Sprinkler
897	25'-1½		100.95	2.1570		10'-0	0.077698	-0.180	
897	25'-1½	16.8	100.33	2	(See Notes)	43'-10½	120	35.666	Sprinkler, fE(3'-6), PO(12'-3½)
673	23'-9½		201.28	2.1570		15'-9½	0.278513	0.591	
						59'-8		16.623	
								52.880	Total(Pt) Route 2

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes Fitting/Device (Equivalent Length) Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value	
										Node 2
860	24'-3½	16.8	99.65	2	(See Notes)	10'-0	120	35.180		
838	23'-10½		98.19	2.1570		10'-0	0.073808	0.180		
317	18'-10½		199.13	2.1570		10'-0	0.273015	0.739		
838	23'-10½	16.8	100.94	2	(See Notes)	44'-9½	120	36.099	Sprinkler, fE(3'-6), PO(12'-3½)	
317	18'-10½		199.13	2.1570		15'-9½	0.273015	2.180		
317	18'-10½		199.13	4		60'-7	0.273015	16.544		
317	18'-10½			4		10'-0	120	54.823		
316	18'-10½		199.13	4.2600		10'-0	0.009927	-0.000		
316	18'-10½		199.32	4		10'-0	120	54.922		
315	18'-10½		398.44	4.2600		10'-0	0.035818	0.000	Flow (q) from Route 6	
315	18'-10½		200.00	4		9'-9½	120	55.281		
314	18'-10½		598.44	4.2600		9'-9½	0.076018	-0.000	Flow (q) from Route 9	
314	18'-10½		590.43	4.2600		10'-0	120	56.025		
313	18'-10½		590.43	4.2600		10'-0	0.074147	0.000		
313	18'-10½			2	(See Notes)	118'-8½	120	56.766		
670	23'-9½		9.90	2.1570		31'-7½	0.001059	-2.130	PO(12'-3½) 2fE(3'-6), PO(12'-3½)	
						150'-3½	0.001059	0.159		
								54.796	Total(Pt) Route 3	
860	24'-3½	16.8	99.65	2	(See Notes)	10'-0	120	35.180	***** Route 4 ***** Sprinkler	
873	24'-8½		1.46	2.1570		10'-0	0.000031	-0.180		
						10'-0	0.000031	0.000		
								35.000	Total(Pt) Route 4	
859	24'-3½	16.8	99.74	2	(See Notes)	10'-0	120	35.249	***** Route 5 ***** Sprinkler	
872	24'-8½		1.46	2.1570		10'-0	0.000031	-0.180		
						10'-0	0.000031	0.000		
								35.069	Total(Pt) Route 5	
859	24'-3½	16.8	99.74	2	(See Notes)	10'-0	120	35.249	***** Route 6 ***** Sprinkler	
837	23'-10½		98.28	2.1570		10'-0	0.073936	0.180		
						10'-0	0.073936	0.740		

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)		Friction(Pf)	Fixed Pressure Losses, when applicable, are added directly to (Pf) and shown as a negative value
837	23'-10½	16.8	101.04	2	(See Notes)	44'-9½	120	36.169	Sprinkler, fE(3'-6), PO(12'-3½)
316	18'-10½		199.32	2.1570		15'-9½	0.273497	2.180	
						60'-7		16.574	
								54.922	Total(Pt) Route 6
871	24'-8½	16.8	99.84	2	(See Notes)	10'-0	120	35.317	***** Route 7 ***** Sprinkler
896	25'-1½		101.32	2.1570		10'-0	0.078227	-0.180	
896	25'-1½	16.8	100.69	2	(See Notes)	43'-10½	120	35.920	Sprinkler, fE(3'-6), PO(12'-3½)
672	23'-9½		202.01	2.1570		15'-9½	0.280377	0.591	
						59'-8		16.734	
								53.245	Total(Pt) Route 7
858	24'-3½	16.8	100.09	2	(See Notes)	10'-0	120	35.497	***** Route 8 ***** Sprinkler
871	24'-8½		1.48	2.1570		10'-0	0.000032	-0.180	
								0.000	
								35.317	Total(Pt) Route 8
858	24'-3½	16.8	100.09	2	(See Notes)	10'-0	120	35.497	***** Route 9 ***** Sprinkler
836	23'-10½		98.61	2.1570		10'-0	0.074398	0.180	
836	23'-10½	16.8	101.39	2	(See Notes)	44'-9½	120	36.422	Sprinkler, fE(3'-6), PO(12'-3½)
315	18'-10½		200.00	2.1570		15'-9½	0.275235	2.180	
						60'-7		16.679	
								55.281	Total(Pt) Route 9
313	18'-10½		9.90	4		10'-0	120	56.766	***** Route 10 ***** Flow (q) from Route 3
312	18'-10½		580.53	4.2600		10'-0	0.071863	-0.000	
312	18'-10½			4		10'-0	120	57.485	
311	18'-10½		567.68	4.2600		10'-0	0.068948	0.689	
311	18'-10½			4		10'-0	120	58.174	
310	18'-10½		551.02	4.2600		10'-0	0.065250	0.000	
								0.653	

