



---

## MEMORANDUM

**Date: August 3, 2017**  
**To: Cyndy Bratz P.E., Project Manager, Tetra Tech**  
**From: Katy Isaksen, KI&A**  
**Subject: City of Stevenson High Strength Wastewater Rates - Draft**

---

This technical memorandum addresses Task 20 High Strength Wastewater Rates from City of Stevenson Wastewater Facility Plan Amendment 1 Scope of Work dated March 13, 2017.

### **Current sewer rate structure**

All sewer customers pay a monthly rate for sewer service that includes the collection system, treatment plant and administrative functions related to the sewer system. The current rate structure shares the system costs by number of customers, size of water meter and amount of water usage.

- Residential pays a flat rate of \$29.25 per month per the number of dwelling units.
- Non-residential customers pay a base rate by the size of the water meter plus a volume charge that is set at 40% of the water charges: base rate by meter size (includes first 400 cubic feet) + \$0.039 per cubic foot of metered water.
- Non-residential transient quarters pay \$15.00 per overnight room + the same volume charge of 40% of water charges.

The current sewer rates have been in effect since 2010 (Ordinance No. 1033, adopted December 17, 2009). The volume portion of the sewer rate is defined as 40% of the water charges, which were last adjusted in 2013.

### **Costs at the Treatment Plant**

The key design measures for the treatment plant are flow and BOD. Total suspended solids are also a key parameter but is not a differentiator for Stevenson. BOD is a measure of strength of the wastewater to be treated. The cost to treat high BOD wastewater is greater than typical residential wastewater (domestic wastewater). The regulatory issues that are being resolved are due to the amount and concentration of BOD that is more than the treatment plant can handle at times. The necessary improvements are costly and are driven by the BOD from higher strength customers.

### **High Strength Wastewater Rates**

Strength-based wastewater rates are ones where the higher strength dischargers pay more than average residential domestic wastewater dischargers. Stevenson's rates do not currently reflect the strength of the wastewater.

Together with Tetra Tech, we looked at other local examples, including Hood River, Bend and Washougal. Each of these has their own categories of strength and charge a higher fee for the higher strength along with a base rate and volume. We looked at the local examples and developed a reasonable alternative for the customers and dischargers at Stevenson.

### **Recommended High Strength Rate Structure**

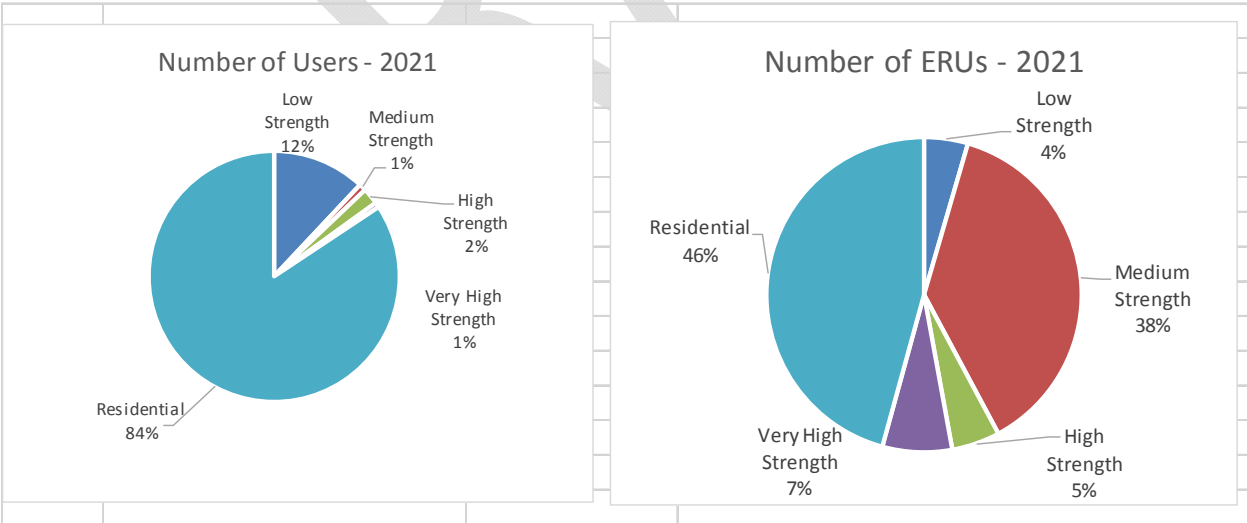
Non-residential customers are assigned to a customer class based on the BOD strength of the wastewater for a typical user of that type. The categories have been developed for Stevenson to reflect the customer types already in the City or with reasonable expectation of that type of user.

