

Memorandum

To: Yuri Nasonovs - City of La Crosse
 From: Kristopher Roppe, PE
 Date: May 20, 2022
 Subject: Copper Rocks Sanitary Sewer Pipe Sizing

INTRODUCTION

Sanitary sewer pipe sizing calculations have been prepared to check the 8 inch pipe size for sanitary sewer serving the proposed Copper Rocks development. Sanitary sewer flow calculations have been completed to meet the regulations of Wisconsin Administrative Code NR 110.

ASSUMPTIONS

The following assumptions were used to compute flows and minimum pipe diameters.

- 3 - 11 unit townhomes with a total of 57 bedrooms
- 1 - 52 unit buildings with a total of 64 bedrooms
- 1 - 72 unit buildings with a total of 96 bedrooms
- 1 - 59 unit buildings with a total of 75 bedrooms
- Flows from commercial uses have been established using 13 gallons per day per employee or 20 gallons per day per seat depending on proposed use
- The proposed storm sewer system is separate from the proposed sanitary sewer system.
- Water usage is assumed to be 68 gallons per person per day (p) based on the City of Milwaukee standard.
- The population density (D) is assumed to be 1.5 people per bedroom (186).

CALCULATIONS

Using the following equation, an average daily flow (Q) was computed to be 33,899 gallons per day (gpd).

$$Q = p * D * A$$

Inflating this average flow by 400% (per Wis Admin Code NR 110.13 for submains and branches), a peak flow (Q_{peak}) was calculated to be 135,596 gpd (0.21 cfs). Designing for full pipe conditions, the following equation was used.

$$D = 1.299 \left(Q * \frac{n}{S^2} \right)^{\frac{3}{8}}, \text{ where } Q = Q_{peak}, n = 0.012, \text{ and } S = 0.004.$$

D = 4.7 inches (use 6 inches)

CONCLUSIONS

Since the calculated pipe diameter of 4 inches is less than the required minimum pipe diameter of 8 inches, a 8-inch pipe was used for the private sanitary sewer main. A spreadsheet with breakdown of calculations is attached.

Copper Rocks Sanitary Flow Summary

		Area (sf) / # of Units	Number of Bedrooms	Number of People	Flow (gpd)	Notes
LOT 1 (3) 11 unit Townhomes	Studio	2	2	3	204	68 gpd per capita (typ)
	1 BR	3	3	4.5	306	
	2 BR	4	8	12	816	
	3 BR	2	6	9	612	
Subtotal					1,938	Per building (3 buildings total)
Total					5,814	
LOT 4 SOUTH BUILDING	Residential - Studio	11	11	16.5	1,122	
	Residential - 1 BR	32	32	48	3,264	
	Residential - 2 BR	16	32	48	3,264	
	Brewery	5610	80	Seats	1,600	20 gpd per seat
	Restaurant	2640	60	Seats	1,200	20 gpd per seat
	TBD	5520		20	260	13 gpd per employee
Subtotal					10,710	
LOT 2 WEST BUILDING	Tenant Space (TBD)	4364		15	195	13 gpd per employee
	Residential - Studio	24	24	36	2,448	
	Residential - 1 BR	24	24	36	2,448	
	Residential - 2 BR	24	48	72	4,896	
	Rivertown Dental	6667		20	260	13 gpd per employee
Subtotal					10,247	
LOT 3 EAST BUILDING	Residential - Studio	16	16	24	1,632	
	Residential - 1 BR	24	24	36	2,448	
	Residential - 2 BR	12	24	36	2,448	
	Coffee Shop	2018	30	Seats	600	20 gpd per seat
	Activity Center	9471			0	* For Resident Use Only, no additional flow
Subtotal					7,128	
				Total Daily Flow:	33,899	
				Peak Daily Flow:	135,596	400% of Average
				Peak Flow (GPM):	94.16	
				Peak Flow (CFS):	0.21	
Minimum Pipe Diameter Required (in):					4.7	