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes
310	18'-10½			4		10'-0	120	58.827	
309	18'-10½		529.75	4.2600		10'-0	0.060668	-0.000	
309	18'-10½			2	(See Notes)	118'-8½	120	59.434	
666	23'-9½		26.64	2.1570		31'-7½	0.006605	-2.130	PO(12'-3½) 2fE(3'-6), PO(12'-3½)
						150'-3½		0.993	
								58.297	Total(Pt) Route 10
309	18'-10½		26.64	4		10'-0	120	59.434	***** Route 11 ***** Flow (q) from Route 10
308	18'-10½		503.11	4.2600		10'-0	0.055146	-0.000	
308	18'-10½			4		10'-0	120	59.985	
307	18'-10½		470.35	4.2600		10'-0	0.048686	0.000	
307	18'-10½			4		10'-0	120	60.472	
306	18'-10½		430.68	4.2600		10'-0	0.041363	-0.000	
306	18'-10½			4		10'-0	120	60.886	
305	18'-10½		383.32	4.2600		10'-0	0.033345	0.000	
305	18'-10½			2	(See Notes)	118'-8½	120	61.219	
662	23'-9½		55.84	2.1570		31'-7½	0.025981	-2.130	PO(12'-3½) 2fE(3'-6), PO(12'-3½)
						150'-3½		3.905	
								62.995	Total(Pt) Route 11
308	18'-10½			2	(See Notes)	118'-8½	120	59.985	***** Route 12 ***** PO(12'-3½) 2fE(3'-6), PO(12'-3½)
665	23'-9½		32.77	2.1570		31'-7½	0.009690	-2.130	
						150'-3½		1.456	
								59.312	Total(Pt) Route 12
656	23'-9½		64.07	4		10'-0	120	64.686	***** Route 13 ***** Flow (q) from Route 22
657	23'-9½		64.07	4.2600		10'-0	0.001218	-0.000	
657	23'-9½		64.24	4		10'-0	120	64.698	Flow (q) from Route 21
658	23'-9½		128.30	4.2600		10'-0	0.004402	0.044	

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes	
										Node 2
658	23'-9½		64.84	4		10'-0	120	64.742	Flow (q) from Route 20	
659	23'-9½		193.14	4.2600		10'-0	0.009382	0.094		
659	23'-9½		66.10	4		10'-0	120	64.836		
660	23'-9½		259.24	4.2600		10'-0	0.016173	0.162	Flow (q) from Route 19	
660	23'-9½		68.24	4	(See Notes)	8'-11	120	64.998	Flow (q) from Route 18 fT(16'-0)	
						16'-0		0.000		
4	23'-9½		327.48	4.2600		24'-11	0.024919	0.621		
								65.619	Total(Pt) Route 13	
312	18'-10½			2	(See Notes)	118'-8½	120	57.485	***** Route 14 ***** PO(12'-3½) 2fE(3'-6), PO(12'-3½)	
						31'-7½		0.001715		-2.130
669	23'-9½		12.85	2.1570		150'-3½				0.258
								55.613	Total(Pt) Route 14	
310	18'-10½			2	(See Notes)	118'-8½	120	58.827	***** Route 15 ***** PO(12'-3½) 2fE(3'-6), PO(12'-3½)	
						31'-7½		0.004356		-2.130
667	23'-9½		21.27	2.1570		150'-3½				0.655
								57.352	Total(Pt) Route 15	
311	18'-10½			2	(See Notes)	118'-8½	120	58.174	***** Route 16 ***** PO(12'-3½) 2fE(3'-6), PO(12'-3½)	
						31'-7½		0.002774		-2.130
668	23'-9½		16.66	2.1570		150'-3½				0.417
								56.462	Total(Pt) Route 16	
307	18'-10½			2	(See Notes)	118'-8½	120	60.472	***** Route 17 ***** PO(12'-3½) 2fE(3'-6), PO(12'-3½)	
						31'-7½		0.013801		-2.130
664	23'-9½		39.67	2.1570		150'-3½				2.074
								60.417	Total(Pt) Route 17	
305	18'-10½		55.84	4		10'-0	120	61.219	***** Route 18 ***** Flow (q) from Route 11	
								0.000		
304	18'-10½		327.48	4.2600		10'-0	0.024919	0.249		
304	18'-10½			2	(See Notes)	118'-8½	120	61.468	PO(12'-3½) 2fE(3'-6), PO(12'-3½)	
						31'-7½		0.037651		-2.130
660	23'-9½		68.24	2.1570		150'-3½				5.659
								64.998	Total(Pt) Route 18	

