SCHEMATIC WATER ANALYSIS

DIVINITY CAMPUS

CITY OF ROCHESTER, MONROE COUNTY
STATE OF NEW YORK

PREPARED FOR:
ROC GOODMAN, LLC
550 LATONA ROAD, BLDG. E, SUITE 501
ROCHESTER, NEW YORK 14626
(585)225-0140

PREPARED BY:

COSTICH
ENGINEERING

217 Lake Avenue
Rochester NY 14608

PROJECT NO. CE#6702
MAY, 2019
REVISED: JULY 25th, 2019

COSTICH ENGINEERING

July 25, 2019

DIVINITY CAMPUS
CITY OF ROCHESTER, MONROE COUNTY
STATE OF NEW YORK

SCHEMATIC WATER ANALYSIS

OVERVIEW

The proposed development of a portion of the Divinity Campus will include a water main extension along South Goodman Street, which will connect to a private water main to service the proposed apartments. The following summary will provide an overview of existing conditions, proposed improvements, and applicable standards to which the system will be designed, and constructed.

EXISTING WATER SERVICE

The property as it exists today, consists of a single water connection, via the 8" water main located on Highland Avenue. This connection services buildings on site which includes Strong Hall, Trever Eaton Hall, the Montgomery House, the Presidents House, Saunders House and Andrews House. A pump house exists today on the south property line, adjacent to the point of connection on Highland Avenue, which was designed to provide required domestic and fire flows for the above mentioned buildings. The pump house includes a split of domestic and fire protection services (into 4" & 8" respectively), backflow prevention devices, meters, a domestic pump and a fire pump.

PROPOSED DEVELOPMENT WATER SERVICE

The proposed development will be serviced by a new connection point on South Goodman Street, in which a City of Rochester Water Bureau public water main will be extended. From the right-of-way line, a private 8" combined water service will enter Building 100 and a proposed Pump Room located in the basement pump/mechanical, where the service will split into a 4" domestic and a 6" fire protection service. The pump room will include backflow prevention devices, meters, a domestic pump for the 4" service and a fire pump for the 6" service. The pump room will be used to service Building 100 & Building 200.

The intention of the new water connection point on South Goodman Street, was to not increase water demands on the existing system. As part of the proposed development, Saunders and Andrews House will be disconnected from the existing service, and will be serviced through the new connection point on South Goodman Street. A modification will also be made to the 6" fire main which services the existing hydrant on the North side of Strong Hall.

Pumps are being proposed due to the head required, the unique topography of the site and in order to meet the required pressures at the buildings for domestic and fire scenarios. The pump room will closely reflect the design of the existing pump house on Highland Avenue which includes backflow devices, domestic pump, fire pump, and two individual domestic and fire protection services.

Estimated domestic and Needed Fire Flows (NFF) for the proposed development can be found in the Appendix including detailed calculations and modeling.

The new water distribution, including domestic and fire protection services, will be included under a Reciprocal Easement Agreement (R.E.A.).

CONCLUSION

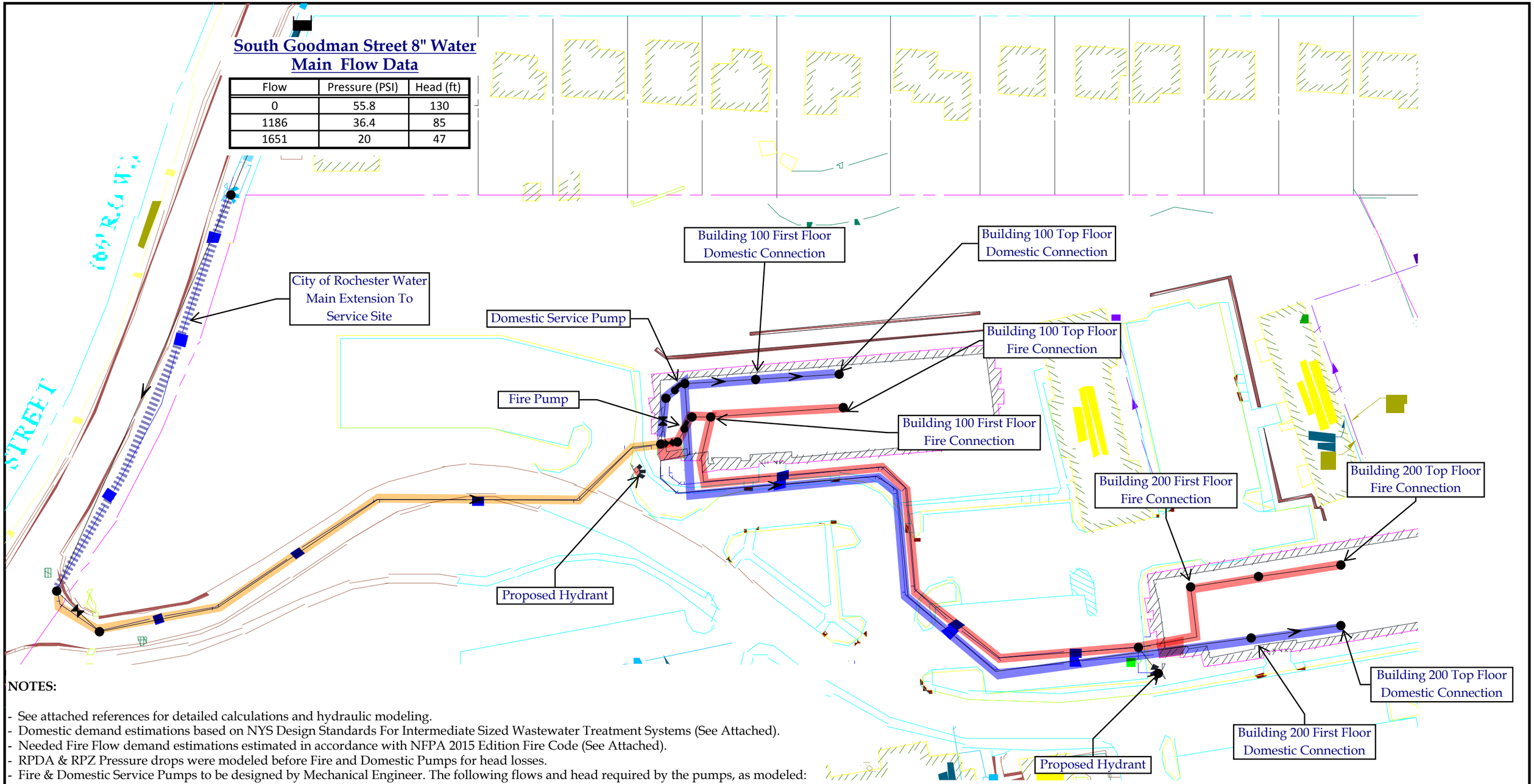
By providing a separate water distribution system within the site, the existing building water services will continue to operate as designed without being altered and the site will be provided with an additional source of public water. The existing buildings have a different nature of use, in comparison to the proposed apartment buildings, and a separate distribution system will separate the two land uses.

APPENDIX

- **CONCEPTUAL DESIGN SUMMARY EXHIBIT**
- **DOMESTIC & FIRE SCENARIO EXHIBITS**
- **SOUTH GOODMAN STREET FLOW DATA**
- **DOMESTIC DEMAND CALCULATIONS & REFERNCES**
- **NEEDED FIRE FLOW (NFF) CALCULATIONS & REFERNCES**
- **HYDRAULIC MODELING AND REPORTS**
- **BACKFLOW PREVENTION DEVICE CUT SHEETS**

South Goodman Street 8" Water Main Flow Data

Flow	Pressure (PSI)	Head (ft)
0	55.8	130
1186	36.4	85
1651	20	47



NOTES:

- See attached references for detailed calculations and hydraulic modeling.
- Domestic demand estimations based on NYS Design Standards For Intermediate Sized Wastewater Treatment Systems (See Attached).
- Needed Fire Flow demand estimations estimated in accordance with NFPA 2015 Edition Fire Code (See Attached).
- RPDA & RPZ Pressure drops were modeled before Fire and Domestic Pumps for head losses.
- Fire & Domestic Service Pumps to be designed by Mechanical Engineer. The following flows and head required by the pumps, as modeled:

DOMESTIC: 190 GPM @ 81-ft of Head **FIRE:** 8,751 GPM @ 81-ft of Head

8" CITY OF ROCHESTER WATER MAIN EXTENSION TO SITE
8" COMBINED SERVICE TO BUILDING 100
6" FIRE SERVICE
4" DOMESTIC SERVICE

WATER SERVICE CONCEPTUAL DESIGN

DIVINITY CAMPUS_CE#6702

C.R.A. ~ 07/25/2019 ~ N.T.S.

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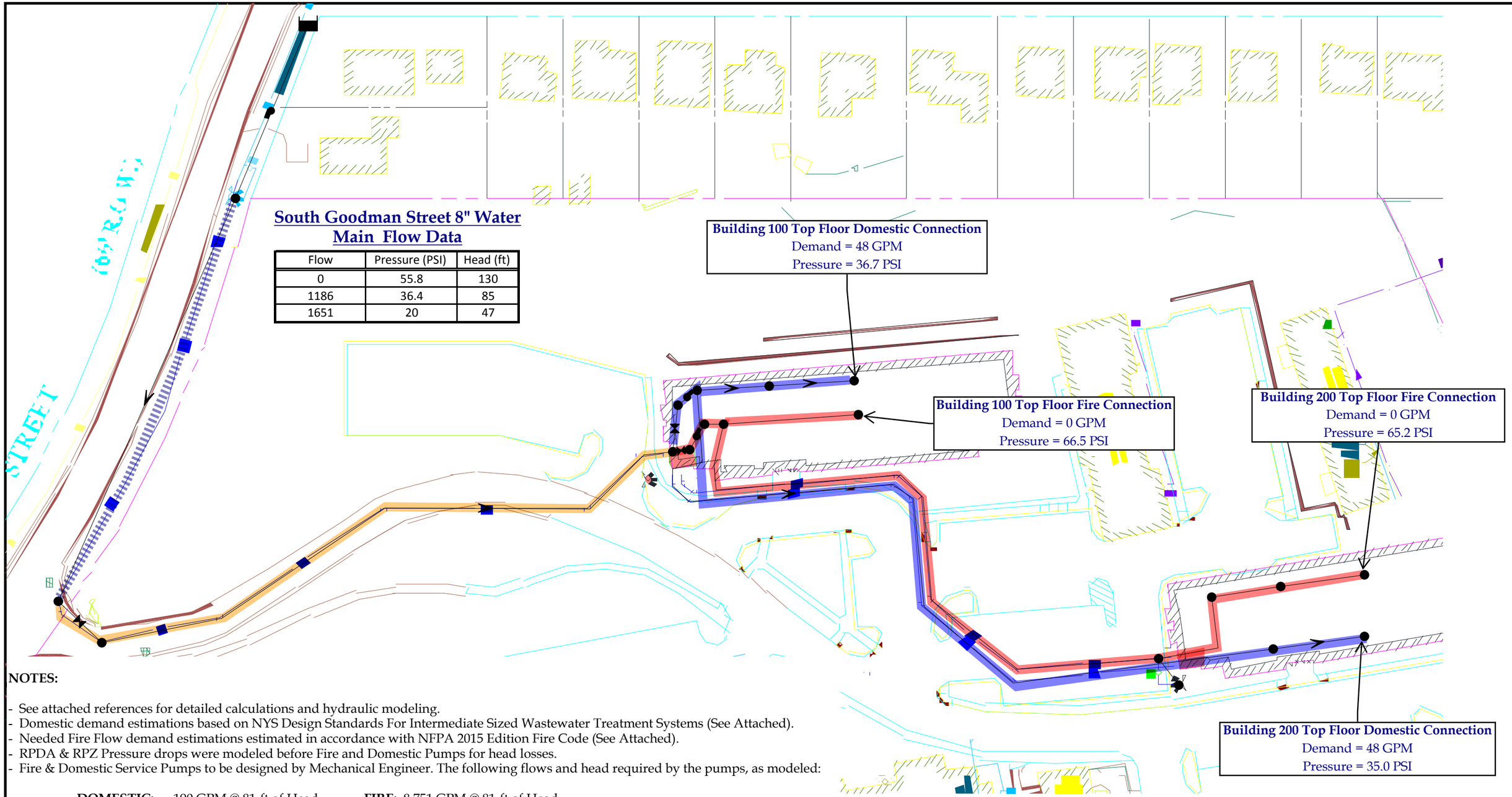