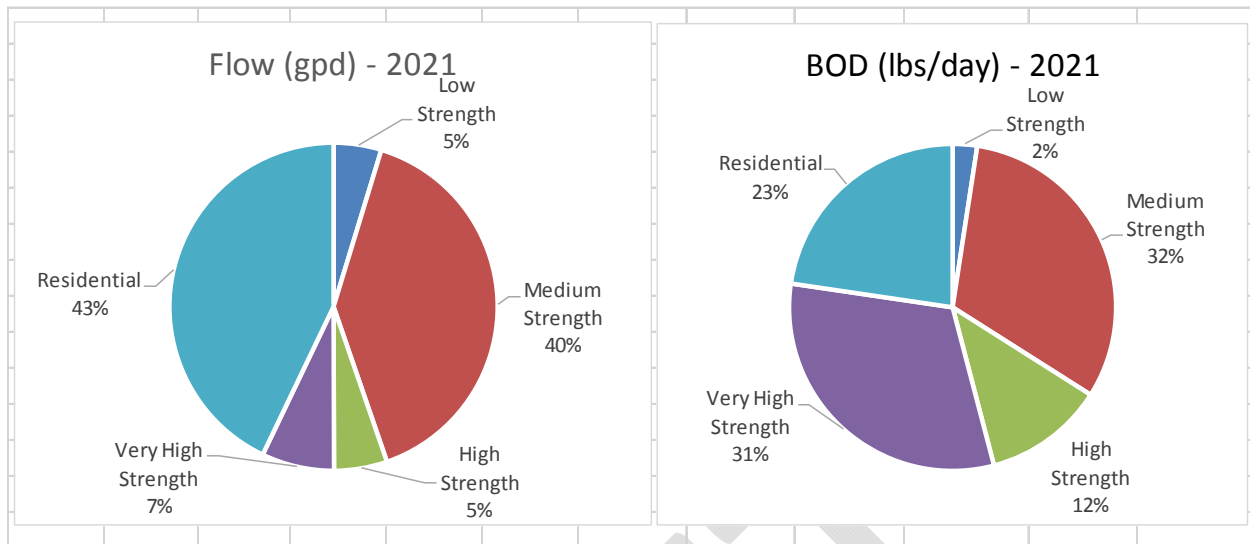
Strength Category	BOD Strength	Types of Typical Users
Low	< 300 mg/L	Public Facilities, Hotel / Motel w/o Restaurant, General Retail, Office Space, Industrial w/o Process Discharge
Medium	301 - 600 mg/L	Hotel / Motel with Restaurant, School with Cafeteria, Laundromat, Nursing Home, Hospital
High	600 - 2,000 mg/L	Grocery Store, Bakery, Restaurant, Coffee Shop
Very High	> 2,000 mg/L	Food Production, Brewery, Distillery, Cider Production, Dairy, Industrial with Process Discharge
Residential	Typical <300 mg/L	Single and multi-family residences

The typical wastewater from a residential area is up to 300 mg/L of BOD as it arrives at the treatment plant. The Low strength category is designed to coincide with residential or domestic strength wastewater. The City’s sewer code defines wastewater > 300 mg/L as higher strength wastewater. The Medium, High and Very High categories are designed to capture the other primary types of commercial customers. We discussed the potential for a super high strength category > 3,000 mg/L to provide additional incentive for the beverage industry but it is not included at this time.

**Key Parameters by Strength Category**

The four key parameters (number of customers, ERUs, flow and BOD) have been charted by strength category to demonstrate the usage of the treatment process. This analysis focused on the year 2021 when the new plant is anticipated to be operational. Residential represents 84% of the users, 46% of the ERUs, 43% of the flow, and 23% of the BOD. Low strength represents 12% of users, 5% of flow and 2% of BOD. And so forth up to very high strength. Very high strength represents 1% of users, 7% of the flow and 31% of BOD.





### Allocation of WWTP Capital and O&M Costs

Alternative 1B: 20% Pretreatment is the basis for the cost allocation in the year 2021 when the improvements are planned to be operational. Tetra Tech reviewed the capital costs for the WWTP improvements and allocated each item between Flow and BOD. 54% of the WWTP improvements are attributed to BOD. KI&A estimated the annual debt service on the improvements assuming a 20-year loan at 2% interest. Approximately \$431,000 or 54% in annual debt service is attributed to BOD.