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes
Node 2	Elev 2 (Foot)		Total Flow (Q)	Actual ID	Equiv. Length (Foot)	Total (Foot)			
304	18'-10½		68.24	4		10'-0	120	61.468	***** Route 19 ***** Flow (q) from Route 18
303	18'-10½		259.24	4.2600		10'-0	0.016173	-0.000	
303	18'-10½			2	(See Notes)	118'-8½	120	61.630	
659	23'-9½		66.10	2.1570		31'-7½	0.035499	-2.130	PO(12'-3½) 2fE(3'-6), PO(12'-3½)
						150'-3½		5.336	
								64.836	Total(Pt) Route 19
303	18'-10½		66.10	4		10'-0	120	61.630	***** Route 20 ***** Flow (q) from Route 19
302	18'-10½		193.14	4.2600		10'-0	0.009382	0.094	
302	18'-10½			2	(See Notes)	118'-8½	120	61.724	PO(12'-3½) 2fE(3'-6), PO(12'-3½)
658	23'-9½		64.84	2.1570		31'-7½	0.034251	-2.130	
						150'-3½		5.148	
								64.742	Total(Pt) Route 20
302	18'-10½		64.84	4		10'-0	120	61.724	***** Route 21 ***** Flow (q) from Route 20
301	18'-10½		128.30	4.2600		10'-0	0.004402	0.044	
301	18'-10½			2	(See Notes)	118'-8½	120	61.768	PO(12'-3½) 2fE(3'-6), PO(12'-3½)
657	23'-9½		64.24	2.1570		31'-7½	0.033665	-2.130	
						150'-3½		5.060	
								64.698	Total(Pt) Route 21
301	18'-10½		64.24	4		10'-0	120	61.768	***** Route 22 ***** Flow (q) from Route 21
300	18'-10½		64.07	4.2600		10'-0	0.001218	-0.000	
300	18'-10½			2	(See Notes)	118'-8½	120	61.780	PO(12'-3½) 2fE(3'-6), PO(12'-3½)
656	23'-9½		64.07	2.1570		31'-7½	0.033503	-2.130	
						150'-3½		5.036	
								64.686	Total(Pt) Route 22
314	18'-10½			2	(See Notes)	118'-8½	120	56.025	***** Route 23 ***** PO(12'-3½) 2fE(3'-6), PO(12'-3½)
671	23'-9½		8.01	2.1570		31'-7½	0.000715	-2.130	
						150'-3½		0.107	
								54.003	Total(Pt) Route 23

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes
306	18'-10½			2	(See Notes)	118'-8½	120	60.886	***** Route 24 ***** PO(12'-3½) 2fE(3'-6), PO(12'-3½)
663	23'-9½		47.36	2.1570		31'-7½	0.019153	-2.130	
						150'-3½		2.879	
								61.635	Total(Pt) Route 24

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV Alarm Valve	AngV Angle Valve	b Bushing
BaV Ball Valve	BFP Backflow Preventer	BV Butterfly Valve
C Cross Flow Turn 90°	cplg Coupling	Cr Cross Run
CV Check Valve	DelV Deluge Valve	DPV Dry Pipe Valve
E 90° Elbow	EE 45° Elbow	Ee1 11¼° Elbow
Ee2 22½° Elbow	f Flow Device	fd Flex Drop
FDC Fire Department Connectic	fE 90° FireLock(TM) Elbow	fEE 45° FireLock(TM) Elbow
flg Flange	FN Floating Node	fT FireLock(TM) Tee
g Gauge	GloV Globe Valve	GV Gate Valve
Ho Hose	Hose Hose	HV Hose Valve
Hyd Hydrant	LtE Long Turn Elbow	mecT Mechanical Tee
Noz Nozzle	P1 Pump In	P2 Pump Out
PIV Post Indicating Valve	PO Pipe Outlet	PrV Pressure Relief Valve
PRV Pressure Reducing Valve	red Reducer/Adapter	S Supply
sCV Swing Check Valve	SFx Seismic Flex	Spr Sprinkler
St Strainer	T Tee Flow Turn 90°	Tr Tee Run
U Union	WirF Wirsbo	WMV Water Meter Valve
Z Cap		