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DOMESTIC: 190 GPM @ 81-ft of Head **FIRE:** 8,751 GPM @ 81-ft of Head

8" CITY OF ROCHESTER WATER MAIN EXTENSION TO SITE
10" COMBINED SERVICE TO BUILDING 200
6" FIRE SERVICE
4" DOMESTIC SERVICE

DOMESTIC DEMANDS SCENARIO FOR CONCEPTUAL DESIGN

DIVINITY CAMPUS_CE#6702

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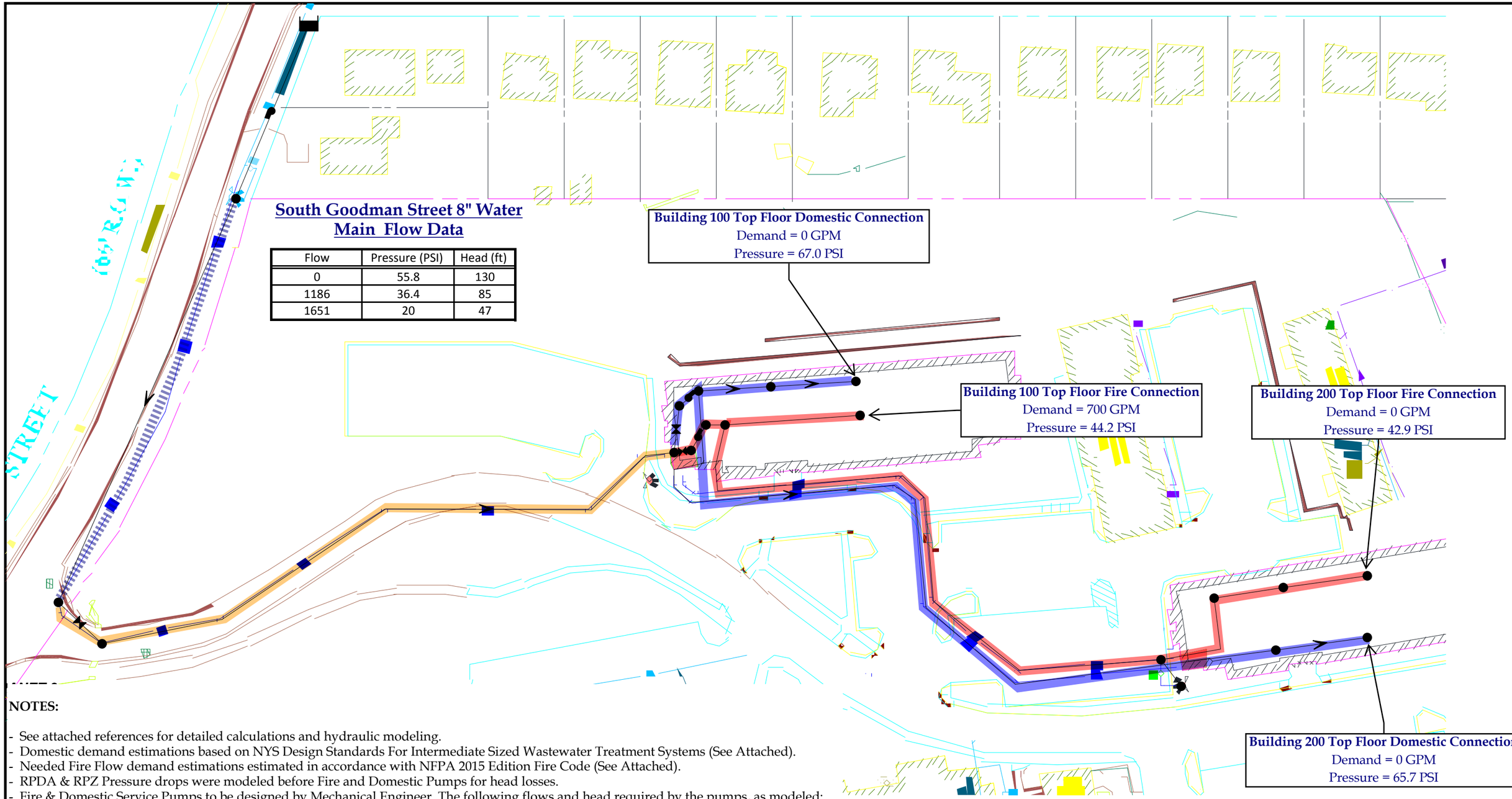

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8" CITY OF ROCHESTER WATER MAIN EXTENSION TO SITE
10" COMBINED SERVICE TO BUILDING 100
6" FIRE SERVICE
4" DOMESTIC SERVICE

FIRE AT BUILDING 100
SCENARIO FOR CONCEPTUAL DESIGN

DIVINITY CAMPUS_CE#6702
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South Goodman Street 8" Water Main Flow Data

Flow	Pressure (PSI)	Head (ft)
0	55.8	130
1186	36.4	85
1651	20	47

Building 100 Top Floor Domestic Connection
Demand = 0 GPM
Pressure = 67.0 PSI

Building 100 Top Floor Fire Connection
Demand = 0 GPM
Pressure = 44.2 PSI

Building 200 Top Floor Domestic Connection
Demand = 0 GPM
Pressure = 31.5 PSI

Building 200 Top Floor Fire Connection
Demand = 700 GPM
Pressure = 65.7 PSI

NOTES:

- See attached references for detailed calculations and hydraulic modeling.
- Domestic demand estimations based on NYS Design Standards For Intermediate Sized Wastewater Treatment Systems (See Attached).
- Needed Fire Flow demand estimations estimated in accordance with NFPA 2015 Edition Fire Code (See Attached).
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DOMESTIC: 190 GPM @ 81-ft of Head **FIRE:** 8,751 GPM @ 81-ft of Head

8" CITY OF ROCHESTER WATER MAIN EXTENSION TO SITE
10" COMBINED SERVICE TO BUILDING 100
6"FIRE SERVICE
4" DOMESTIC SERVICE

FIRE AT BUILDING 200
SCENARIO FOR CONCEPTUAL DESIGN

DIVINITY CAMPUS_CE#6702
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Domestic Scenario


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******************************************************************
*                          E P A N E T                           *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                         Version 2.0                            *
******************************************************************

Input File: Goodman Service Only - Domestic 8in.net
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Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in	
1	5	1	265	8	
15	@BLDG200-FF_DOM	@BLDG200-TF_DOM	1	4	
9	@BLDG100-FF_DOM	@BLDG100-TF_DOM	1	4	
20	17	HYD03	40	6	
21	17	20	100	6	
29	MECH_DOM-PUMP_DS	@BLDG100-FF_DOM	5	4	
7	20	@BLDG200-FF_FP	5	6	
10	@BLDG200-FF_FP	@BLDG200-TF_FP	1	6	
13	MECH_FP-PUMP_DS	@BLDG100-FF_FP	5	6	
19	@BLDG100-FF_FP	@BLDG100-TF_FP	1	6	
8	@BLDG100-FF_FP	17	400	6	
17	MECH_DOM-PUMP_DS	@BLDG200-FF_DOM	400	4	
2	2	MechRoomUp	1000	12	
11	3	5	#N/A	#N/A	Pump
12	MECH_RPZ_DS	MECH_DOM-PUMP_DS	#N/A	#N/A	Pump
14	MECH_RPDA_DS	MECH_FP-PUMP_DS	#N/A	#N/A	Pump
3	1	2	#N/A	8	Valve
5	MechRoomUp	MECH_RPZ_DS	#N/A	4	Valve
6	MechRoomUp	MECH_RPDA_DS	#N/A	6	Valve

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
11	100.00	75.00	542.75	3.13	3.13	0.00
12	100.00	75.00	220.21	1.27	1.27	0.00
14	100.00	75.00	536.17	0.00	0.00	0.00
				Demand Charge:		0.00
				Total Cost:		0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
@BLDG100-FF_DOM	0.00	734.71	53.17	0.00	
@BLDG100-TF_DOM	48.00	734.71	36.70	0.00	
5	0.00	698.57	56.14	0.00	
1	0.00	698.48	53.51	0.00	
2	0.00	698.48	53.51	0.00	
@BLDG200-FF_DOM	0.00	733.67	56.19	0.00	
@BLDG200-TF_DOM	48.00	733.67	34.95	0.00	
MechRoomUp	0.00	698.43	41.35	0.00	
MECH_RPZ_DS	0.00	682.15	34.30	0.00	
MECH_RPDA_DS	0.00	675.43	31.38	0.00	
MECH_DOM-PUMP_DS	0.00	734.72	57.08	0.00	
MECH_FP-PUMP_DS	0.00	803.43	86.85	0.00	
17	0.00	803.43	83.81	0.00	
20	0.00	803.43	86.41	0.00	
HYD03	0.00	803.43	84.68	0.00	
@BLDG200-FF_FP	0.00	803.43	82.08	0.00	
@BLDG200-TF_FP	0.00	803.43	65.18	0.00	
@BLDG100-FF_FP	0.00	803.43	82.95	0.00	
@BLDG100-TF_FP	0.00	803.43	66.48	0.00	
3	-96.00	569.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status	
1	96.00	0.61	0.32	Open	
15	48.00	1.23	2.62	Open	
9	48.00	1.23	2.62	Open	
20	0.00	0.00	0.00	Open	
21	0.00	0.00	0.00	Open	
29	48.00	1.23	2.62	Open	
7	0.00	0.00	0.00	Open	
10	0.00	0.00	0.00	Open	
13	0.00	0.00	0.00	Open	
19	0.00	0.00	0.00	Open	
8	0.00	0.00	0.00	Open	
17	48.00	1.23	2.63	Open	
2	96.00	0.27	0.05	Open	
11	96.00	0.00	-129.57	Open	Pump
12	96.00	0.00	-52.57	Open	Pump
14	0.00	0.00	-128.00	Open	Pump
3	96.00	0.61	0.00	Active	Valve
5	96.00	2.45	16.28	Open	Valve
6	0.00	0.00	23.00	Open	Valve

