

## **Appendix D: Treatment System Modeling Results**

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DRAFT

# Bremerton Westside WWTP

## Aeration Basin Capacity Modeling Summary

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Summary- A summary of the modeling results for three scenarios is provided below. The targeted SRT of the aeration basins was met for Scenario 2, where the aeration basins are in service to treat the 2044 AAF and AAL. However, the SRT for the MML and the AAL in the maintenance scenario did not meet the targeted

	S1 2044 MM WWF MML	S2 2044 AAF AAL	S3 2044 AAF AAL	
Design Year				
Influent Flow				
Influent Load				
Influent Data				Notes
Influent Flow, MGD	13.50	6.19	6.19	
Influent COD, mg/L	218	352	352	
Influent cBOD, mg/L	115	185	185	
Influent TSS, mg/L	139	232	232	
Influent VSS, mg/L	105	177	177	
Influent TKN, mg/L as N	23.0	37.1	37.1	
Influent Ammonia, mg/L as N	15.5	25.0	25.0	
Influent TP, mg/L as P	2.6	4.1	4.1	
Influent Alkalinity, mg/L as CaCO3	280	280	280	
Process				
Primary Clarifier Area, sqft	10053	10053	10053	
Aeration Basin Volume, MG	0.83	0.83	0.41	
Secondary Clarifier Area, sqft	19007	19007	19007	
Anaerobic Digester Volume, MG	0.68	0.68	0.68	
Primary Clarification				
Primary Sludge Flow, GPD	21300	20800	20200	
Primary TSS Removal Rate, % per Influent	45%	59%	59%	
Primary CBOD Removal Rate, , % per Influent	25%	33%	33%	
Primary TKN Removal Rate, , % per Influent	-5%	-2%	-4%	
Primary Effluent TSS, mg/L	76.3	94.7	94.5	
Primary Effluent CBOD, mg/L	85.6	124.3	124.5	
Primary Effluent TKN, mg/L	24.2	37.8	38.5	
Aeration Basin				
Aeration Basin Total SRT, days	2.4	4.0	2.0	Target = 5 days ( WWF ), 4 days (AAF)
Total HRT, hrs	1.5	3.2	1.6	
MLSS Concentration, mg/L	2509	2487	2532	
MLVSS Concentration, mg/L	2058	1982	2255	
VSS/TSS Ratio	0.82	0.80	0.89	
Aeration Basin DO, mg/L	2.0	2.0	2.0	
Aeration Basin Airflow, scfm	2008	1715	1384	
Solids Production and Yield				
Yield, lbs TSS/lbs PE CBOD	0.74	0.66	0.69	(WAS TSS+Eff TSS)/PE CBOD
RAS TSS, mg/L	8504	5211	5301	
WAS Flow, MGD	0.10	0.10	0.10	
WAS, lbs/d at RAS TSS Calculated	7156	4259	4417	
RAS Rate, MGD	5.60	5.60	5.60	
RAS Flow Fraction	0.41	0.90	0.90	
Secondary Effluent				
CBOD, mg/L	14	12	17	Permit: '<25 mg/L
Soluble CBOD, mg/L	4	2	4	
TSS, mg/L	20	24	24	Permit: '<30 mg/L
pH	7.0	7.1	7.1	
NH3-N, mg/L	18	29	29	
TKN, mg/L	20.1	31.8	32.5	
NO3-N, mg/L	0.0	0.0	0.0	
Alkalinity, mg/L as CaCO3	289.1	289.1	289.1	
DO, mg/L	2.0	2.0	2.0	
Temperature, C	11.5	17.0	17.0	
RDT (Thickening)				
Thickened TSS, %	7.2%	7.0%	7.3%	
Thickened TSS to Digester, ppd	6656	3983	4112	
Thickened VSS to Digester, ppd	5456	3156	3660	
Anaerobic Digestion				
Digester Volume, MG	0.68	0.68	0.68	
HRT, days	20.9	24.6	25.1	
Digested TSS (model), TS (DMR), %	3.4%	3.3%	3.2%	
Digested VSS (mode), VS (DMR), %	1.8%	1.7%	1.6%	
VS/TS,%	52.5%	52.1%	51.2%	
Gas, scfd	84602	60665	69879	
GAS/VS Fed, scf/lbs	7.6	7.1	7.7	
VSS destruction, %	57%	54%	59%	
Centrifuge				
Dewatered TSS, %	22%	22%	22%	
Cake Dry, PPD	7470	6079	5994	
Centrate TKN, mg/L	1691	1428	1614	
Centrate Flow, GPD	28400	24200	23800	
Aeration				
Total SOTR, lb/hr	545	464	375	
Aeration Basin SOTE	26.0%	25.9%	26.0%	
Aeration Basin OUR, mg/L/hr	13.1	13.1	13.1	
Airflow, scfm	2008	1715	1384	