

Sewer Flow Projections

Projected Use	Size	GPD/1000s.f.	Gal / day		
Department Store	228,800	300	68,640		
Costco w/ Fueling Sta.	148,300	300	44,490		
General Retail	225,000	300	67,500		
Drug Store	12,000	300	3,600		
Sit Down Restaurant	28,000	400	11,200		
Drive Through Restaurant	12,000	500	6,000		
Movie Theater	62,500	400	25,000		
	716,600		226,430		
Peaking Factor		4	905,720	1.4	CFS - peak hourly flow
pipe diam (in)	area (sf)	velocity (fps)			
4	0.09	16.06			
6	0.20	7.14	Use 6" diam pipe		
8	0.35	4.01			

RECEIVED
CITY OF KELSEO

JAN 28 2010

COMMUNITY
DEVELOPMENT

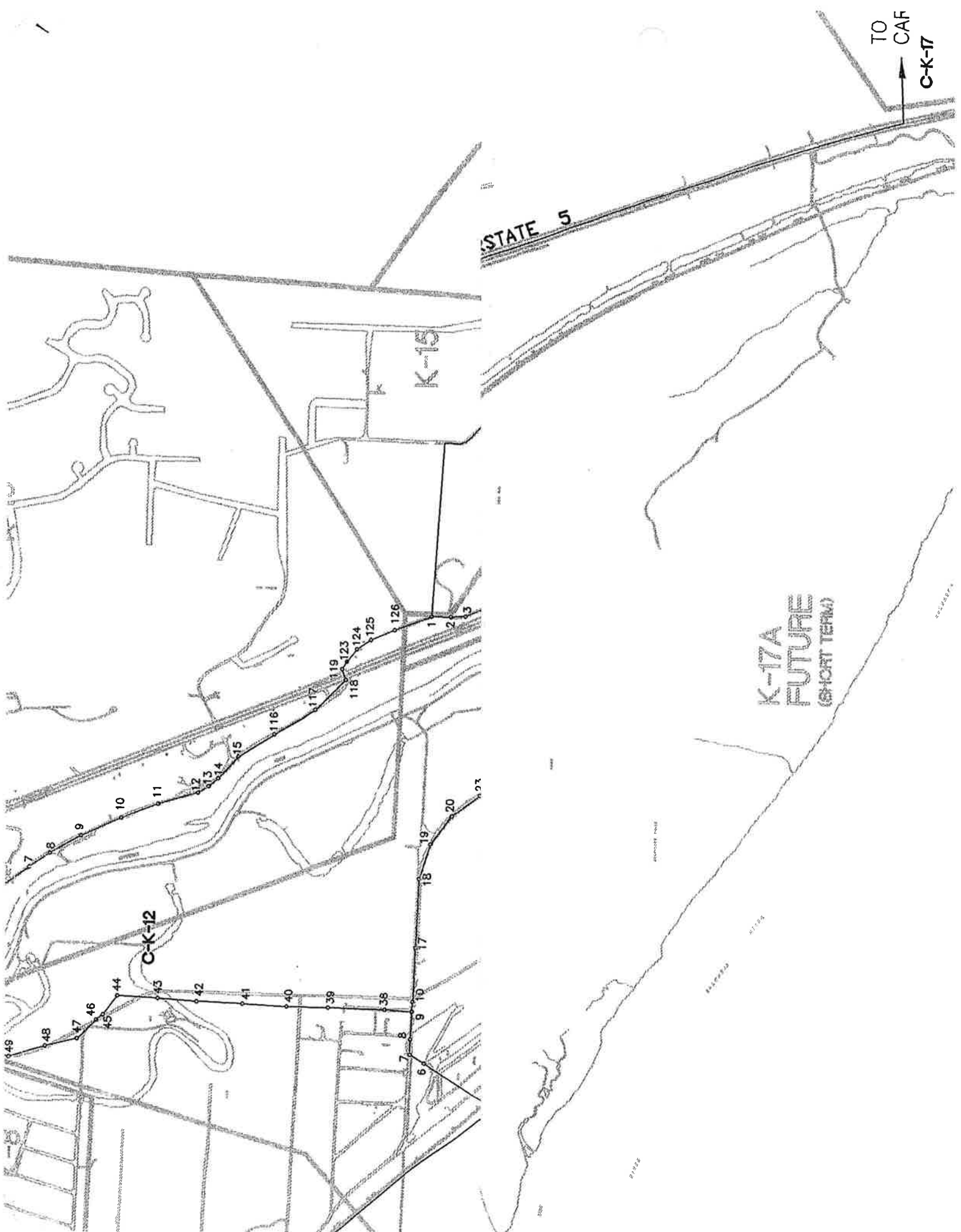
COWLITZ SEWER OPERATING BOARD																						
GENERAL SEWER PLAN																						
COLLECTION SYSTEM HYDRAULIC ANALYSIS - 0-5 YEAR PLANNING PEAK FLOW CONDITIONS																						
Description	Basin ID	Area	MH Reach	Length	Dia.	Mat'l	N	MH Inv Elev.		Down- strm	ft	ft	Head Loss	Dnstrm Excess	HL/L	Pipe Slope	Pipe Area	Full Flow Capacity	Projected PWPF Capacity	Excess Pipe Capacity		
								Up- strm	ft												ft	ft
Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input	Input		
Columbia Street	K 3		14	260	6	V.C.	0.013	67.03	49.59	71.40	54.74	52.94	35.03	19.71	0.2036	0.0671	0.20	1.5	0.9	0.0	0.9	
west of Tilla Drive	K 1		128	110	8	AC	0.013	14.09	14.07	20.69	21.72	0.02	35.01	****	0.0002	0.0002	0.35	0.2	0.1	0.0	0.1	
west of Tilla Drive	K 1		127	202	8	AC	0.013	14.07	14.04	21.72	21.89	0.03	34.98	****	0.0001	0.0001	0.35	0.1	0.1	0.1	0.0	
east of Creescent Street	K 1		126	142	8	CONC	0.013	14.04	12.21	21.89	18.97	-35.55	70.53	****	-0.2504	0.0129	0.35	1.4	0.9	0.1	0.8	
Columbia Street	K 6		39	270	8	V.C.	0.013	49.59	48.33	54.74	50.63	1.26	69.27	****	0.0047	0.0047	0.35	0.8	0.5	0.1	0.4	
2nd Avenue	K 6		38	37	8	V.C.	0.013	46.42	44.74	51.67	51.67	1.91	67.36	****	0.0069	0.0069	0.35	1.0	0.7	0.1	0.5	
2nd Avenue	K 6		37	36	8	V.C.	0.013	46.42	44.74	51.67	51.67	1.68	65.68	****	0.0067	0.0067	0.35	1.0	0.6	0.2	0.5	
2nd Avenue	K 6		36	34	8	V.C.	0.013	44.74	42.31	52.99	53.31	2.43	63.25	****	0.0759	0.0759	0.35	3.3	2.2	0.2	2.0	
Cowlitz Way	K 6		34	238	8	CONC	0.013	28.03	28.03	38.23	38.23	14.28	48.97	****	0.0600	0.0600	0.35	3.0	1.9	0.2	1.7	