FIRE AT BUILDING 100


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******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.0                             *
******************************************************************

Input File: Gooodman Service - Fire BLDG 100.net
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Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in	
1	5	1	265	8	
15	@BLDG200-FF_DOM	@BLDG200-TF_DOM	1	4	
9	@BLDG100-FF_DOM	@BLDG100-TF_DOM	1	4	
20	17	HYD03	40	6	
21	17	20	100	6	
29	MECH_DOM-PUMP_DS	@BLDG100-FF_DOM	5	4	
7	20	@BLDG200-FF_FP	5	6	
10	@BLDG200-FF_FP	@BLDG200-TF_FP	1	6	
13	MECH_FP-PUMP_DS	@BLDG100-FF_FP	5	6	
19	@BLDG100-FF_FP	@BLDG100-TF_FP	1	6	
8	@BLDG100-FF_FP	17	400	6	
17	MECH_DOM-PUMP_DS	@BLDG200-FF_DOM	400	4	
2	2	MechRoomUp	1000	12	
11	3	5	#N/A	#N/A	Pump
12	MECH_RPZ_DS	MECH_DOM-PUMP_DS	#N/A	#N/A	Pump
14	MECH_RPDA_DS	MECH_FP-PUMP_DS	#N/A	#N/A	Pump
3	1	2	#N/A	8	Valve
5	MechRoomUp	MECH_RPZ_DS	#N/A	4	Valve
6	MechRoomUp	MECH_RPDA_DS	#N/A	6	Valve

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
11	100.00	75.00	473.50	19.89	19.89	0.00
12	100.00	75.00	439.83	0.00	0.00	0.00
14	100.00	75.00	391.31	16.44	16.44	0.00
				Demand Charge:		0.00
				Total Cost:		0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
@BLDG100-FF_DOM	0.00	804.50	83.41	0.00	
@BLDG100-TF_DOM	0.00	804.50	66.95	0.00	
5	0.00	682.04	48.98	0.00	
1	0.00	678.63	44.90	0.00	
2	0.00	678.63	44.90	0.00	
@BLDG200-FF_DOM	0.00	804.50	86.88	0.00	
@BLDG200-TF_DOM	0.00	804.50	65.65	0.00	
MechRoomUp	0.00	676.50	31.85	0.00	
MECH_RPZ_DS	0.00	699.50	41.82	0.00	
MECH_RPDA_DS	0.00	658.84	24.19	0.00	
MECH_DOM-PUMP_DS	0.00	804.50	87.31	0.00	
MECH_FP-PUMP_DS	0.00	752.25	64.67	0.00	
17	0.00	751.99	61.53	0.00	
20	0.00	751.99	64.13	0.00	
HYD03	0.00	751.99	62.39	0.00	
@BLDG200-FF_FP	0.00	751.99	59.79	0.00	
@BLDG200-TF_FP	0.00	751.99	42.89	0.00	
@BLDG100-FF_FP	0.00	751.99	60.66	0.00	
@BLDG100-TF_FP	700.00	751.94	44.17	0.00	
3	-700.00	569.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status	
1	700.00	4.47	12.86	Open	
15	0.00	0.00	0.00	Open	
9	0.00	0.00	0.00	Open	
20	0.00	0.00	0.00	Open	
21	0.00	0.00	0.00	Open	
29	0.00	0.00	0.00	Open	
7	0.00	0.00	0.00	Open	
10	0.00	0.00	0.00	Open	
13	700.00	7.94	52.20	Open	
19	700.00	7.94	52.19	Open	
8	0.00	0.00	0.00	Open	
17	0.00	0.00	0.00	Open	
2	700.00	1.99	2.13	Open	
11	700.00	0.00	-113.04	Open	Pump
12	0.00	0.00	-105.00	Open	Pump
14	700.00	0.00	-93.42	Open	Pump
3	700.00	4.47	0.00	Active	Valve
5	0.00	0.00	23.00	Open	Valve
6	700.00	7.94	17.67	Open	Valve

FIRE AT BUILDING 200


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******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.0                             *
******************************************************************

Input File: Gooodman Service - Fire BLDG 200.net
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Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in	
1	5	1	265	8	
15	@BLDG200-FF_DOM	@BLDG200-TF_DOM	1	4	
9	@BLDG100-FF_DOM	@BLDG100-TF_DOM	1	4	
20	17	HYD03	40	6	
21	17	20	100	6	
29	MECH_DOM-PUMP_DS	@BLDG100-FF_DOM	5	4	
7	20	@BLDG200-FF_FP	5	6	
10	@BLDG200-FF_FP	@BLDG200-TF_FP	1	6	
13	MECH_FP-PUMP_DS	@BLDG100-FF_FP	5	6	
19	@BLDG100-FF_FP	@BLDG100-TF_FP	1	6	
8	@BLDG100-FF_FP	17	400	6	
17	MECH_DOM-PUMP_DS	@BLDG200-FF_DOM	400	4	
2	2	MechRoomUp	1000	12	
11	3	5	#N/A	#N/A	Pump
12	MECH_RPZ_DS	MECH_DOM-PUMP_DS	#N/A	#N/A	Pump
14	MECH_RPDA_DS	MECH_FP-PUMP_DS	#N/A	#N/A	Pump
3	1	2	#N/A	8	Valve
5	MechRoomUp	MECH_RPZ_DS	#N/A	4	Valve
6	MechRoomUp	MECH_RPDA_DS	#N/A	6	Valve

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
11	100.00	75.00	473.50	19.89	19.89	0.00
12	100.00	75.00	439.83	0.00	0.00	0.00
14	100.00	75.00	391.31	16.44	16.44	0.00
				Demand Charge:		0.00
				Total Cost:		0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
@BLDG100-FF_DOM	0.00	804.50	83.41	0.00	
@BLDG100-TF_DOM	0.00	804.50	66.95	0.00	
5	0.00	682.04	48.98	0.00	
1	0.00	678.63	44.90	0.00	
2	0.00	678.63	44.90	0.00	
@BLDG200-FF_DOM	0.00	804.50	86.88	0.00	
@BLDG200-TF_DOM	0.00	804.50	65.65	0.00	
MechRoomUp	0.00	676.50	31.85	0.00	
MECH_RPZ_DS	0.00	699.50	41.82	0.00	
MECH_RPDA_DS	0.00	658.84	24.19	0.00	
MECH_DOM-PUMP_DS	0.00	804.50	87.31	0.00	
MECH_FP-PUMP_DS	0.00	752.25	64.67	0.00	
17	0.00	731.11	52.48	0.00	
20	0.00	725.89	52.82	0.00	
HYD03	0.00	731.11	53.34	0.00	
@BLDG200-FF_FP	0.00	725.63	48.37	0.00	
@BLDG200-TF_FP	700.00	725.58	31.45	0.00	
@BLDG100-FF_FP	0.00	751.99	60.66	0.00	
@BLDG100-TF_FP	0.00	751.99	44.19	0.00	
3	-700.00	569.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status	
1	700.00	4.47	12.86	Open	
15	0.00	0.00	0.00	Open	
9	0.00	0.00	0.00	Open	
20	0.00	0.00	0.00	Open	
21	700.00	7.94	52.20	Open	
29	0.00	0.00	0.00	Open	
7	700.00	7.94	52.20	Open	
10	700.00	7.94	52.19	Open	
13	700.00	7.94	52.21	Open	
19	0.00	0.00	0.00	Open	
8	700.00	7.94	52.20	Open	
17	0.00	0.00	0.00	Open	
2	700.00	1.99	2.13	Open	
11	700.00	0.00	-113.04	Open	Pump
12	0.00	0.00	-105.00	Open	Pump
14	700.00	0.00	-93.42	Open	Pump
3	700.00	4.47	0.00	Active	Valve
5	0.00	0.00	23.00	Open	Valve
6	700.00	7.94	17.67	Open	Valve

ROCHESTER WATER BUREAU

Hydrant Flow Test

19-19

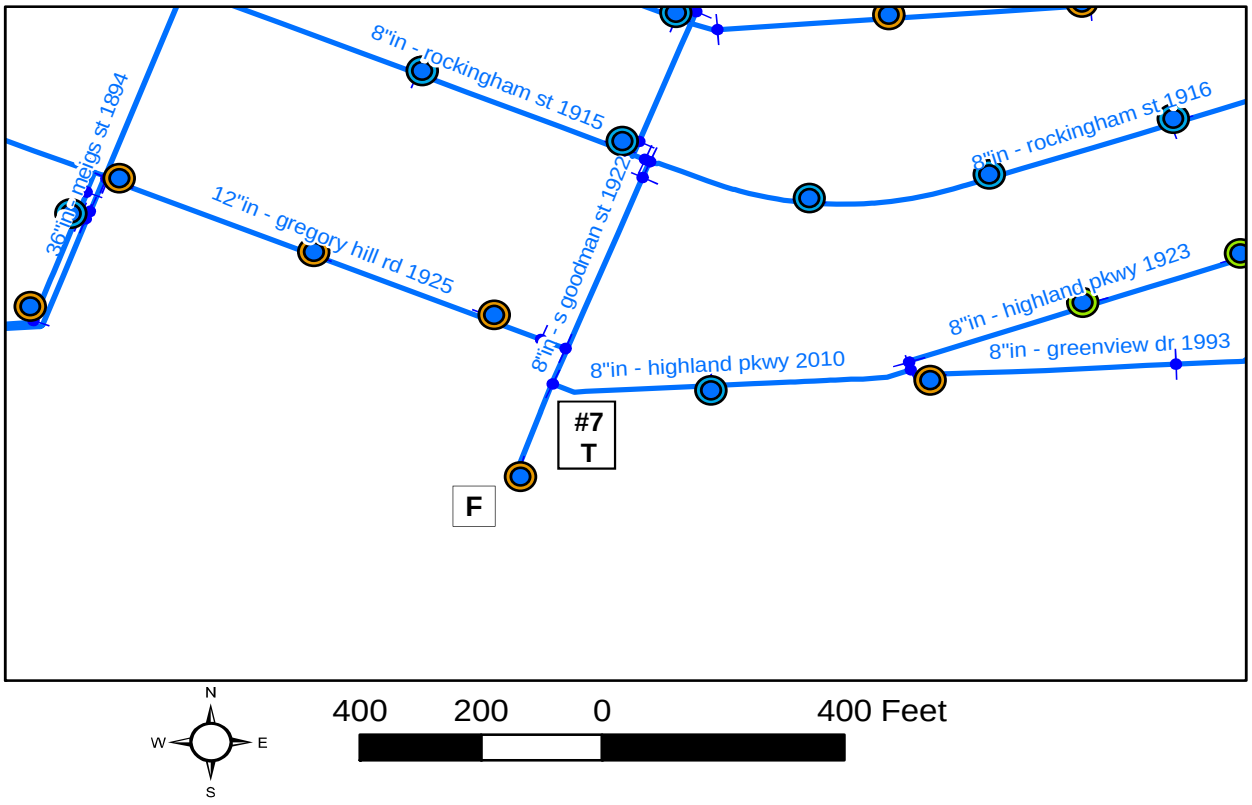
Location	S Goodman St	**Test Purpose**	RWW Engineering
Observer(s)	Liang, Winne, Wheatley	**Material**	CIP
Date	5/8/2019	**Time**	12:15 PM
Main Size, inches	8	**System**	DOM
Installed	1922	**Lined**	No