Hydraulic Overview

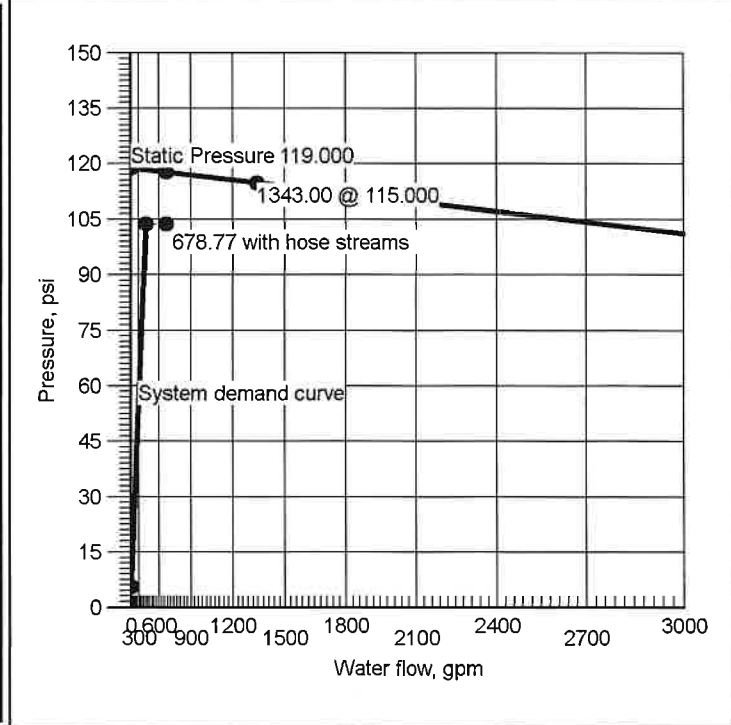
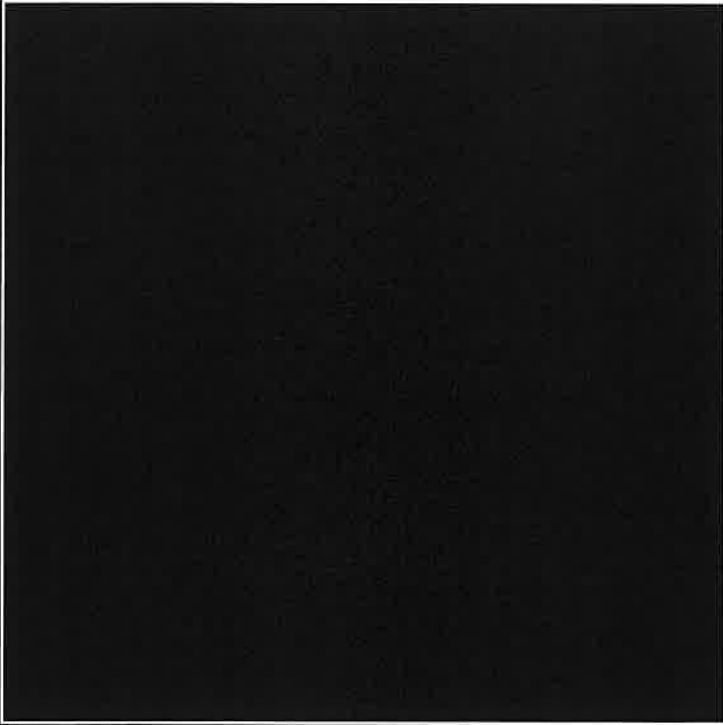
Job Number: n
Report Description: Ordinary Group II (B)

Job	
Job Number n	Design Engineer J & D Sprinkler
Job Name: Natural Stone Supply Remote B	Phone FAX
Address 1	State Certification/License Number
Address 2	AHJ
Address 3	Job Site/Building

System	
Density 0.20gpm/ft ²	Area of Application 1500ft ² (Actual 983ft ²)
Most Demanding Sprinkler Data 11.2 K-Factor 51.20 at 20.898	Hose Streams 250.00
Coverage Per Sprinkler 256ft ²	Number Of Sprinklers Calculated 8
System Pressure Demand 103.882	System Flow Demand 428.77
Total Demand 678.77 @ 103.882	Pressure Result +13.986 (11.9%)