CAPITAL COSTS FOR WWTP IMPROVEMENTS (\$ in thousands)				
Alt. 1B: 20% Pretreatment, 2021	Total	Flow	BOD	% BOD
<b>CITY WWTP</b>				
Headworks	\$ 1,768	\$ 1,768	\$ -	
secondary treatment	\$ 5,058	\$ 1,265	\$ 3,794	
Disinfection	\$ 1,120	\$ 1,120	\$ -	
solids handling	\$ 1,152	\$ -	\$ 1,152	
<b>SUBTOTAL</b>	<b>\$ 9,098</b>	<b>\$ 4,153</b>	<b>\$ 4,946</b>	
support facilities	\$ 3,856	\$ 1,760	\$ 2,096	
<b>SUBTOTAL CITY</b>	<b>\$ 12,954</b>	<b>\$ 5,912</b>	<b>\$ 7,042</b>	<b>54%</b>
<b>Estimated annual debt (2%, 20 years)</b>	<b>\$ 792,224</b>	<b>\$ 361,586</b>	<b>\$ 430,638</b>	<b>54%</b>

Tetra Tech also estimated and reviewed the annual operations and maintenance costs for the WWTP in 2021, assuming 20% pretreatment by the beverage industry. The allocation results in 59% of O&M costs at the WWTP to be attributable to BOD. \$281,000 of annual O&M costs at the WWTP will be used to determine the high strength rates.

ANNUAL O&M COSTS FOR WWTP IMPROVEMENTS (\$ in thousands)				
Alt. 1B: 20% Pretreatment, 2021	Total	Flow	BOD	% BOD
<b>CITY WWTP</b>				
Headworks	\$ 35	\$ 35	\$ -	
secondary treatment	\$ 47	\$ 12	\$ 35	
Disinfection	\$ 12	\$ 12	\$ -	
solids handling	\$ 163	\$ 33	\$ 131	
support facilities	\$ 51	\$ 18	\$ 33	
<b>SUBTOTAL</b>	<b>\$ 307</b>	<b>\$ 109</b>	<b>\$ 198</b>	
WWTP Mgt Tasks	\$ 41	\$ 21	\$ 21	
Lab Labor	\$ 62	\$ 31	\$ 31	
Pretreatment Program Labor	\$ 62	\$ 31	\$ 31	
<b>SUBTOTAL CITY</b>	<b>\$ 473</b>	<b>\$ 192</b>	<b>\$ 281</b>	<b>59%</b>

### Summary of Allocated BOD Costs

The estimated annual costs for the WWTP are \$1,265,000 in 2021 and include the annual debt payment on the CIP (\$792,000) and O&M (\$473,000). The total costs were first allocated between flow and BOD: CIP debt was allocated 54% to BOD and O&M 59% to BOD for a total of \$711,544. The BOD costs were further allocated between standard strength and high strength BOD. The standard portion of the costs would be recovered from all customers in their sewer base and volume rates. Only the high strength allocated costs of \$332,409 will be recovered by the high strength surcharge for 2021.

2021 WWTP Annual Cost Allocation to High Strength Customers					
Component	Annual WWTP	% BOD	BOD \$	% High Str.	Annual High Str. \$
WWTP CIP Debt*	\$792,000	54%	\$430,544		
WWTP O&M	\$473,000	59%	\$281,000		
<b>Total</b>	<b>\$1,265,000</b>		<b>\$711,544</b>	<b>47%</b>	<b>\$332,409</b>
<i>*Debt assumes 20-year loan, 2% interest on WWTP CIP of \$12,954,000</i>					

### High Strength Surcharge – 2021

The annual high strength BOD costs (\$332,409) were further allocated among the strength categories based on the estimated ERU's, flow and BOD anticipated in 2021. The result is the cost per cubic foot at each strength category and is the high strength surcharge for 2021 costs when the improvements are complete, annual debt service will be due and the upgraded O&M program in place.

2021 High Strength Surcharge			
Strength Category	High Str. per cu ft	Plus sewer base rate by size of water meter	Plus volume charges (40% of water bill) excluding first 400 cubic feet
Low	\$0.000		
Medium	\$0.025		
High	\$0.167		
Very High	\$0.368		
Residential	n/a		

This surcharge would be paid by non-residential sewer customers in addition to the sewer base rate by meter size + regular volume charges determined by the water bill.

### Recommended High Strength Surcharge Implementation

The high strength surcharge is recommended to be a new component of the sewer rate structure beginning in 2018. A schedule was developed to phase in the surcharge over a four year period.