Test Data and Results:

Static Pressure	**55.8**	psi	**Test Flow**	1,186	gpm
Residual Pressure	36.4	psi	**Flow at 20 psi**	**1,651**	gpm
Pressure Drop	19.4	psi	**Nozzle Diameter**	4.501	inches
Pitot Pressure	**12.85**	psi	**Nozzle Coefficient**	0.55	

Corrected for Gauge Height above orifice.

Water Used During Test : 13,045 Gallons Mt Read BPS Flow MGD 9.80 Hose Monster



COSTICH ENGINEERING

HYDRAULIC LOADING & DEMAND CALCS

PROPOSED BUILDINGS:

Apartment Building 100:	Number of Floors:	4	Floors
	Number of Units:	**52**	**Units**
Apartment Building 100:	Number of Floors:	4	Floors
	Total No. of Units:	**52**	**Units**
Saunders House:	Number of Floors:	2	Floors
16,348 S.F.	**Total No. of Units:**	**16**	**Units**
Andrews House	Number of Floors:	2	Floors
8,500 S.F.	**Total No. of Units:**	**12**	**Units**

WATER DEMAND:

1.) Per NYS Design Standards For Intermediate Sized Wastewater Treatment Systems (2014):
- Table B-3 Typical Per Unit Hydraulic Loading Rate
- For Apartment Building: 110 GPD/Bedroom

Bldg. 100 Water Demand $= 52\ Units \left[\frac{110\ GPD}{Unit}\right]\left[\frac{1\ Day}{8\ Hr}\right]\left[\frac{1\ Hr}{60\ Min}\right] x\ 4\ (Peak\ Factor) =$ **48 GPM**

Bldg. 200 Water Demand $= 52\ Units \left[\frac{110\ GPD}{Unit}\right]\left[\frac{1\ Day}{8\ Hr}\right]\left[\frac{1\ Hr}{60\ Min}\right] x\ 4\ (Peak\ Factor) =$ **48 GPM**

Saunders House $= 16\ Units \left[\frac{110\ GPD}{Unit}\right]\left[\frac{1\ Day}{8\ Hr}\right]\left[\frac{1\ Hr}{60\ Min}\right] x\ 4\ (Peak\ Factor) =$ **15 GPM**

Andrews House $= 12\ Units \left[\frac{110\ GPD}{Unit}\right]\left[\frac{1\ Day}{8\ Hr}\right]\left[\frac{1\ Hr}{60\ Min}\right] x\ 4\ (Peak\ Factor) =$ **11 GPM**

JOB 6702 Divinity Campus

SHEET NO._____ OF _____

CALCULATED BY: CRA DATE 07/09/2019

CHECKED BY:_____ DATE _____

SCALE _____

WATER DEMAND & SANITARY SEWER LOADING CALCS

Number of Units Proposed:

Apartment Building 100 & 200: 52 units/bldg = 104 units

Per NYS Design Standards For Intermediate Sized Wastewater Treatment Systems (2014):

- Table B-3 Typical Per Unit Hydraulic Loading Rate
- For Apartment Building = 110 GPD/Bedroom

Building 100 & 200:

110 GPD/Bedroom x 104 Units = 11,440 GPD

FROM PREVIOUS SUBMISSION/SITE DESIGN: (05/23/2019)

Number of Units Proposed:

Apartment Building 100 = 200 units
Apartment Building 200 = 40 units

Per NYS Design Standards For Intermediate Sized Wastewater Treatment Systems (2014):

- Table B-3 Typical Per Unit Hydraulic Loading Rate
- For Apartment Building = 110 GPD/Bedroom

Building 100:

110 GPD/Bedroom x 200 Units = 22,000 GPD

Building 200:

110 GPD/Bedroom x 40 Units = 4,400 GPD

TOTAL WATER DEMAND = 26,400 GPD

COSTICH ENGINEERING

NEW YORK STATE

DESIGN STANDARDS FOR

INTERMEDIATE SIZED

WASTEWATER TREATMENT SYSTEMS

MARCH 5, 2014

New York State

Department of Environmental Conservation

Division of Water

625 Broadway

Albany, New York 12233-3505

Andrew M. Cuomo, Governor

Joe Martens, Commissioner

etc.) and exclude extraneous data. There should be a reasonable explanation for the operational variations and any extraneous data excluded.

Method 3: Water Usage Data

A minimum of one year of data collected during similar operational conditions may be required by the Reviewing Engineer. If sufficient measured water usage data is not available, Method 3 should not be used. The average of the daily (24-hour) flow over the duration of the data collection period is an acceptable method for determining the average daily flow rate. The largest daily (24-hour) measured volume during the same period expressed in volume per unit time is an acceptable method for determining the maximum day flow rate. The analysis should account for operational variations (e.g. peak seasonal, weekends, special events, delivery period, etc.) and exclude extraneous data. There should be a reasonable explanation for operational variations and any extraneous data excluded.

For each of these methods, the peak hourly flow rate (largest hourly volume expressed in volume per unit time) should also be identified. When variation in the wastewater flow rate is expected to be substantial, it is necessary to examine the significant delivery period of the wastewater and base the system design upon this information to prevent an excessive rate of flow through wastewater collection and treatment systems. Flow equalization prior to treatment units should be considered to avoid hydraulic overloading of treatment units during peak loading periods (peak hourly flow and maximum daily flow).

Table B-3 Typical Per-Unit Hydraulic Loading Rates

Residential

Type of Use	*Unit*	*Gallons per Day*
Apartment	Per Bedroom	110/130/150[16]
Mobile Home Park	"Single-Wide" Home "Double-Wide" Home	220 330
Single Family Residence	Per Bedroom	110 / 130/ 150[17]

[16] 110 gpd for post 1994 plumbing code fixtures; 130 gpd for pre 1994 fixtures; and 150 gpd for pre 1980 fixtures. Homes over 1,000 gpd, community systems, or lodging establishments with high flow fixtures must account for any higher peak flow periods.

[17] For individual household systems under 1,000 gpd, use design flows in the NYSDOH's *Wastewater Treatment Standards Residential Onsite Systems - Appendix 75- A.*

JOB 6702 Divinity School

SHEET NO. 1 OF 2

CALCULATED BY: C.R.A. DATE 05/17/2019

CHECKED BY: _____ DATE _____

SCALE N.T.S

Fire Flows in Accordance with ISO/NFPA Fire Code (2015 Edition)

Apartment Building 100 & 200:

Fire Flow Area = 15,000 SF x 4 Stories = 60,000 SF

NFPA 2015 Edition Fire Code Table 18.4.5.2.1: Minimum Fire Flow for Area of 60,000 SF = 2,750 GPM

NFPA 2015 Edition Section 18.4.5.3 Buildings Other Than One and Two Family Dwellings:

Section 18.4.5.3.3: "Required fire flow shall be reduced by 75% when the building is protected by an approved automatic sprinkler System, which utilizes a quick response sprinklers throughout. **The resulting fire flow shall not be less than 600 GPM.**

Required Fire Flow for Apartment Building per ISO/NFPA = 2,750 GPM * 0.25 = 688 **GPM**

Will Use 700 GPM for required fire flow.

COSTICH ENGINEERING

Table 18.4.5.2.1 Minimum Required Fire Flow and Flow Duration for Buildings

Fire Flow Area ft^2 (× 0.0929 for m^2)					Fire Flow gpm† (× 3.785 for L/min)	Flow Duration (hours)
I(443), I(332), II(222)*	II(111), III(211)*	IV(2HH), V(111)*	II(000), III(200)*	V(000)*		
0–22,700	0–12,700	0–8200	0–5900	0–3600	1500	
22,701–30,200	12,701–17,000	8201–10,900	5901–7900	3601–4800	1750	
30,201–38,700	17,001–21,800	10,901–12,900	7901–9800	4801–6200	2000	
38,701–48,300	21,801–24,200	12,901–17,400	9801–12,600	6201–7700	2250	2
48,301–59,000	24,201–33,200	17,401–21,300	12,601–15,400	7701–9400	2500	
59,001–70,900	33,201–39,700	21,301–25,500	15,401–18,400	9401–11,300	2750	
70,901–83,700	39,701–47,100	25,501–30,100	18,401–21,800	11,301–13,400	3000	
83,701–97,700	47,101–54,900	30,101–35,200	21,801–25,900	13,401–15,600	3250	3
97,701–112,700	54,901–63,400	35,201–40,600	25,901–29,300	15,601–18,000	3500	
112,701–128,700	63,401–72,400	40,601–46,400	29,301–33,500	18,001–20,600	3750	
128,701–145,900	72,401–82,100	46,401–52,500	33,501–37,900	20,601–23,300	4000	
145,901–164,200	82,101–92,400	52,501–59,100	37,901–42,700	23,301–26,300	4250	
164,201–183,400	92,401–103,100	59,101–66,000	42,701–47,700	26,301–29,300	4500	
183,401–203,700	103,101–114,600	66,001–73,300	47,701–53,000	29,301–32,600	4750	
203,701–225,200	114,601–126,700	73,301–81,100	53,001–58,600	32,601–36,000	5000	
225,201–247,700	126,701–139,400	81,101–89,200	58,601–65,400	36,001–39,600	5250	
247,701–271,200	139,401–152,600	89,201–97,700	65,401–70,600	39,601–43,400	5500	
271,201–295,900	152,601–166,500	97,701–106,500	70,601–77,000	43,401–47,400	5750	
Greater than 295,900	Greater than 166,500	106,501–115,800	77,001–83,700	47,401–51,500	6000	4
		115,801–125,500	83,701–90,600	51,501–55,700	6250	
		125,501–135,500	90,601–97,900	55,701–60,200	6500	
		135,501–145,800	97,901–106,800	60,201–64,800	6750	
		145,801–156,700	106,801–113,200	64,801–69,600	7000	
		156,701–167,900	113,201–121,300	69,601–74,600	7250	
		167,901–179,400	121,301–129,600	74,601–79,800	7500	
		179,401–191,400	129,601–138,300	79,801–85,100	7750	
		Greater than 191,400	Greater than 138,300	Greater than 85,100	8000	

*Types of construction are based on NFPA 220.
†Measured at 20 psi (139.9 kPa).

