

City of Petersburg, VA



Meter Standards

Capacity Charge Analysis

Bill Impacts

April 1, 2019

Source Information for Meter Capacities and Charges Based on Meter Size

- American Water Works Association
 - M1 Manual: Principles of Water Rates, Fees, and Charges
 - M6 Manual: Water Meters—Selection, Installation, Testing, and Maintenance
- Water Environment Federation
 - Manual of Practice 27: Financing and Charges for Wastewater Systems
- ANSI/AWWA
 - C700, Standard for Cold-Water Meters—Displacement Type, Bronze Main Case
 - C708, Standard for Cold-Water Meters—Multijet Type
- Most City meters are manufactured by Neptune
 - See screen shot of product fact sheet
- Rate Study Assumptions
 - Industry guidelines for meter capacities are widely accepted as reasonable and valid for purpose of water and sewer rate setting.
 - Water meter capacities used in the Rate Study are based on industry guidelines.
 - Therefore Rate Study assumptions regarding meter capacities are reasonable and valid.



American Water Works Association

Principals of Water Rates, Fees, and Charges

- A service charge (or meter charge) is a fixed fee that increases with meter size.
 - customer-related costs that change as a function of meter size including installation of meter and service lines, meter testing, repairs, and replacements.
- Customer-related costs for meters and services may be distributed proportionately among customer classes using meter size.
- As an example:
 - Distributing meter and service costs to customer classes is in proportion to the investment in meters and services installed for each customer class, based on the number of equivalent meters.
 - Using equivalent meter and service ratios for purposes of distributing customer costs recognizes that meter and service costs vary depending on considerations such as size of service pipe, materials used, locations of meters, and other local characteristics for various sized meters as compared to 5/8”.



AWWA

Water Meters |
Selection,
Installation,
Testing, &
Maintenance

Table 2-1 Types of meters for water measurement

Type	Usual Range of Sizes	
	<i>in.</i>	<i>mm</i>
I. Displacement		
A. Nutating disc	½–2	13–50
B. Oscillating piston	½–2	13–50
II. Nondisplacement		
A. Velocity		
Multijet	⅝–2	15–50
Singlejet	⅝–6	15–150
Fluidic oscillator	½–2	13–50
Magnetic-pickup turbine	¼–12	6–300
Turbine	¾–20	20–500
Propeller	2–72	50–1,800
Proportional	3–12	80–300
B. Differential pressure		
Fixed opening, variable differential		
Orifice	2–24	50–600
Venturi, flow nozzle, flow tube	2–84	50–2,100
Pitot tube	Unlimited	
Variable opening, fixed differential rotameter	¼–4	6–100
C. Electronic velocity		
Electromagnetic	⅓–72	2–1,800
Ultrasonic	½–72	13–1,800
D. Level measurement		
Weir, Parshall flume, etc.	Unlimited	
III. Compound		
A. Standard compound	2–8	50–200
B. Fire service	3–12	80–300

Most water meters in the City are manufactured by Neptune

A PRODUCT SHEET OF NEPTUNE TECHNOLOGY GROUP

T-10 Meter

SIZES $\frac{5}{8}$ " , $\frac{3}{4}$ " , AND 1"

Every T-10[®] water meter meets or exceeds the latest AWWA C700 Standard. Its nutating disc, positive displacement principle has been time-proven for accuracy and dependability since 1892, ensuring maximum utility revenue.



Operating Characteristics

Meter Size	Normal Operating Range @ 100% Accuracy (+/- 1.5%)	AWWA Standard	Low Flow @ 95% Accuracy
$\frac{5}{8}$ "	$\frac{1}{2}$ to 20 US gpm 0.11 to 4.55 m ³ /h	1 to 20 US gpm 0.23 to 4.5 m ³ /h	$\frac{1}{8}$ US gpm 0.03 m ³ /h
$\frac{3}{4}$ "	$\frac{3}{4}$ to 30 US gpm 0.17 to 6.82 m ³ /h	2 to 30 US gpm 0.45 to 6.8 m ³ /h	$\frac{1}{4}$ US gpm 0.06 m ³ /h
1"	1 to 50 US gpm 0.23 to 11.36 m ³ /h	3 to 50 US gpm 0.68 to 11.4 m ³ /h	$\frac{3}{8}$ US gpm 0.09 m ³ /h

Meter
Capacity &
Factors |
Based on
Industry
Standards

Meter Size	Meter Capacity (gpm)*	Factor based on 5/8" Meter
5/8 inch	20	$(20/20) = 1.0$
3/4 inch	30	$(30/20) = 1.50$
1 inch	50	$(50/20) = 2.50$
1-1/2 inch	100	$(100/20) = 5.0$
2 inch	160	$(160/20) = 8.0$
3 inch	300	$(300/20) = 15.0$
4 inch	500	$(500/20) = 25.0$
6 inch	1,000	$(1000/20) = 50.0$
8 inch	1,600	$(1600/20) = 80.0$
10 inch	2,300	$(2300/20) = 115.0$

*AWWA Manual M6 and Manual M1; WEF Manual of Practice 27. Maximum safe operating capacity. Values depend on type of meter.