Supplies						Check Point Gauges			
<u>Node</u>	<u>Name</u>	<u>Flow(gpm)</u>	<u>Hose Flow(gpm)</u>	<u>Static(psi)</u>	<u>Residual(psi)</u>	<u>Identifier</u>	<u>Pressure(psi)</u>	<u>K-Factor(K)</u>	<u>Flow(gpm)</u>
1	Water Supply	1343.00	250.00	119.000	115.000	Basew	102.033	42.45	428.77

Natural Stone w riser room 6-24-21.cad Water Supply at Node 1 (1343.00, 250.00, 119.000, 115.000)



Hydraulic Calculations

for

Project Name: Natural Stone Supply Remote B

Location: , ,

Drawing Name: Natural Stone w riser room 6-24-21.cad

Calculation Date: 6/25/2021

Design

Remote Area Number: B

Occupancy Classification: Ordinary Group II

Density: 0.20gpm/ft²
Area of Application: 1500ft² (Actual 983ft²)
Coverage per Sprinkler: 256ft²
Type of sprinklers calculated: Upright
No. of sprinklers calculated: 8

In-rack Demand: N/A gpm at Node: N/A
Hose Streams: 250.00 at Node: 1 Type: Allowance at Source

Total Water Required (including Hose Streams where applicable):

From Water Supply at Node 1: 678.77 @ 103.882

Type of System:

Volume of Dry or PreAction System: N/A

for Node: 1 Date: 12-11-20

Location:

Source: Red Line Engineering

Name of Contractor: J & D Sprinkler Co.

Address: 315 W. Main St., Clayton. NC

Phone Number: 919-553-2356

Name of designer: J & D Sprinkler

Authority Having Jurisdiction:

Notes:

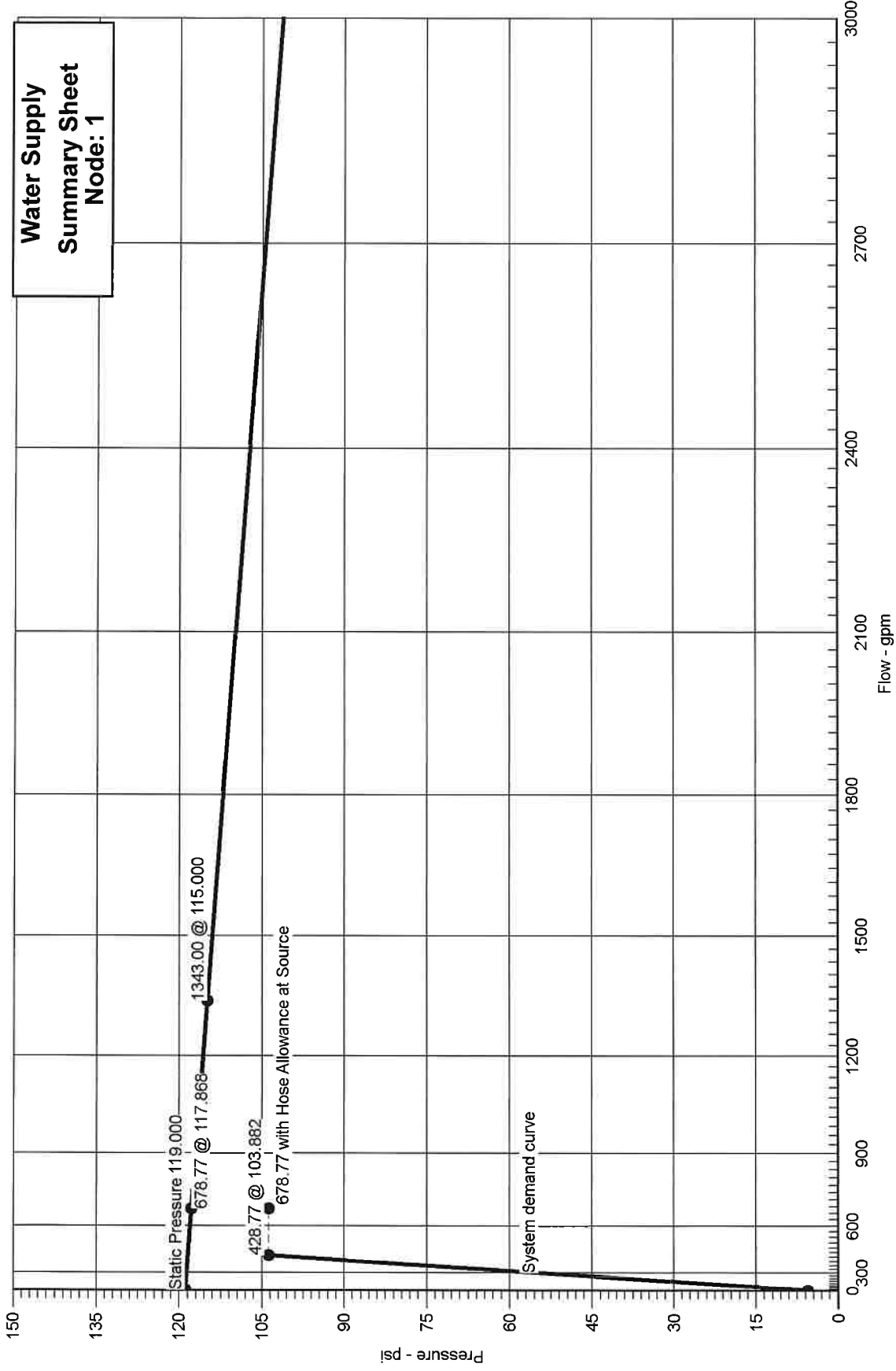
Automatic peaking results Left: N/A Right: N/A