18.4.5.1.5* The reductions in 18.4.5.1.2, 18.4.5.1.3, and 18.4.5.1.4 shall not reduce the required fire flow to less than 500 gpm (1900 L/min).

18.4.5.2 One- and Two-Family Dwellings Exceeding 5000 ft² (464.5 m²).

18.4.5.2.1 Fire flow and flow duration for dwellings having a fire flow area in excess of 5000 ft² (464.5 m²) shall not be less than that specified in Table 18.4.5.2.1.

18.4.5.2.2 Required fire flow shall be reduced by 75 percent and the duration reduced to 1 hour where the one- and two-family dwelling is provided with an approved automatic sprinkler system.

18.4.5.2.3 A reduction in the required fire flow shall be permitted where a one- and two-family dwelling is separated from all lot lines in accordance with Table 18.4.5.1.4.

18.4.5.2.4 Required fire flow for one- and two-family dwellings protected by an approved automatic sprinkler system shall not exceed 2000 gpm (7571 L/min) for 1 hour.

18.4.5.2.5* The reductions in 18.4.5.2.2, and 18.4.5.2.3 shall not reduce the required fire flow to less than 500 gpm (1900 L/min) for 1 hour.

18.4.5.3 Buildings Other Than One- and Two-Family Dwellings.

18.4.5.3.1 The minimum fire flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table 18.4.5.2.1.

18.4.5.3.2 Required fire flow shall be reduced by 75 percent when the building is protected throughout by an approved automatic sprinkler system. The resulting fire flow shall not be less than 1000 gpm (3785 L/min).

18.4.5.3.3 Required fire flow shall be reduced by 75 percent when the building is protected throughout by an approved automatic sprinkler system, which utilizes quick response sprinklers throughout. The resulting fire flow shall not be less than 600 gpm (2270 L/min).

18.4.5.3.4* Required fire flow for buildings protected by an approved automatic sprinkler system shall not exceed 2000 gpm (7571 L/min) for 2 hours.

18.4.5.3.5 Required fire flow for open parking structures that are not protected throughout by an approved automatic sprinkler system shall be reduced by 75 percent where all of the following conditions are met:

(1) The structure complies with the building code.
(2) The structure is of Type I or Type II construction.
(3) The structure is provided with a Class I standpipe system in accordance with NFPA 14. Class I standpipe systems of the manual dry type shall be permitted.
(4) The resulting fire flow is not less than 1000 gpm (3785 L/min).

18.4.5.4* Required Fire Flow and Automatic Sprinkler System Demand. For a building with an approved fire sprinkler system, the fire flow demand and the fire sprinkler system demand shall not be required to be added together. The water supply shall be capable of delivering the larger of the individual demands.

18.5 Fire Hydrants.

18.5.1 Fire Hydrant Locations and Distribution. Fire hydrants shall be provided in accordance with Section 18.5 for all new buildings, or buildings relocated into the jurisdiction unless otherwise permitted by 18.5.1.1 or 18.5.1.2.

18.5.1.1 Fire hydrants shall not be required where the water distribution system is not capable of providing a fire flow of greater than 500 gpm (1893 L/min) at a residual pressure of 20 psi (139.9 kPa).

18.5.1.2* Fire hydrants shall not be required where modification or extension of the water distribution system is deemed to be impractical by the AHJ.

18.5.1.3 The provisions of 18.5.1.1 and 18.5.1.2 shall not eliminate the fire flow requirements of Section 18.4.

18.5.1.4* The distances specified in Section 18.5 shall be measured along fire department access roads in accordance with 18.2.3.

18.5.1.5 Where fire department access roads are provided with median dividers incapable of being crossed by fire apparatus, or where fire department access roads have traffic counts of more than 30,000 vehicles per day, hydrants shall be placed on both sides of the fire department access road on an alternating basis, and the distances specified by Section 18.5 shall be measured independently of the hydrants on the opposite side of the fire department access road.

18.5.1.6 Fire hydrants shall be located not more than 12 ft (3.7 m) from the fire department access road.

18.5.2 Detached One- and Two-Family Dwellings. Fire hydrants shall be provided for detached one- and two-family dwellings in accordance with both of the following:

(1) The maximum distance to a fire hydrant from the closest point on the building shall not exceed 600 ft (122 m).
(2) The maximum distance between fire hydrants shall not exceed 800 ft (244 m).

18.5.3 Buildings Other than Detached One- and Two-Family Dwellings. Fire hydrants shall be provided for buildings other than detached one- and two-family dwellings in accordance with both of the following:

(1) The maximum distance to a fire hydrant from the closest point on the building shall not exceed 400 ft (76 m).
(2) The maximum distance between fire hydrants shall not exceed 500 ft (152 m).

18.5.4 Minimum Number of Fire Hydrants for Fire Flow.

18.5.4.1 The minimum number of fire hydrants needed to deliver the required fire flow for new buildings in accordance with Section 18.4 shall be determined in accordance with Section 18.5.4.

18.5.4.2 The aggregate fire flow capacity of all fire hydrants within 1000 ft (305 m) of the building, measured in accordance with 18.5.1.4 and 18.5.1.5, shall be not less than the required fire flow determined in accordance with Section 18.4.

18.5.4.3* The maximum fire flow capacity for which a fire hydrant shall be credited shall be as specified by Table 18.5.4.3. Capacities exceeding the values specified in Table 18.5.4.3 shall be permitted when local fire department operations have the ability to accommodate such values as determined by the fire department.

18.5.4.4 Fire hydrants required by 18.5.2 and 18.5.3 shall be included in the minimum number of fire hydrants for fire flow required by 18.5.4.

Construction Types - Definitions

TYPE I-A--Fire Resistive Non-combustible (Commonly found in high-rise buildings and Group I occupancies).
- 3 Hr. Exterior Walls*
- 3 Hr. Structural Frame
- 2 Hr. Floor/Ceiling Assembly
- 1 ½ Hr. Roof Protection

TYPE I-B--Fire Resistive Non-Combustible (Commonly found in mid-rise office & Group R buildings).
- 2 Hr. Exterior Walls*
- 2 Hr. Structural Frame
- 2 Hr. Ceiling/Floor Separation
- 1 Hr. Ceiling/Roof Assembly

TYPE II-A--Protected Non-Combustible (Commonly found in newer school buildings).
- 1 Hr. Exterior Walls
- 1 Hr. Structural Frame
- 1 Hr. Floor/Ceiling/Roof Protection

TYPE II-B--Unprotected Non-Combustible (Most common type of non-combustible construction used in commercial buildings).

Building constructed of non-combustible materials but these materials have no fire resistance.

TYPE III-A--Protected Combustible (Also known as "ordinary" construction with brick or block walls and a wooden roof or floor assembly which is 1 hour fire protected).
- 2 Hr. Exterior Walls*
- 1 Hr. Structural Frame
- 1 Hr. Floor/Ceiling/Roof Protection

TYPE III-B--Unprotected Combustible (Also known as "ordinary" construction; has brick or block walls with a wooden roof or floor assembly which is not protected against fire. These buildings are frequently found in "warehouse" districts of older cities.)
- 2 Hr. Exterior Walls*
- No fire resistance for structural frame, floors, ceilings, or roofs.

TYPE IV--Heavy Timber (also known as "mill" construction; to qualify all wooden members must have a minimum nominal dimension of 8 inches.)
- 2 Hr. Exterior Walls*
- 1 Hr. Structural Frame or Heavy Timber
- Heavy Timber Floor/Ceiling/Roof Assemblies

TYPE V-A--Protected Wood Frame (Commonly used in the construction of newer apartment buildings; there is no exposed wood visible.)
- 1 Hr. Exterior Walls
- 1 Hr. Structural Frame
- 1 Hr. Floor/Ceiling/Roof

TYPE V-B--Unprotected Wood Frame (Examples of Type V-N construction are single family homes and garages. They often have exposed wood so there is no fire resistance.)

- Note exceptions in the building code for fire resistance ratings of exterior walls and opening protection.

Job Name 6702 Divinity Campus

Job Location City of Rochester

Engineer Costich Engineering, DPC

Approval

Contractor

Approval

Contractor's P.O. No.

Representative

LEAD FREE*

Series 957, 957N, 957Z

Reduced Pressure Zone Assemblies

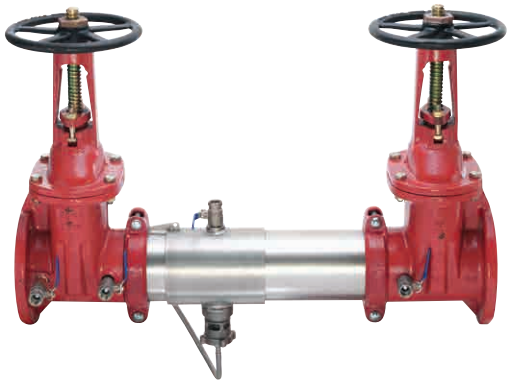
Sizes: 2½" – 10" (65 – 250 mm)

Series 957, 957N, 957Z Reduced Pressure Zone Assemblies provide protection to the potable water system from contamination in accordance with national plumbing codes. Series 957, 957N, 957Z are normally used in health hazard applications for protection against backsiphonage or backpressure.

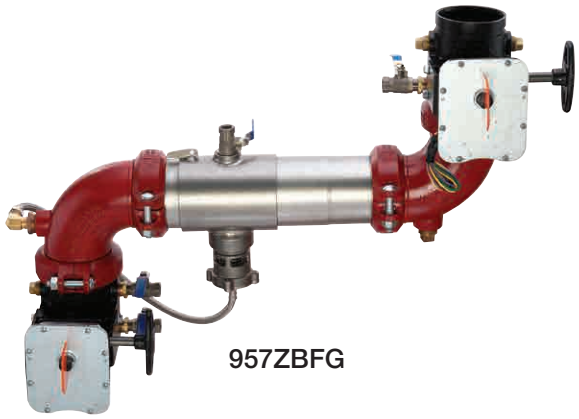
Series 957 is also available with SentryPlus™ Alert technology to detect catastrophic relief valve discharge that could potentially cause flooding, and issue a multi-channel alert (call, email, text) to selected users so they can take action to avoid potentially costly flooding.