1st Avenue	K 6		33	275	8	CONC	0.013	28.03	23.97	38.23	32.07	4.06	44.91	****	0.0148	0.0148	0.35	1.5	1.0	0.2	0.7	
1st Avenue	K 6		32	31	8	CONC	0.013	23.97	17.59	32.07	23.29	6.38	38.53	****	0.0252	0.0252	0.35	1.9	1.2	0.3	1.0	
1st Avenue	K 6		31	30	8	CONC	0.013	17.59	15.70	23.29	31.50	8.64	29.89	1.61	0.4114	0.0900	0.35	3.6	2.3	0.3	2.1	
Division Street	K 1		83	150	10	CONC	0.013	8.95	8.35	14.17	15.67	0.60	29.29	****	0.0040	0.0040	0.55	1.4	0.9	0.1	0.8	
east of Forth Avenue	K 1		82	108	10	CONC	0.013	8.35	7.97	15.67	15.87	-5.29	34.58	****	-0.0490	0.0035	0.55	1.3	0.8	0.2	0.7	
1st Avenue	K 6		30	29	494	10	CONC	0.013	15.70	31.50	22.39	2.06	34.58	****	0.0042	0.0042	0.55	1.4	0.9	0.2	0.7	
Oak Street	K 6		29	28	75	10	V.C.	0.013	13.64	22.39	21.51	0.43	34.15	****	0.0057	0.0057	0.55	1.7	1.1	0.2	0.9	
1st Avenue	K 6		28	19A	155	10	V.C.	0.013	13.21	21.51	22.53	5.80	28.35	****	0.0374	0.0070	0.55	1.8	1.2	0.2	1.0	
1st Avenue	K 6		5	4	192	10	V.C.	0.013	7.41	6.02	21.71	-17.50	45.85	****	-0.0911	0.0072	0.55	1.9	1.2	0.3	1.0	
Allen Street	K 13		83	71	95	10	A.C.	0.013	24.91	24.64	28.59	0.48	45.37	****	0.0051	0.0028	0.55	1.2	0.8	1.0	****	
Allen Street	K 13		71	70	371	10	CONC	0.013	24.64	23.59	30.79	8.03	37.33	****	0.0217	0.0028	0.55	1.2	0.8	2.1	****	
Allen Street	K 13		70	69	23	10	A.C.	0.013	23.59	23.52	30.79	0.49	36.84	****	0.0217	0.0031	0.55	1.2	0.8	2.1	****	
Allen Street	K 13		69	68	216	10	A.C.	0.013	23.52	22.91	30.79	4.68	32.17	2.12	0.0216	0.0028	0.55	1.2	0.8	2.1	****	
Allen Street	K 13		68	100	464	10	A.C.	0.013	22.91	21.60	34.29	10.04	22.12	9.17	0.0216	0.0028	0.55	1.2	0.8	2.1	****	
south of Allen Street	K 13		100	101	75	10	CONC	0.013	21.61	18.88	31.29	27.96	2.76	19.36	8.60	0.0368	0.0364	0.55	4.2	2.7	2.1	0.6
south of Allen Street	K 13		101	102	104	10	CONC	0.013	18.85	5.43	27.96	15.42	-55.66	75.02	****	-0.5352	0.1290	0.55	7.9	5.1	2.1	3.0
Minor Road	K 13		26	25	256	10	CONC	0.013	141.39	124.00	147.60	129.40	17.39	124.83	4.57	0.0679	0.0679	0.55	5.7	3.7	0.5	3.2
Minor Road	K 13		25	24	474	10	CONC	0.013	124.00	85.20	129.40	96.10	38.80	86.03	10.07	0.0819	0.0819	0.55	6.3	4.1	1.0	3.1