Current Water Capacity Charge

Meter Size	Monthly Capacity Charge*	Number of Accounts	% of Customers
5/8 inch	\$8.84	8,588	72.7%
3/4 inch**	\$8.84	210	1.8%
1 inch	\$22.12	2,426	20.5%
1-1/2 inch	\$38.67	228	1.9%
2 inch	\$70.68	291	2.5%
3 inch	\$141.34	22	<1%
4 inch	\$220.86	21	<1%
6 inch	\$441.76	19	<1%
8 inch	\$883.52	2	<1%
10 inch	\$1,369.44	4	<1%
		11,811	

*Current Rates and Fees as of July 1, 2017.

**Not listed in City Code, but City billing system applies charges same as 5/8" meter.

- Estimated revenues generated by Water Capacity Charges total approximately \$2.2 Million, or approximately 16% of Budgeted Utility Revenues.



Current Sewer Capacity Charge

Meter Size	Monthly Capacity Charge*	Number of Accounts	% of Customers
5/8 inch	\$20.05	8,565	72.9%
3/4 inch**	\$20.05	210	1.8%
1 inch	\$50.11	2,392	20.4%
1-1/2 inch	\$87.74	224	1.9%
2 inch	\$160.31	286	2.4%
3 inch	\$325.35	21	<1%
4 inch	\$501.01	21	<1%
6 inch	\$1,002.01	19	<1%
8 inch	\$2,004.03	2	<1%
10 inch	\$3,106.24	4	<1%
		11,744	

*Current Rates and Fees as of July 1, 2017.

**Not listed in City Code, but City billing system applies charges same as 5/8" meter.

- Estimated revenues generated by Water Capacity Charges total approximately \$5 Million, or approximately 35% of Budgeted Utility Revenues.

Options | Capacity Charges Water & Sewer

- Option 1
 - Uniform Charge
 - Same Rate for All Meter Sizes
- Option 2
 - Based on Industry Standards relative to 5/8" meter
 - Equivalent meter and service ratios for purposes of distributing customer costs
- Option 3
 - Hybrid of Options 1 and 2 above
 - Relative to average meter capacity for 5/8", 3/4", and 1" meters



Comparison | Water Capacity Charge

Option 1
Uniform Charge
Same Rate for All
Meter Sizes

Meter Size	Current Monthly Capacity Charge*	<u>Option 1</u> Monthly Capacity Charge	Difference per Month
5/8 inch	\$8.84	\$15.60	\$6.76
3/4 inch**	\$8.84	\$15.60	\$6.76
1 inch	\$22.12	\$15.60	(\$6.52)
1-1/2 inch	\$38.67	\$15.60	(\$23.07)
2 inch	\$70.68	\$15.60	(\$55.08)
3 inch	\$141.34	\$15.60	(\$125.74)
4 inch	\$220.86	\$15.60	(\$205.26)
6 inch	\$441.76	\$15.60	(\$426.16)
8 inch	\$883.52	\$15.60	(\$867.92)
10 inch	\$1,369.44	\$15.60	(\$1,353.84)

*Current Rates and Fees as of July 1, 2017.

**Not listed in City Code, but City billing system applies charges same as 5/8" meter.





Comparison | Sewer Capacity Charge

Option 1
Uniform Charge
Same Rate for All
Meter Sizes

Meter Size	Current Monthly Capacity Charge*	<u>Option 1</u> Monthly Capacity Charge	Difference per Month
5/8 inch	\$20.05	\$35.26	\$15.21
3/4 inch**	\$20.05	\$35.26	\$15.21
1 inch	\$50.11	\$35.26	(\$14.85)
1-1/2 inch	\$87.74	\$35.26	(\$52.48)
2 inch	\$160.31	\$35.26	(\$125.05)
3 inch	\$325.35	\$35.26	(\$290.09)
4 inch	\$501.01	\$35.26	(\$465.75)
6 inch	\$1,002.01	\$35.26	(\$966.75)
8 inch	\$2,004.03	\$35.26	(\$1,968.77)
10 inch	\$3,106.24	\$35.26	(\$3,070.98)

*Current Rates and Fees as of July 1, 2017.