Features

- 2½", 3" and 4" (65, 80 and 100mm) sizes available with quarter-turn ball valve shutoffs
- Replaceable check disc rubber
- Extremely compact design
- 70% Lighter than traditional designs
- 304 (Schedule 40) stainless steel housing & sleeve
- Groove fittings allow integral pipeline adjustment
- Patented torsion spring checks provide lowest pressure loss
- Unmatched ease of serviceability
- Bottom mounted cast stainless steel relief valve
- Available with grooved butterfly valve shutoffs



957OSY



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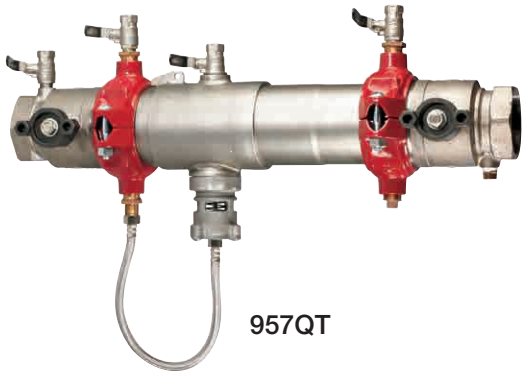


957QT

NOTICE

Inquire with governing authorities for local installation requirements

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

WATTS®

Specifications

The Reduced Pressure Zone Assembly shall consist of two independent torsion spring check modules, a differential pressure relief valve located between and below the two modules, two drip tight shutoff valves, and required torsion spring check modules and relief valve shall be contained with a sleeve accessible single housing constructed from 304 (Schedule 40) stainless steel pipe with groove end connections. Torsion spring checks shall have replaceable elastomer discs and in operation produce drip tight closure against the reverse flow of liquid caused by backpressure or backsiphonage. Assembly shall be a Watts Regulator Company Series 957, 957N, 957Z.

NOTICE

When installing a drain line on Series 957 backflow preventers, use 957AG air gaps. See ES-AG/EL/TC for additional information.

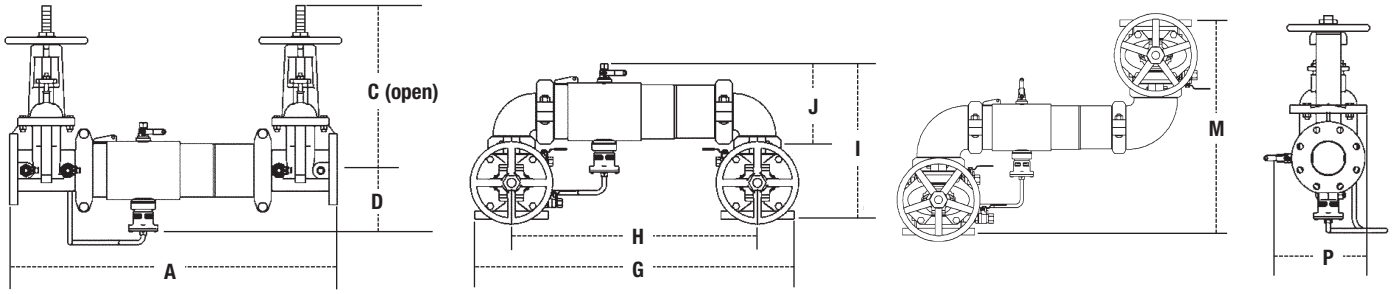
Available Models & Options

Suffix:

NRS –	non-rising stem, resilient seated gate valves
OSY –	UL/FM outside stem and yoke resilient seated gate valves
BFG –	UL/FM grooved gear operated butterfly valves with tamper switch
QT –	2½" - 4" (65 - 100mm) quarter-turn ball valves
*OSY FxG –	Flanged inlet gate connection and grooved outlet gate connection
**OSY GxF –	Grooved inlet gate connection and flanged outlet gate connection
***OSY GxG –	Grooved inlet gate connection and grooved outlet gate connection
****ALERT	with SentryPlus™ Alert flood detection system

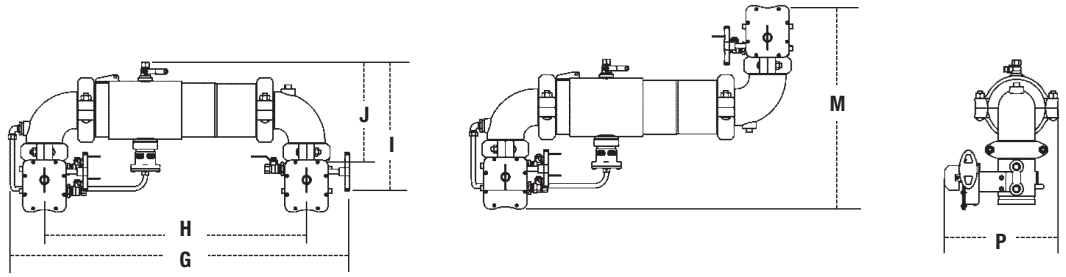
*Available with grooved NRS gate valves – consult factory
**Post indicator plate and operating nut available – consult factory
***Consult factory for dimensions

**** Not available with the 957N or 957Z



957, 957N, 957Z

SIZE (DN)		DIMENSIONS																		WEIGHT					
		A		C (OSY)		C (NRS)		D		G		H		I		J		M		P		957NRS		957OSY		957N NRS		957N OSY	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.	lbs.	kgs.	lbs.	kgs.	lbs.	kgs.
2½	65	30¾	781	16⅜	416	9⅜	238	6½	165	29 1/16	738	21½	546	15½	393	8 13/16	223	21¼	540	9 3/16	234	118	54	128	58	126	57	136	62
3	80	31¾	806	18⅞	479	10¼	260	6 1/16	170	30¼	768	22¼	565	17⅛	435	9 3/16	233	23	584	10½	267	134	61	148	67	147	67	161	73
4	100	33¾	857	22¾	578	12 3/16	310	7	178	33	838	23½	597	18½	470	9 15/16	252	26¼	667	11 3/16	284	164	74	164	74	187	85	187	85
6	150	43½	1105	30⅛	765	16	406	8½	216	44¾	1137	33½	851	23 3/16	589	13 1/16	332	34¼	870	15	381	276	125	298	135	317	144	339	154
8	200	49¾	1264	37¾	959	19 15/16	506	9 1/16	246	54⅛	1375	40⅛	1019	27 7/16	697	15 1/16	399	36⅞	937	17 3/16	437	441	200	483	219	516	234	558	253
10	250	57¾	1467	45¾	1162	23 13/16	605	11 3/16	285	66	1676	49½	1257	32½	826	17 5/16	440	44½	1124	20	508	723	328	783	355	893	405	950	431



957NBFG, 957ZBFG

SIZE (DN)		DIMENSIONS												WEIGHT	
		G		H		I		J		M		P		957N/957Z	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.
2½	65	32½	826	23	584	15½	394	9½	241	19¾	502	11 13/16	300	67	30
3	80	34	864	24	610	16 5/16	414	10 1/16	256	21¼	540	12⅛	308	70	32
4	100	35⅝	905	25½	648	17 3/16	437	10 15/16	279	23½	597	12⅝	321	87	39
6	150	46½	1181	35¼	895	20½	521	13½	343	27¼	692	15	382	160	73

Noryl® is a registered trademark of SABIC Innovative Plastics Holding BV.

Dimensions — Weight

Materials

Housing & Sleeve: 304 (Schedule 40) Stainless Steel

Elastomers: EPDM, Silicone and Buna-N

Torsion Spring Checks: Noryl®, Stainless Steel

Check Discs: Reversible Silicone or EPDM

Test Cocks: Bronze Body Nickel Plated

Pins & Fasteners: 300 Series Stainless Steel

Springs: Stainless Steel

Pressure — Temperature

Temperature Range: 33°F – 140°F (0.5°C – 60°C)

Maximum Working Pressure: 175psi (12.1 bar)

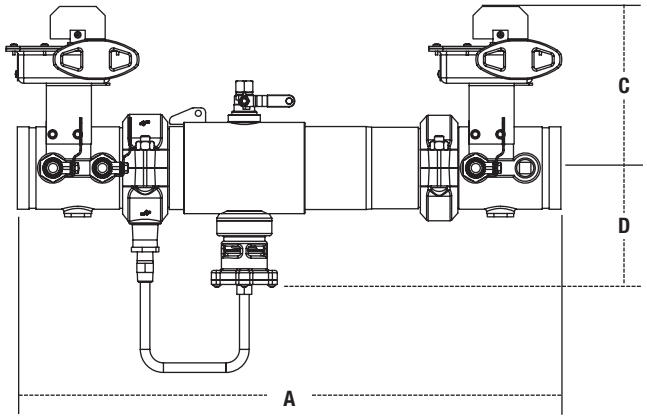
Approvals

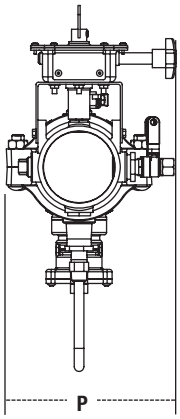
- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at The University of Southern California (FCCCHR-USC)
  (Excluding 'N' Pattern – 10", 'Z' Pattern – 6" and 10")
- AWWA C551-92

1013 B64.4 (**BFG & OSY Only)

For additional approval information please contact the factory or visit our website at Watts.com

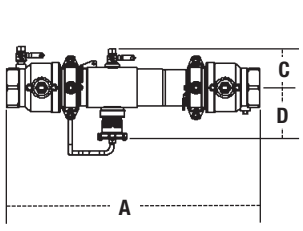
Dimensions — Weight continued

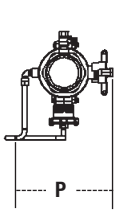


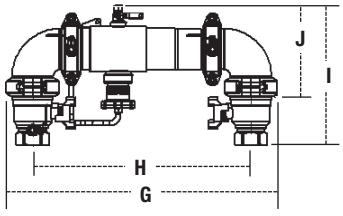


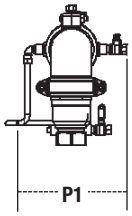
957 BFG

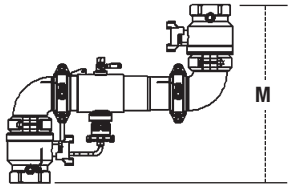
SIZE (DN)		DIMENSIONS								WEIGHT	
		A		C		D		P			
in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*
4	100	29	737	7¾	197	6⅜	162	9½	241	66	30
6	150	36½	927	9 11/16	246	7 7/16	189	14¼	362	122	55











957QT

SIZE (DN)		DIMENSIONS																		WEIGHT			
		A		C		D		G		H		I		J		M		P		P1		QT		QTN	
in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*	*lbs.*	*kgs.*
2 1/2	65	27 1/2	698	4 7/8	124	6 7/8	175	30¼	768	21½	546	16 1/16	407	11⅜	289	19 7/8	505	11 5/16	287	11 5/16	287	46	21	57	26
3	80	28	711	4 7/8	124	6 7/8	175	30¼	768	22¼	565	16 9/16	420	11⅜	289	20 7/8	531	11 5/16	287	11 5/16	287	56	25	67	30
4	100	28¾	730	4 7/8	124	6 7/8	175	30¼	768	23½	597	18 5/16	465	11⅜	289	24 3/8	619	11 5/16	287	11 5/16	287	76	34	87	39

Capacity

Series 957, 957N, 957Z flow curves as tested by Underwriters Laboratory.

