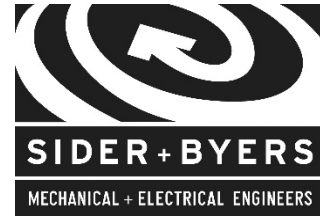


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MEMO FOR RECORD

To: City of Mercer Island
Attention: Don Cole
Project: Mercer Island Mixed Use
Subject: Water Meter Sizing Calculation

Page: 1 of 1
Date: 5.4.2021
S+BA No.: 18093

Included in this document is rationale for our selection of a 4" meter to serve the residential water demand and a 3" meter to serve the combined water demands of the commercial spaces and irrigation at Mercer Island Mixed Use (2885 78th Ave SE).

Residential Meter Sizing:

Peak residential water demand for Mercer Island Mixed has been calculated to be 395 GPM:

RESIDENTIAL PLUMBING CALCULATIONS							
2015 UPC PLUMBING CODE				FIXTURE UNITS PER APPENDIX A			
FIXTURE	QTY	DOMESTIC WATER WSFU			SEWER DFU		
		PER FIXTURE	TOTAL	HW PER FIXTURE	TOTAL	PER FIXTURE	TOTAL
Private Tank Water Closet	196	2.5	490	-	-	3	588
Public Flush Valve Water Closet	2	5	10	-	-	4	8
Lavatory (Public or Private)	210	1	210	0.75	157.5	1	210
Shower (Single Head)	57	2	114	1.5	85.5	2	114
Bathtub or Combo Bath/Shwr	143	4	572	3	429	2	286
Kitchen Sink	161	1.5	241.5	1.125	181.13	2	322
Dishwasher	159	1.5	238.5	1.125	178.88	2	318
Service Valve Outlet	159	1	159	-	-	0	0
Clothes Washer	159	4	636	3	477	3	477
TOTALS	1246		2671		1509.00		2323

TOTAL BUILDING DEMAND IS 395 GPM PER APPENDIX A OF 2015 UPC. BUILDING WATER SERVICE SIZE = 6".
 OUTGOING BUILDING WASTE IS TWO 8" PIPES.

The table below includes all components of pressure loss from the water meter to the furthest residential fixture. At no point does cold water speed exceed 8 ft/s. Using a 4" meter* allows for a satisfactory minimum pressure of 26.2 PSI at the furthest fixture.

PRESSURE LOSS TABLE	
COMPONENT	PRESSURE LOSS (PSI)
4" Meter (@ 395 GPM)	16
Triplex 3" RPBA's	12
Elevation Change (45')	19.5
6" Pipe - 300'	1.4
4" Pipe - 200'	2.5
3" Pipe - 125'	2.3
2" Pipe - 20'	0.6
1-1/2" Pipe - 95'	4.7
1" Pipe - 20'	1.5
1/2" Pipe - 30'	1.3
TOTAL PRESSURE LOSS	61.8

AVAILABLE PRESSURE AT SITE IS 88 PSI DURING AVERAGE DEMAND PERIOD. WORST CASE PRESSURE AT FURTHEST FIXTURE IS 26.2 PSI.

*Meter pressure drop is taken from Chart A 102.2 in Appendix A of 2015 UPC.

Commercial Meter Sizing:

Since commercial spaces are all future tenant improvements no exact water demand can be calculated. As such, all future restaurant spaces have been approximated to have a peak water demand of 100 fixture units while all other retail spaces have been approximated to have a peak demand of 50 fixture units. An additional maximum load of 47.2 GPM from irrigation results in a total commercial demand of 202.2 GPM.

PRESSURE LOSS TABLE	
COMPONENT	PRESSURE LOSS (PSI)
3" Meter (@ 202.2 GPM)	10
3" RPBA	12
Elevation Change (15')	6.5
3" Pipe - 450'	18
2" Pipe - 30'	1.6
TOTAL PRESSURE LOSS	48.1

AVAILABLE PRESSURE AT SITE IS 88 PSI DURING AVERAGE DEMAND PERIOD. WORST CASE PRESSURE AT FURTHEST FIXTURE IS 39.9 PSI.

BY: Andy Johnston, Engineer