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Comparison | Water Capacity Charge

Option 2

Based on Industry Standards relative to 5/8" meter Equivalent meter and service ratios for purposes of distributing customer costs

Meter Size	Current Monthly Capacity Charge*	<u>Option 2</u> Monthly Capacity Charge	Difference per Month
5/8 inch	\$8.84	\$8.83	(\$0.01) ↓
3/4 inch**	\$8.84	\$13.25	\$4.41 ↑
1 inch	\$22.12	\$22.08	(\$0.04) ↓
1-1/2 inch	\$38.67	\$44.15	\$5.48 ↑
2 inch	\$70.68	\$70.64	(\$0.04) ↓
3 inch	\$141.34	\$132.45	(\$8.89) ↓
4 inch	\$220.86	\$220.76	(\$0.10) ↓
6 inch	\$441.76	\$441.51	(\$0.25) ↓
8 inch	\$883.52	\$706.42	(\$177.10) ↓
10 inch	\$1,369.44	\$1,015.48	(\$353.96) ↓

*Current Rates and Fees as of July 1, 2017.

**Not listed in City Code, but City billing system applies charges same as 5/8" meter.



Comparison | Sewer Capacity Charge

Option 2

Based on Industry Standards relative to 5/8" meter Equivalent meter and service ratios for purposes of distributing customer costs

Meter Size	Current Monthly Capacity Charge*	<u>Option 2</u> Monthly Capacity Charge	Difference per Month
5/8 inch	\$20.05	\$20.03	(\$0.02) ↓
3/4 inch**	\$20.05	\$30.04	\$9.99 ↑
1 inch	\$50.11	\$50.07	(\$0.04) ↓
1-1/2 inch	\$87.74	\$100.14	\$12.40 ↑
2 inch	\$160.31	\$160.22	(\$0.09) ↓
3 inch	\$325.35	\$300.41	(\$24.94) ↓
4 inch	\$501.01	\$500.69	(\$0.32) ↓
6 inch	\$1,002.01	\$1,001.38	(\$0.63) ↓
8 inch	\$2,004.03	\$1,602.20	(\$401.83) ↓
10 inch	\$3,106.24	\$2,303.16	(\$803.08) ↓

*Current Rates and Fees as of July 1, 2017.

**Not listed in City Code, but City billing system applies charges same as 5/8" meter.



Comparison | Water Capacity Charge

Option 3
Hybrid of
Options 1 and 2
Based on Industry
Standards relative
to 5/8", 3/4", and 1"
meters

Meter Size	Current Monthly Capacity Charge*	<u>Option 3</u> Monthly Capacity Charge	Difference per Month
5/8 inch	\$8.84	\$12.48	\$3.64
3/4 inch**	\$8.84	\$12.48	\$3.64
1 inch	\$22.12	\$12.48	(\$9.64)
1-1/2 inch	\$38.67	\$37.44	(\$1.23)
2 inch	\$70.68	\$59.91	(\$10.77)
3 inch	\$141.34	\$112.32	(\$29.02)
4 inch	\$220.86	\$187.21	(\$33.65)
6 inch	\$441.76	\$374.41	(\$67.35)
8 inch	\$883.52	\$599.06	(\$284.46)
10 inch	\$1,369.44	\$861.15	(\$508.29)

*Current Rates and Fees as of July 1, 2017.

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Comparison | Sewer Capacity Charge

Option 3

Hybrid of Options 1 and 2 relative to average 5/8", 3/4", and 1" meters

Meter Size	Current Monthly Capacity Charge*	<u>Option 3</u> Monthly Capacity Charge	Difference per Month
5/8 inch	\$20.05	\$28.25	\$8.20
3/4 inch**	\$20.05	\$28.25	\$8.20
1 inch	\$50.11	\$28.25	(\$21.86)
1-1/2 inch	\$87.74	\$84.76	(\$2.98)
2 inch	\$160.31	\$135.62	(\$24.69)
3 inch	\$325.35	\$254.28	(\$71.07)
4 inch	\$501.01	\$423.80	(\$77.21)
6 inch	\$1,002.01	\$847.59	(\$154.42)
8 inch	\$2,004.03	\$1,356.15	(\$647.88)
10 inch	\$3,106.24	\$1,949.47	(\$1,156.77)