Hydraulic Graph

Job Name: Natural Stone Supply Remote B
Remote Area Number: B

N 1.85

Date: 6/25/2021

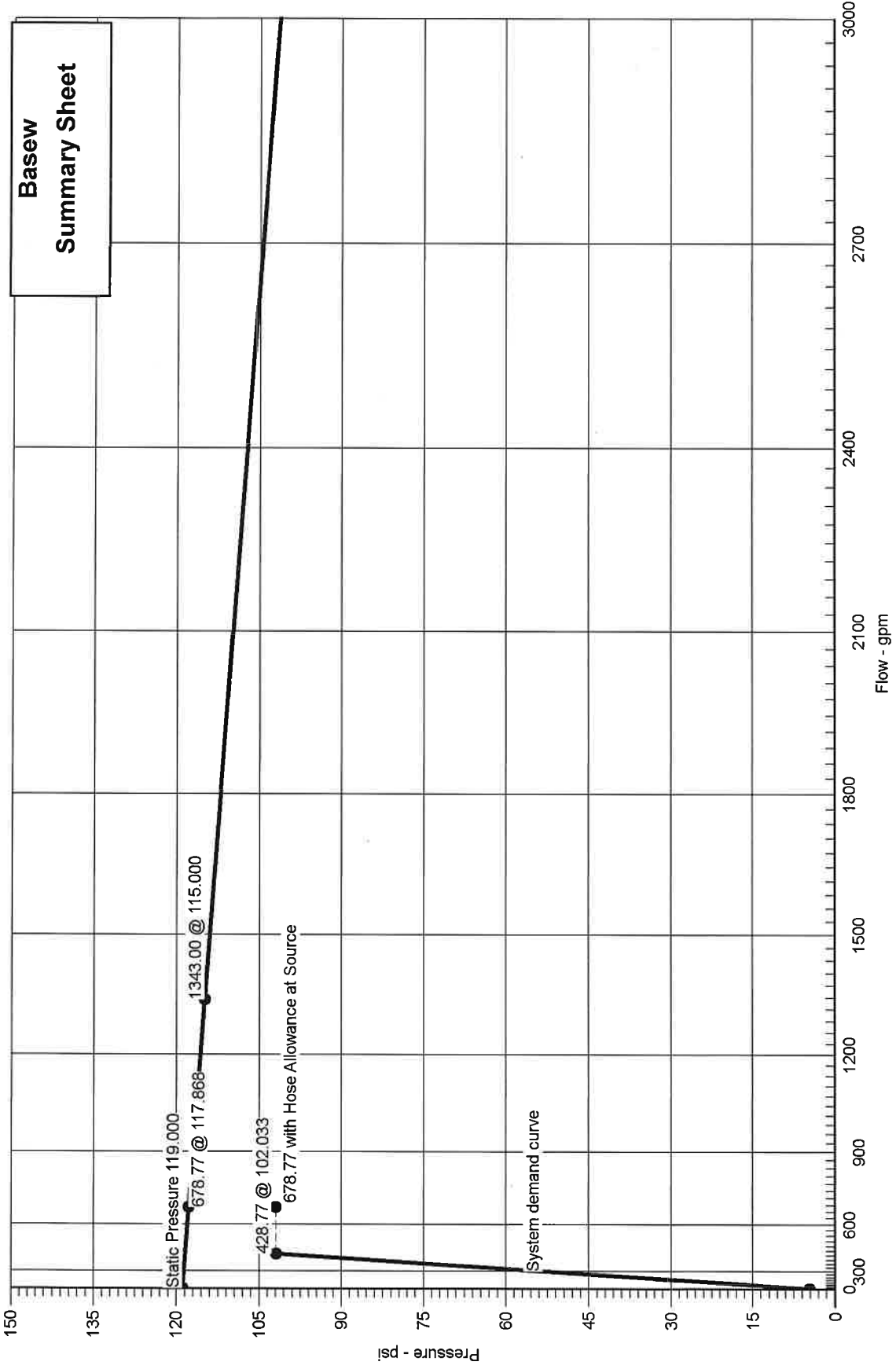


Hydraulic Graph

Job Name: Natural Stone Supply Remote B
Remote Area Number: B

N 1.85

Date: 6/25/2021



Basew
Summary Sheet



Summary Of Outflowing Devices

Job Number: n

Report Description: Ordinary Group II (B)

Device		Actual Flow (gpm)	Minimum Flow (gpm)	K-Factor (K)	Pressure (psi)		
Sprinkler	926	51.86	51.20	11.2	21.441		
Sprinkler	927	53.04	51.20	11.2	22.425		
Sprinkler	928	52.64	51.20	11.2	22.087		
⇒ Sprinkler	929	51.20	51.20	11.2	20.898		
Sprinkler	952	54.67	51.20	11.2	23.828		
Sprinkler	953	55.90	51.20	11.2	24.913		
Sprinkler	954	55.48	51.20	11.2	24.539		
Sprinkler	955	53.98	51.20	11.2	23.228		

⇒ Most Demanding Sprinkler Data

Supply Analysis							
Node	Name	Static (psi)	Residual (psi) @	Flow (gpm)	Available (psi) @	Total Demand (gpm)	Required Pressure (psi)
1	Water Supply	119.000	115.000	1343.00	117.868	678.77	103.882
Node Analysis							
Node Number	Elevation (Foot)	Node Type	Pressure at Node (psi)	Discharge at Node (gpm)	Notes		
1	-1'-0	Supply	103.882	428.77			
926	12'-0	Sprinkler	21.441	51.86			
927	12'-0	Sprinkler	22.425	53.04			
928	12'-0	Sprinkler	22.087	52.64			
929	12'-0	Sprinkler	20.898	51.20			
952	12'-0	Sprinkler	23.828	54.67			
953	12'-0	Sprinkler	24.913	55.90			
954	12'-0	Sprinkler	24.539	55.48			
955	12'-0	Sprinkler	23.228	53.98			
2	-1'-0		103.727				
3	1'-0	Supply	102.033				
100	12'-0		81.764				
487	12'-0		27.221				