Recommended High Strength Surcharge Before Grants					
Strength Category	Strength of BOD	2018 per cu ft	2019 per cu ft	2020 per cu ft	2021 per cu ft
Low	< 300 mg/L	\$0.000	\$0.000	\$0.000	\$0.000
Medium	301 - 600 mg/L	\$0.010	\$0.014	\$0.017	\$0.025
High	600 - 2,000 mg/L	\$0.066	\$0.090	\$0.114	\$0.167
Very High	> 2,000 mg/L	\$0.145	\$0.198	\$0.251	\$0.368
Residential	< 300 mg/L	n/a	n/a	n/a	n/a

The City does not plan to change the method of calculating the rest of the sewer bill, however the normal base and volume rates are expected to increase annually to pay for the remaining sewer improvements and increased O&M program not paid for by the high strength surcharge. The impact on each non-residential customer will vary depending on the strength category and the volume of water.

The 2018 rates are based on existing 2016 customer base and plant activity. The 2019 and 2020 rates simply ramp the rates up to reach the recommended 2021 level.

This calculation includes an assumption about the amount of debt, interest rate and length of repayment and should be updated when the financing package and improvement costs are known.

### Alternate Considering \$5 million in Grants

The financial chapter in the Wastewater Facility Plan included a funding scenario with \$5 million in grant funding that would not have to be repaid. This would lower the estimated annual debt payment for all customers. If we apply the same \$5 million in grant funding to the high strength surcharge, the recommended implementation schedule would be as follows:

Recommended High Strength Surcharge With \$5 Million Grants					
Strength Category	Strength of BOD	2018 per cu ft	2019 per cu ft	2020 per cu ft	2021 per cu ft
Low	< 300 mg/L	\$0.000	\$0.000	\$0.000	\$0.000
Medium	301 - 600 mg/L	\$0.010	\$0.014	\$0.017	\$0.019
High	600 - 2,000 mg/L	\$0.066	\$0.090	\$0.114	\$0.128
Very High	> 2,000 mg/L	\$0.145	\$0.198	\$0.251	\$0.282
Residential	< 300 mg/L	n/a	n/a	n/a	n/a

The impact on each non-residential customer will vary depending on the strength category and the volume of water.

The calculation should be updated when the financing package and improvement costs are known.

### Appendix

Surcharge rates and revenue estimates by strength category – A. Before grants, B. With \$5 Million grants

## Appendix A – Surcharge rates with revenue estimates by strength category

### Before Grants:

@100% Debt															
2021 High Strength								BOD	Total	Std	Hi Str.	Hi Str.	Hi Str.	Hi Str.	Hi Str.
Group	ERU	gpd	mg/l	%	lb/d	lb/d	lb/d	Annual \$	Month \$	per gal	cu ft/mo	per cu ft			
Lo str	58	7,050	300	2.4	18	18	0	\$0	\$0	\$0.000	28,275	\$0.000			
Med str	486	59,073	450	30.1	222	148	74	\$71,418	\$5,951	\$0.003	236,924	\$0.025			
Hi Str	64	7,779	1300	11.5	84	19	65	\$62,698	\$5,225	\$0.022	31,199	\$0.167			
Very Hi str	92	11,183	2500	31.7	233	28	205	\$198,293	\$16,524	\$0.049	44,852	\$0.368			
Resid	590	71,715	300	24.4	179	179	0	\$0	\$0	\$0.000	287,627	\$0.000			
	1290	156,800	563	100.0	736	392	344	\$332,409	\$27,701						
					100%	53%	47%								
2021 est. cost			O&M + Debt on CIP		\$711,544	\$379,135	\$332,409								

@100% Debt				2021 High Strength Surcharge				2021 High Strength Surcharge Revenue			
Strength Category	High Str. per cu ft	plus Sewer base rate by size of water meter	plus Volume charges (40% of water bill) excluding first 400 cubic feet	Strength Category	Volume cu ft/mo	Revenue monthly \$	Revenue annual \$	Strength Category	Volume cu ft/mo	Revenue monthly \$	Revenue annual \$
Low	\$0.000	by size of	excluding first 400	Low	28,275	\$0	\$0	Low	28,275	\$0	\$0
Medium	\$0.025	water	cubic feet	Medium	236,924	\$5,951	\$71,418	Medium	236,924	\$5,951	\$71,418
High	\$0.167	meter		High	31,199	\$5,225	\$62,698	High	31,199	\$5,225	\$62,698
Very High	\$0.368			Very High	44,852	\$16,524	\$198,293	Very High	44,852	\$16,524	\$198,293
Residential	n/a			Residential	287,627	\$0	\$0	Residential	287,627	\$0	\$0
				Total	628,877	\$27,701	\$332,409	Total	628,877	\$27,701	\$332,409