*Current Rates and Fees as of July 1, 2017

**Not listed in City Code, but City billing system applies charges same as 5/8" meter.





Comparison | Water Capacity Charge

Summary of Scenarios

Meter Size	Current Monthly Capacity Charge*	Option 1 Monthly Difference	Option 2 Monthly Difference	Option 3 Monthly Difference
5/8 inch	\$8.84	\$6.76	(\$0.01)	\$3.64
3/4 inch**	\$8.84	\$6.76	\$4.41	\$3.64
1 inch	\$22.12	(\$6.52)	(\$0.04)	(\$9.64)
1-1/2 inch	\$38.67	(\$23.07)	\$5.48	(\$1.23)
2 inch	\$70.68	(\$55.08)	(\$0.04)	(\$10.77)
3 inch	\$141.34	(\$125.74)	(\$8.89)	(\$29.02)
4 inch	\$220.86	(\$205.26)	(\$0.10)	(\$33.65)
6 inch	\$441.76	(\$426.16)	(\$0.25)	(\$67.35)
8 inch	\$883.52	(\$867.92)	(\$177.10)	(\$284.46)
10 inch	\$1,369.44	(\$1,353.84)	(\$353.96)	(\$508.29)

*Current Rates and Fees as of July 1, 2017.

**Not listed in City Code, but City billing system applies charges same as 5/8" meter.



Comparison | Sewer Capacity Charge

Summary of Scenarios

Meter Size	Current Monthly Capacity Charge*	Option 1 Monthly Difference	Option 2 Monthly Difference	Option 3 Monthly Difference
5/8 inch	\$20.05	\$15.21	(\$0.02)	\$8.20
3/4 inch**	\$20.05	\$15.21	\$9.99	\$8.20
1 inch	\$50.11	(\$14.85)	(\$0.04)	(\$21.86)
1-1/2 inch	\$87.74	(\$52.48)	\$12.40	(\$2.98)
2 inch	\$160.31	(\$125.05)	(\$0.09)	(\$24.69)
3 inch	\$325.35	(\$290.09)	(\$24.94)	(\$71.07)
4 inch	\$501.01	(\$465.75)	(\$0.32)	(\$77.21)
6 inch	\$1,002.01	(\$966.75)	(\$0.63)	(\$154.42)
8 inch	\$2,004.03	(\$1,968.77)	(\$401.83)	(\$647.88)
10 inch	\$3,106.24	(\$3,070.98)	(\$803.08)	(\$1,156.77)

*Current Rates and Fees as of July 1, 2017.

**Not listed in City Code, but City billing system applies charges same as 5/8" meter.



Impact to Monthly Bill

5/8" Meter
5,000 gallons

Bill Impact for 5/8" Meter, 5,000 gallons based on Rates Effective 7/1/2017

	Capacity Charge		Volume Charge		Total Water and Sewer^
	Water	Sewer	Water	Sewer	
Base Case*	\$8.84	\$20.05	\$11.10	\$25.16	\$65.15
Option 1	\$15.60	\$35.26	\$11.10	\$25.16	\$87.12
Option 2	\$8.83	\$20.03	\$11.10	\$25.16	\$65.12
Option 3	\$12.48	\$28.25	\$11.10	\$25.16	\$76.99

Water Volume Charge:

$$(2,244 \text{ gallons} \times \$0.000798) + (2,756 \times \$0.003378) = \$1.79 + \$9.31 = \$11.10$$

Sewer Volume Charge:

$$(2,244 \text{ gallons} \times \$0.001785) + (2,756 \times \$0.007676) = \$4.006 + \$21.155 = \$25.16$$

* Rates Effective 7/1/2017.

^ This is an estimate and could change based on actual financial performance.



Impact to Monthly Bill

3/4" Meter
5,000 gallons

Bill Impact for 3/4" Meter, 5,000 gallons based on Rates Effective 7/1/2017

	Capacity Charge		Volume Charge		Total Water and Sewer [^]
	Water	Sewer	Water	Sewer	
Base Case*	\$8.84	\$20.05	\$11.10	\$25.16	\$65.15
Option 1	\$15.60	\$35.26	\$11.10	\$25.16	\$87.12
Option 2	\$13.25	\$30.04	\$11.10	\$25.16	\$79.55
Option 3	\$12.48	\$28.25	\$11.10	\$25.16	\$76.99

* Rates Effective 7/1/2017. Not listed in City Code, but City billing system applies charges same as 5/8" meter.

[^] This is an estimate and could change based on actual financial performance.



Impact to Monthly Bill

1" Meter
5,000 gallons

Bill Impact for 1" Meter, 5,000 gallons based on Rates Effective 7/1/2017					
	Capacity Charge		Volume Charge		Total Water and Sewer^
	Water	Sewer	Water	Sewer	
Base Case*	\$22.12	\$50.11	\$11.10	\$25.16	\$108.49
Option 1	\$15.60	\$35.26	\$11.10	\$25.16	\$87.12
Option 2	\$22.08	\$50.07	\$11.10	\$25.16	\$108.41
Option 3	\$12.48	\$28.25	\$11.10	\$25.16	\$76.99

* Rates Effective 7/1/2017.

^ This is an estimate and could change based on actual financial performance.