522	12'-0		30.200				
626	12'-0		55.807				

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes
929	12'-0	11.2	51.20	1½	(See Notes)	16'-0	120	20.898	***** Route 1 ***** Sprinkler
928	12'-0		51.20	1.6820		16'-0	0.074307	1.189	
928	12'-0	11.2	52.64	1½	(See Notes)	8'-9½	120	22.087	Sprinkler, PO(9'-11)
487	12'-0		103.84	1.6820		9'-11	0.274869		
						18'-8		5.134	
487	12'-0		104.90	2		10'-0	120	27.221	Flow (q) from Route 2
522	12'-0		208.73	2.1570		10'-0	0.297888	2.979	
522	12'-0		109.46 + 110.4	2	(See Notes)	18'-5	120	30.200	Flow (q) from Route 3 and 4 fE(4'-3½)
626	12'-0		428.77	2.1570		4'-3½	1.128279		
						22'-8½		25.607	
626	12'-0			2½	(See Notes)	35'-11	120	55.807	2fE(4'-3½), PO(16'-5½)
100	12'-0		428.77	2.6350		25'-0½	0.425662	0.000	
						61'-0		25.957	
100	12'-0			6	(See Notes)	13'-11½	120	81.764	ALV(35'-2½), 2E(17'-7), BFP(-15.000), Basew
3	1'-0		428.77	6.3570		70'-5	0.005840	4.776	
						84'-4½		15.493	
3	1'-0			6	(See Notes)	87'-7½	140	102.033	2E(22'-1), T(47'-3½)
2	-1'-0		428.77	6.2800		91'-5	0.004660	0.859	
						179'-0		0.834	
2	-1'-0			8	(See Notes)	136'-5	140	103.727	Water Supply
1	-1'-0		428.77	8.3900		136'-5	0.001137		
								0.155	
			250.00					103.882	Hose Allowance At Source
1			678.77						Total(Pt) Route 1
926	12'-0	11.2	51.86	1½	(See Notes)	12'-11	120	21.441	***** Route 2 ***** Sprinkler
927	12'-0		51.86	1.6820		12'-11	0.076090	0.984	
927	12'-0	11.2	53.04	1½	(See Notes)	7'-2½	120	22.425	Sprinkler, PO(9'-11)
487	12'-0		104.90	1.6820		9'-11	0.280093		
						17'-1½		4.796	

