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City of Puyallup
333 S Meridian
Puyallup, WA 98371

Subject: Bradley Heights – Existing SS Capacity
AGC Job #3227

Bradley Heights is a proposed multi-family development of parcel 041903-6-006 on 27th Ave SE to the east of Meridian. An existing 8-inch sanitary sewer extends across the project's frontage to the east property line at 5th St SE. The existing sewer appears to only serve parcel 041903-2-105 on the north side of 27th.

The capacity of this existing sewer main will be determined to ensure there is adequate capacity for the proposed multifamily development.

First, the average daily flow must be determined. Parcel 041903-2-105 is developed as senior living with 278 total units. Per the DOE Criteria for Sewage Works Design, Table G2-2, homes for the aged have a design flow of 100 gpd per bed. For this analysis, the site is assumed to have one bed per dwelling unit. The project site will develop with 236 multi-family apartments and a recreation center. For dwellings, the design flow is 100 gpd per person. For this analysis, each apartment unit is assumed to have two people. For the recreation center, the design rate of 200 gpd per 1,000 sf of floor space is assumed. The daily flow is thus determined:

Table G2- 2. Design Basis for New Sewage Works

Discharge Facility	Design Units	Flow* (gpd)	BOD (lb/day)	SS (lb/day)	Flow Duration (hr)
Dwellings	per person	100	0.2	0.2	24
Schools with showers and cafeteria	per person	16	.04	.04	8
Schools without showers and with cafeteria	per person	10	.025	.025	8
Boarding schools	per person	75	0.2	0.2	16
Motels at 65 gal/person (rooms only)	per room	130	0.26	0.26	24
Trailer courts at 3 persons/trailer	per trailer	300	0.6	0.6	24
Restaurants	per seat	50	0.2	0.2	16
Interstate or through-highway restaurants	per seat	180	0.7	0.7	16
Interstate rest areas	per person	5	0.01	0.01	24
Service stations	per vehicle serviced	10	0.01	0.01	16
Factories	per person per 8-hr shift	15-35	0.03-0.07	0.03-0.07	Operating period
Shopping centers	per 1,000 sq ft of ultimate floor space	200-300	0.01	0.01	12
Hospitals	per bed	300	0.6	0.6	24
Nursing homes	per bed	200	0.3	0.3	24
Homes for the aged	per bed	100	0.2	0.2	24
Doctor's office in medical center	per 1,000 sq ft	500	0.1	0.1	12
Laundromats, 9 to 12 machines	per machine	500	0.3	0.3	16
Community colleges	per student and faculty	15	0.03	0.03	12
Swimming pools	per swimmer	10	0.001	0.001	12
Theaters, drive-in type	per car	5	0.01	0.01	4
Theaters, auditorium type	per seat	5	0.01	0.01	12
Picnic areas	per person	5	0.01	0.01	12
Resort camps, day and night, with limited plumbing	per campsite	50	0.05	0.05	24
Luxury camps with flush toilets	per campsite	100	0.1	0.1	24

*Includes normal infiltration

Tributary Area									
Existing									
Parcel	Area	Units	Use	Design units	Factor	Quantity	flow (gpd)	Total	
0419032105	7.90	278	Senior Living	per unit	1	278	100	27800	
Proposed									
0419036006	7.78	236	multi-family	per capita	2	472	100	94400	
		1	rec center	per 1,000 sf	4.6	4.6	200	4232	
					Total Average Daily Flow			126432	gpd

Figure C1-1 is used to determine the peaking factor. The peaking factor is based on the population tributary to the sewer. Based on the assumptions above, the population is 750. The daily flow is multiplied by the peaking factor to determine the peak hourly flow, which is the flow rate used to verify pipe capacity.

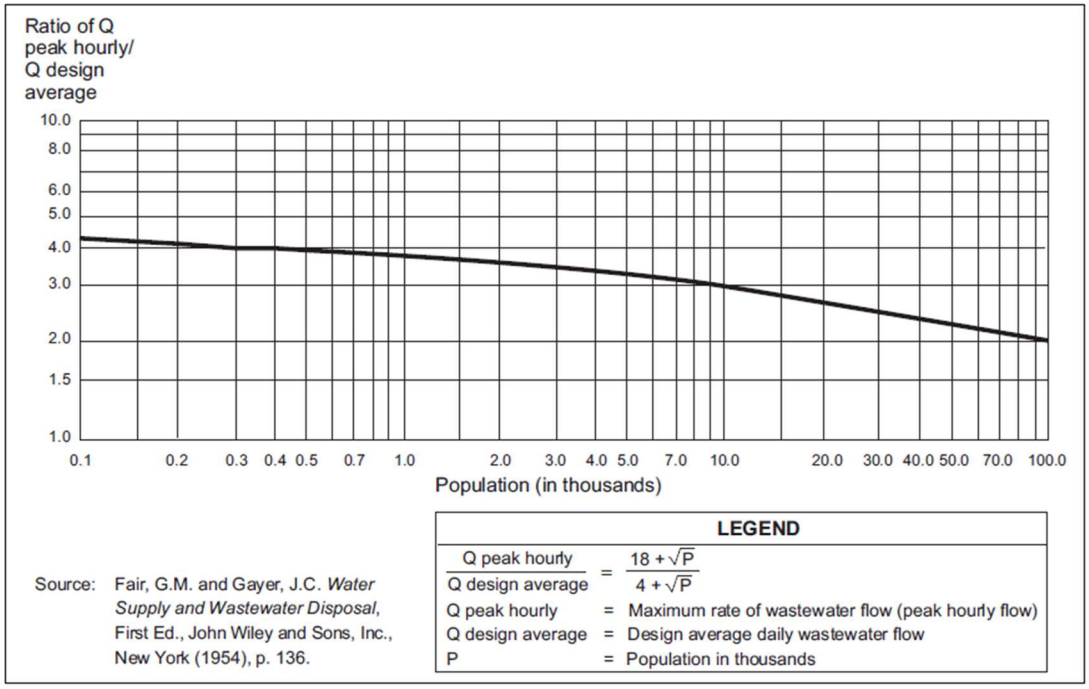

Figure C1-1. Ratio of Peak Hourly Flow to Design Average Flow

Population	750	
Peaking Factor	3.88	
Peak Hourly Flow	490188	gpd
=	340.41	gpm
=	0.7585	cfs

Manning's Equation is used to determine if the existing pipes have capacity for the calculated peak flow. The flattest pipe in 27th Ave SE is at a slope of 0.96%.

Manning's Equation Analysis								
Dia.	radius	n	S	depth	Area	Hyd. Rad.	Q	V
in	ft		ft/ft	feet	sf	ft	cfs	fps
8	0.333	0.013	0.0096	0.667	0.3491	0.1667	1.183998	3.392

The Manning's analysis shows that the full-flow capacity of the existing pipe exceeds the total peak flow rate for the basin.

Please call or e-mail if you have any questions or need additional information to process.

Sincerely,

Robert A. Trivitt, PE
Project Manager