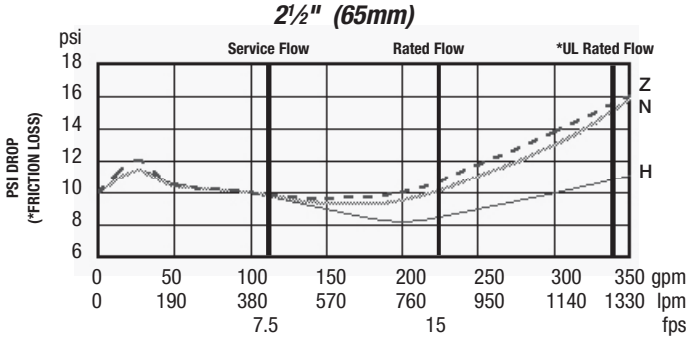
Flow characteristics collected using butterfly shutoff valves

——— Horizontal ——— N-Pattern - - - - - Z-Pattern

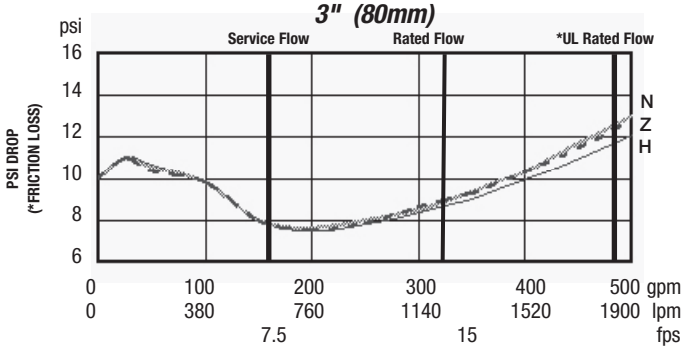
Flow capacity chart identifies valve performance based upon rated water velocity up to 25fps

- Service Flow is typically determined by a rated velocity of 7.5fps based upon schedule 40 pipe.
- Rated Flow identifies maximum continuous duty performance determined by AWWA.
- UL Flow Rate is 150% of Rated Flow and is not recommended for continuous duty.
- AWWA Manual M22 [Appendix C] recommends that the maximum water velocity in services be not more than 10fps.

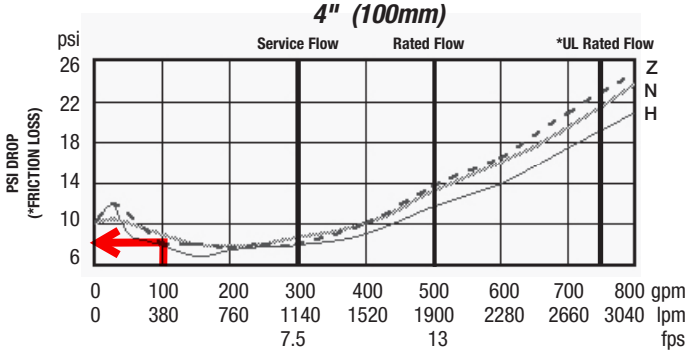
2½" (65mm)



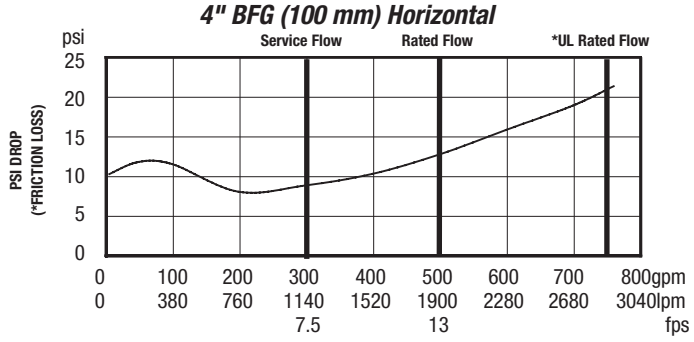
3" (80mm)



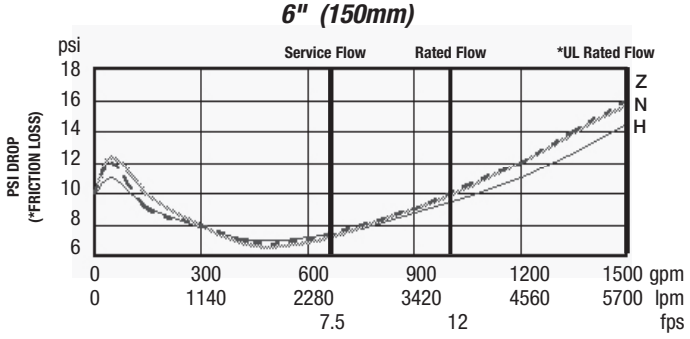
4" (100mm)



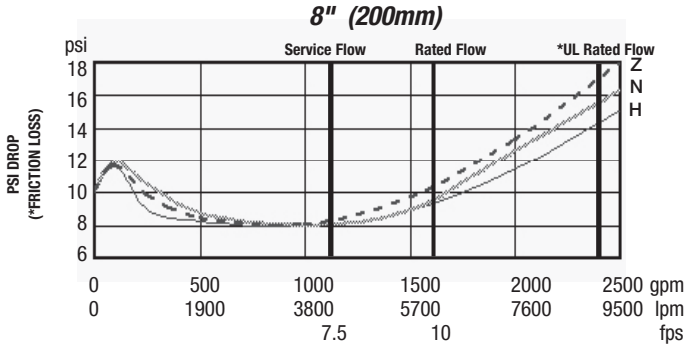
4" BFG (100 mm) Horizontal



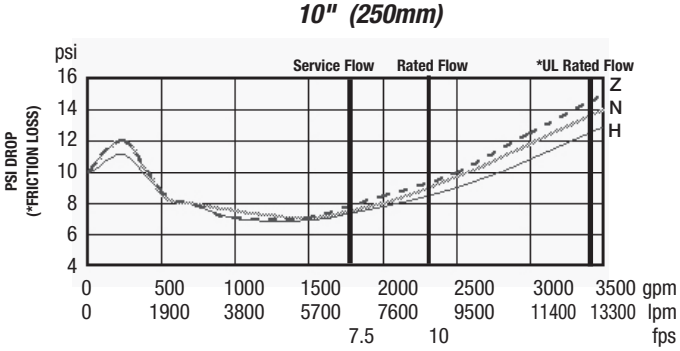
6" (150mm)



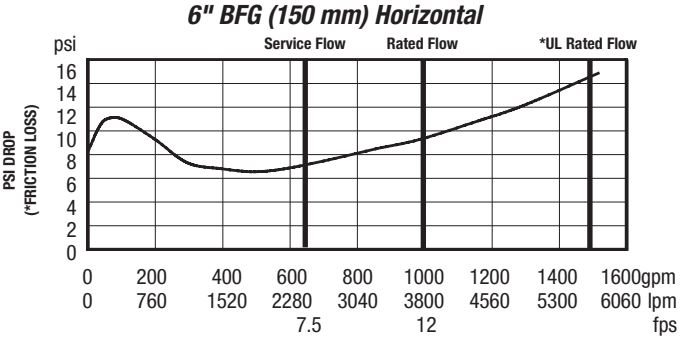
8" (200mm)



10" (250mm)



6" BFG (150 mm) Horizontal



WATTS®

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Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Watts.com

Job Name **6702 Divinity Campus**

Job Location **City of Rochester**

Engineer **Costich Engineering, DPC**

Approval _____

Contractor **TBD**

Approval _____

Contractor's P.O. No. _____

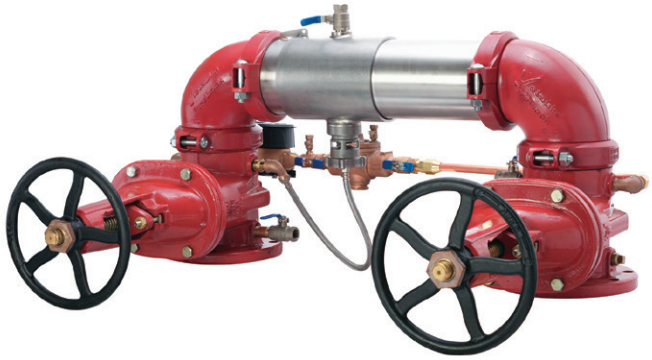
Representative _____

Series 957RPDA, 957NRPDA, 957ZRPDA

Reduced Pressure Detector Assemblies

Sizes: 2½" – 10"

Series 957RPDA, 957NRPDA, 957ZRPDA Reduced Pressure Detector Assemblies provide protection to the potable water system from contamination in accordance with national plumbing codes. The 957RPDA, 957NRPDA, 957ZRPDA are normally used in health hazard applications to protect against backsiphonage and backpressure. The Watts 957RPDA, 957NRPDA, 957ZRPDA are used to monitor unauthorized use of water from the fire protection system.



957NRPDAOSY

Features

- Extremely compact design
- 70% lighter than traditional designs
- 304 (Schedule 40) stainless steel housing & sleeve
- Groove fittings allow integral pipeline adjustment
- Patented torsion spring check provides lowest pressure loss
- Unmatched ease of serviceability
- Replaceable check disc rubber
- Available with grooved butterfly valve shutoffs
- Bottom mounted cast stainless steel relief valve
- Metered bypass to detect leakage or theft of water from the fire sprinkler system

Specifications

The Reduced Pressure Detector Assembly shall consist of two independent torsion spring check modules, a differential pressure relief valve located between and below the two modules, two drip tight shutoff valves, and required torsion spring check modules and relief valve shall be contained within a sleeve accessible single housing constructed from 304 (Sch 40) stainless steel pipe with groove end connections. Torsion spring checks shall have reversible elastomer discs and in operation produce drip tight closure against reverse flow caused by backpressure or backsiphonage. The bypass line shall include a meter, small diameter reduced pressure zone assembly and isolation valves. Assembly shall be Watts Series 957RPDA, 957NRPDA, 957ZRPDA.

⚠ WARNING

It is illegal to use this product in any plumbing system providing water for human consumption, such as drinking or dishwashing, in the United States. Before installing standard material product, consult your local water authority, building and plumbing codes.