@100% debt				2016 High Strength Surcharge				2016 High Strength Surcharge Revenue			
Strength Category	High Str. per cu ft	plus sewer base rate by size of water meter	plus Volume charges (40% of water bill) excluding first 400 cubic feet	Strength Category	Volume cu ft/mo	Revenue monthly \$	Revenue annual \$	Strength Category	Volume cu ft/mo	Revenue monthly \$	Revenue annual \$
Low	\$0.000	by size of	excluding first 400	Low	26,326	\$0	\$0	Low	26,326	\$0	\$0
Medium	\$0.010	water	cubic feet	Medium	223,761	\$2,213	\$26,556	Medium	223,761	\$2,213	\$26,556
High	\$0.066	meter		High	29,250	\$1,929	\$23,142	High	29,250	\$1,929	\$23,142
Very High	\$0.145			Very High	39,975	\$5,798	\$69,581	Very High	39,975	\$5,798	\$69,581
Residential	n/a			Residential	239,852	\$0	\$0	Residential	239,852	\$0	\$0
				Total	559,163	\$9,940	\$119,279	Total	559,163	\$9,940	\$119,279

@100% debt				
Recommended High Strength Surcharge				
Strength Category	2018 per cu ft	2019 per cu ft	2020 per cu ft	2021 per cu ft
Low	\$0.000	\$0.000	\$0.000	\$0.000
Medium	\$0.010	\$0.014	\$0.017	\$0.025
High	\$0.066	\$0.090	\$0.114	\$0.167
Very High	\$0.145	\$0.198	\$0.251	\$0.368
Residential	n/a	n/a	n/a	n/a

## Appendix B – Surcharge rates with revenue estimates by strength category

### With \$5 Million in Grants:

Includes \$5 Million Grants													
2021 High Strength				BOD	Total	Std	Hi Str.		Hi Str.	Hi Str.	Hi Str.	Hi Str.	
Group	ERU	gpd	mg/l	%	lb/d	lb/d	lb/d		Annual \$	Month \$	per gal	cu ft/mo	per cu ft
Lo str	58	7,050	300	2.4	18	18	0		\$0	\$0	\$0.000	28,275	\$0.000
Med str	486	59,073	450	30.1	222	148	74		\$54,722	\$4,560	\$0.003	236,924	\$0.019
Hi Str	64	7,779	1300	11.5	84	19	65		\$48,040	\$4,003	\$0.017	31,199	\$0.128
Very Hi str	92	11,183	2500	31.7	233	28	205		\$151,936	\$12,661	\$0.038	44,852	\$0.282
Resid	590	71,715	300	24.4	179	179	0		\$0	\$0	\$0.000	287,627	\$0.000
	1290	156,800	563	100.0	736	392	344		\$254,697	\$21,225			
						100%	53%	47%					
2021 est. cost				O&M + Debt on CIP	\$545,197	\$290,500	\$254,697						

Includes \$5 Million Grants				2021 High Strength Surcharge Revenue			
Strength Category	High Str. per cu ft	plus sewer base rate by size of water meter	plus Volume charges (40% of water bill) excluding first 400 cubic feet	Strength Category	Volume cu ft/mo	Revenue monthly \$	Revenue annual \$
Low	\$0.000			Low	28,275	\$0	\$0
Medium	\$0.019			Medium	236,924	\$4,560	\$54,722
High	\$0.128			High	31,199	\$4,003	\$48,040
Very High	\$0.282			Very High	44,852	\$12,661	\$151,936
Residential	n/a			Residential	287,627	\$0	\$0
				Total	628,877	\$21,225	\$254,697

Includes \$5 Million Grants				2016 High Strength Surcharge Revenue			
Strength Category	High Str. per cu ft	plus sewer base rate by size of water meter	plus Volume charges (40% of water bill) excluding first 400 cubic feet	Strength Category	Volume cu ft/mo	Revenue monthly \$	Revenue annual \$
Low	\$0.000			Low	26,326	\$0	\$0
Medium	\$0.010			Medium	223,761	\$2,213	\$26,556
High	\$0.066			High	29,250	\$1,929	\$23,142
Very High	\$0.145			Very High	39,975	\$5,798	\$69,581
Residential	n/a			Residential	239,852	\$0	\$0
				Total	559,163	\$9,940	\$119,279

Includes \$5 Million Grants				
Recommended High Strength Surcharge				
Strength Category	2018 per cu ft	2019 per cu ft	2020 per cu ft	2021 per cu ft
Low	\$0.000	\$0.000	\$0.000	\$0.000
Medium	\$0.010	\$0.014	\$0.017	\$0.019
High	\$0.066	\$0.090	\$0.114	\$0.128
Very High	\$0.145	\$0.198	\$0.251	\$0.282
Residential	n/a	n/a	n/a	n/a