Pipe Information

Node 1	Elev 1 (Foot)	K-Factor	Flow added this step (q)	Nominal ID	Fittings & Devices	Length (Foot)	C Factor	Total(Pt)	Notes
								27.221	Total(Pt) Route 2
955	12'-0	11.2	53.98	1½	(See Notes)	16'-0	120	23.228	••••• Route 3 ••••• Sprinkler
954	12'-0		53.98	1.6820		16'-0	0.081941	1.311	
954	12'-0	11.2	55.48	1½	(See Notes)	8'-9½	120	24.539	Sprinkler, PO(9'-11)
522	12'-0		109.46	1.6820		9'-11	0.303048	5.660	
						18'-8			
								30.200	Total(Pt) Route 3
952	12'-0	11.2	54.67	1½	(See Notes)	12'-11½	120	23.828	••••• Route 4 ••••• Sprinkler
953	12'-0		54.67	1.6820		12'-11½	0.083894	1.085	
953	12'-0	11.2	55.90	1½	(See Notes)	7'-2½	120	24.913	Sprinkler, PO(9'-11)
522	12'-0		110.57	1.6820		9'-11	0.308770	5.287	
						17'-1½			
								30.200	Total(Pt) Route 4

Equivalent Pipe Lengths of Valves and Fittings (C=120 only)

C Value Multiplier

$$\left(\frac{\text{Actual Inside Diameter}}{\text{Schedule 40 Steel Pipe Inside Diameter}} \right)^{4.87} = \text{Factor}$$

Value Of C	100	130	140	150
Multiplying Factor	0.713	1.16	1.33	1.51

Fittings Legend

ALV Alarm Valve	AngV Angle Valve	b Bushing
BalV Ball Valve	BFP Backflow Preventer	BV Butterfly Valve
C Cross Flow Turn 90°	cplg Coupling	Cr Cross Run
CV Check Valve	DelV Deluge Valve	DPV Dry Pipe Valve
E 90° Elbow	EE 45° Elbow	Ee1 11¼° Elbow
Ee2 22½° Elbow	f Flow Device	fd Flex Drop
FDC Fire Department Connectic	fE 90° FireLock(TM) Elbow	fEE 45° FireLock(TM) Elbow
fg Flange	FN Floating Node	fT FireLock(TM) Tee
g Gauge	GloV Globe Valve	GV Gate Valve
Ho Hose	Hose Hose	HV Hose Valve
Hyd Hydrant	LtE Long Turn Elbow	mecT Mechanical Tee
Noz Nozzle	P1 Pump In	P2 Pump Out
PIV Post Indicating Valve	PO Pipe Outlet	PrV Pressure Relief Valve
PRV Pressure Reducing Valve	red Reducer/Adapter	S Supply
sCV Swing Check Valve	SFx Seismic Flex	Spr Sprinkler
St Strainer	T Tee Flow Turn 90°	Tr Tee Run
U Union	WirF Wirsbo	WMV Water Meter Valve
Z Cap		

148 Jarco Drive - Hydrant Flow Test

1 message

Ed Evon <edevon1213@gmail.com>
To: Ed Evon <edevon1213@gmail.com>

Mon, Dec 14, 2020 at 8:54 AM

We performed a hydrant flow test at the site today.

Test Hydrant

Static: 119 psi

Residual 115 psi

Flow Hydrant

Gauge: 62 psi

Flow: 1,343 gpm

Let me know if you have any questions or concerns.

Have a Blessed Day,

Gary J. McCabe, P.E.



123 Raleigh Street

Fuquay-Varina, North Carolina 27526

Office: (919) 779-6851

Mobile: (919) 606-4560