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

WATTS®

Available Models

Suffix:

OSY – UL/FM outside stem and yoke, resilient seated gate valves

BFG – UL/FM grooved gear operated butterfly valves with tamper switch

*OSY FxG – Flanged inlet gate connection and grooved outlet gate connection

*OSY GxF – Grooved inlet gate connection and flanged outlet gate connection

*OSY GxG – Grooved inlet gate connection and grooved outlet gate connection

Available with grooved NRS gate valves - consult factory*
Post indicator plate and operating nut available - consult factory*
*Consult factory for dimensions

Materials

Housing & Sleeve: 304 (Schedule 40) Stainless Steel
Elastomers: EPDM, Silicone and Buna 'N'
Torsion Spring Checks: Noryl®, Stainless Steel
Check Discs: Reversible Silicone or EPDM
Test Cocks: Bronze Body Nickel Plated
Pins & Fasteners: 300 Series Stainless Steel
Springs: Stainless Steel

Pressure — Temperature

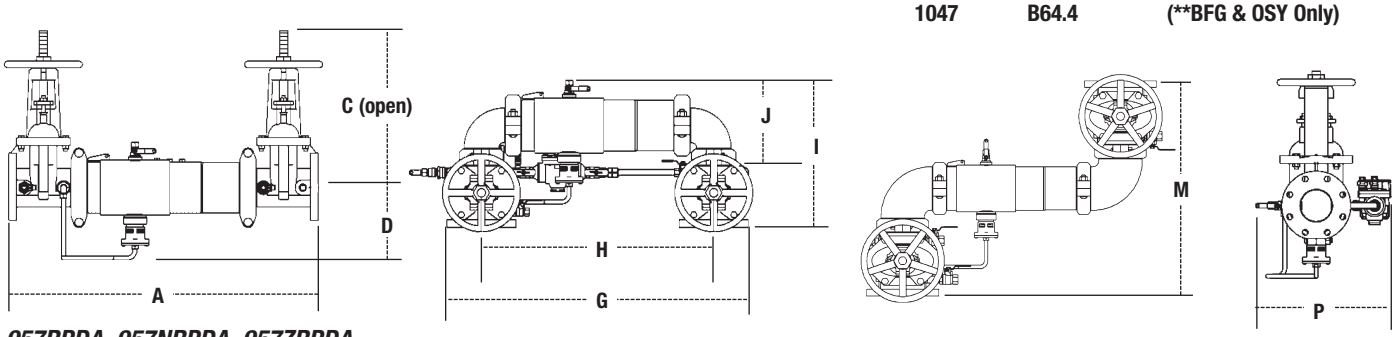
Temperature Range: 33°F – 140°F (0.5°C – 60°C)
Maximum Working Pressure: 175psi (12.1 bar)

Approvals

- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at The University of Southern California (FCCCHR-USC)
  (Excluding 'N' Pattern – 10"'Z', Pattern – 6" and 10")
- AWWA C511-97

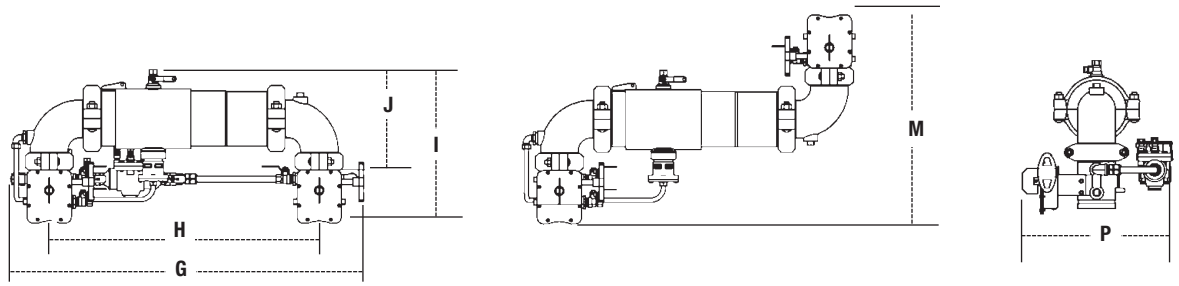
1047 B64.4 (**BFG & OSY Only)

Dimensions — Weight



957RPDA, 957NRPDA, 957ZRPDA

SIZE	DIMENSIONS																		WEIGHT			
	A		C (OSY)		D		G		H		I		J		M		P		957RPDA		957NRPDA	
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*	*lbs.*	*kgs.*
2½	30¾	781	16⅜	416	6½	165	29 1/16	738	21½	546	15½	393	8 13/16	223	21¼	540	13 3/16	335	142	64	150	68
3	31¾	806	18⅞	479	6 11/16	170	30¼	768	22¼	565	17⅛	435	9 3/16	233	23	584	14½	368	162	73	175	79
4	33¾	857	22¾	578	7	178	33	838	23½	597	18½	470	9 15/16	252	26¼	667	15 3/16	386	178	81	201	91
6	43½	1105	30⅛	765	8½	216	44¾	1137	33¼	845	23 3/16	589	13 1/16	332	32¼	819	19	483	312	142	353	160
8	49¾	1264	37¾	959	9 11/16	246	54⅛	1375	40⅛	1019	27 7/16	697	15 11/16	399	36⅞	937	21 3/16	538	497	225	572	
10	57¾	1467	45¾	1162	23 13/16	605	8 3/16	208	66	1676	49½	1257	32½	826	17 5/16	440	20	508	721	327	781	354



957NRPDABFG, 957ZRPDABFG

SIZE	DIMENSIONS												WEIGHT	
	G		H		I		J		M		P		957RPDABFG	
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kgs.*
2½	32½	826	23	584	15½	394	9½	241	19¾	502	15 13/16	402	81	37
3	34	864	24	610	16 5/16	414	10 1/16	256	21¼	540	16⅛	410	84	38
4	35⅝	905	25½	648	17 3/16	437	10 15/16	279	23½	597	16⅝	422	101	46
6	46½	1181	35¼	895	20½	521	13½	343	27¼	692	19	483	174	79

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Capacity

Series 957RPDA, 957NRPDA, 957ZRPDA flow curves as tested by Underwriters Laboratory.

Flow characteristics collected using butterfly shutoff valves

——— Horizontal ——— N-Pattern ------ Z-Pattern

Flow capacity chart identifies valve performance based upon rated water velocity up to 25fps

- Service Flow is typically determined by a rated velocity of 7.5fps based upon schedule 40 pipe.
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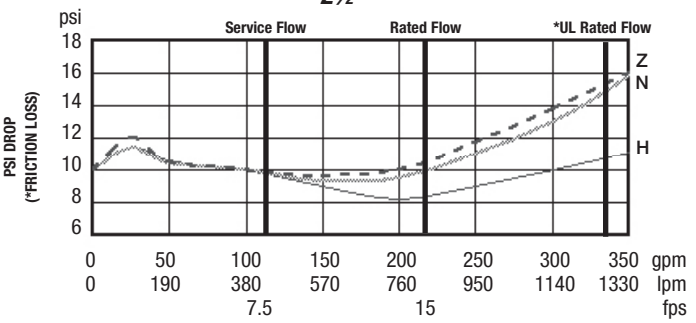
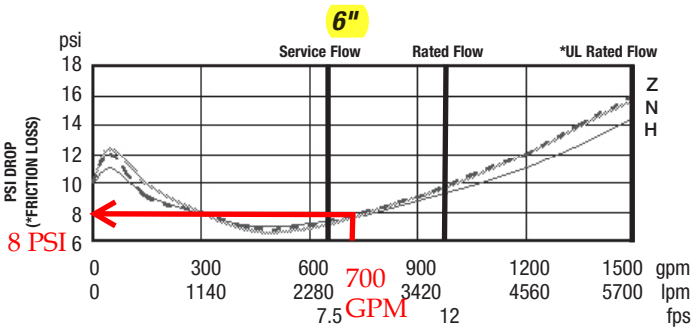
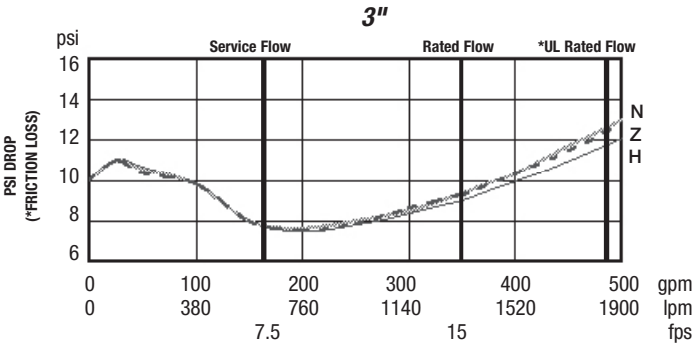
2½"



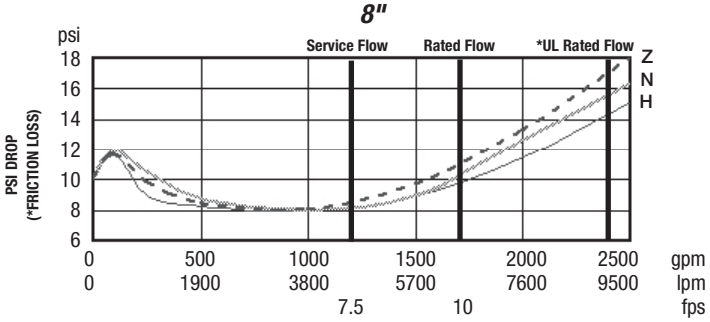
6"



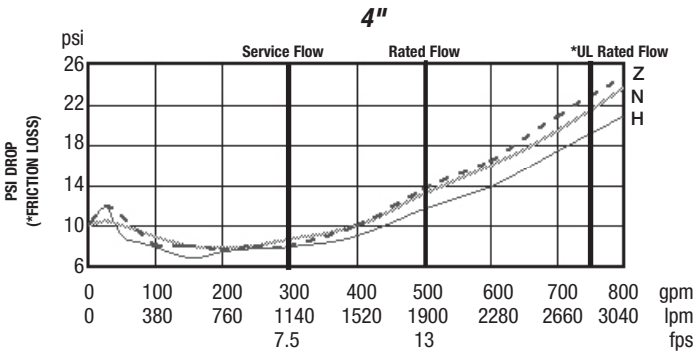
3"



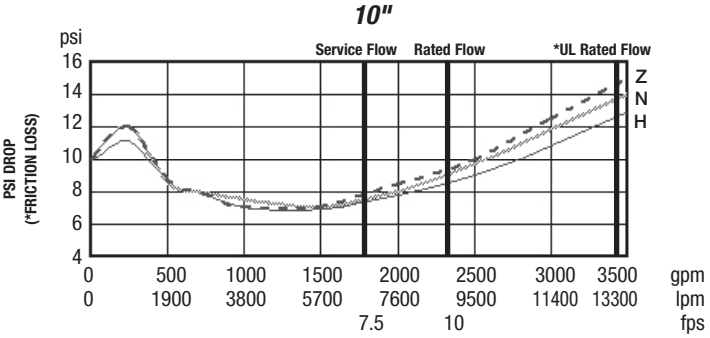
8"



4"



10"



NOTICE

Inquire with governing authorities for local installation requirements

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