Minor Road	K 13		24	23	55	10	CONC	0.013	85.20	60.40	96.10	92.00	24.80	61.23	30.77	0.4509	0.4509	0.55	14.8	9.5	1.0	8.6
Minor Road	K 13		23	22	155	10	CONC	0.013	60.40	42.60	92.00	61.20	17.80	43.43	17.77	0.1148	0.1148	0.55	7.4	4.8	1.0	3.8
Minor Road	K 13		22	21	93	10	CONC	0.013	42.60	41.00	61.20	54.50	1.60	41.83	12.67	0.0172	0.0172	0.55	2.9	1.9	1.0	0.9
Minor Road	K 13		21	20	172	10	CONC	0.013	41.00	35.00	61.20	73.70	6.00	35.83	37.87	0.0349	0.0349	0.55	4.1	2.7	1.0	1.7
Minor Road	K 13		20	19	205	10	CONC	0.013	35.00	30.20	73.70	66.20	4.80	31.03	35.17	0.0234	0.0234	0.55	3.4	2.2	1.0	1.2
Minor Road	K 13		19	18	200	10	CONC	0.013	30.20	27.20	66.20	51.90	3.00	28.03	23.87	0.0150	0.0150	0.55	2.7	1.7	1.0	0.8
Minor Road	K 13		18	17	85	10	CONC	0.013	27.20	24.20	51.90	40.30	3.00	25.03	15.27	0.0353	0.0353	0.55	4.1	2.7	1.0	1.7
Minor Road	K 13		17	16	100	10	CONC	0.013	24.20	20.00	40.30	27.90	4.20	20.83	7.07	0.0420	0.0420	0.55	4.5	2.9	1.0	1.9
Minor Road	K 13		16	15	105	10	CONC	0.013	20.00	14.44	27.90	20.00	5.56	15.27	4.73	0.0530	0.0530	0.55	5.1	3.3	1.0	2.3
Minor Road	K 13		15	14	470	10	CONC	0.013	14.44	7.41	20.00	11.20	7.03	10.48	0.72	0.0150	0.0150	0.55	2.7	1.7	1.0	0.8
Minor Road	K 13		14	13	63	10	CONC	0.013	7.41	7.32	11.20	12.80	0.29	10.18	2.62	0.0047	0.0047	0.55	0.8	0.5	1.0	****
Minor Road	K 13		13	12	180	10	CONC	0.013	7.32	7.05	12.80	11.00	0.84	9.35	1.65	0.0047	0.0047	0.55	0.9	0.5	1.0	****

Description		Basin ID	Area	MH Reach	Length	Dia.	Mat'l	N	MH Inv Elev.		MH Rim Elev.		Head Loss	Dnstrm	Excess Head	HL/L	Pipe Slope	Pipe Area	Full Flow Capacity	Projected PWWF	Excess Pipe Capacity		
									Up	Down	Up	Down										ft	ft
Input		Input		Input		Input		Input		Input		Input		Input		Input		Input		Input		Input	
Talley Way	K 17	35	34	400	12	CONC	0.013	3.64	2.84	9.85	6.36	0.80	3.47	2.90	0.0020	0.0020	0.79	1.6	1.0	0.4	0.6		
Talley Way	K 17	34	33	400	12	CONC	0.013	2.84	2.04	6.36	10.40	0.80	2.67	7.74	0.0020	0.0020	0.79	1.6	1.0	0.5	0.6		
Talley Way	K 17	33	30	404	12	CONC	0.013	2.04	1.24	10.40	8.15	-3.52	6.19	1.97	-0.0087	0.0020	0.79	1.6	1.0	0.5	0.5		
Red Path Street	K 1	37A	37	116	15	PVC	0.010	5.56	4.88	15.57	16.07	0.68	5.51	10.57	0.0059	0.0059	1.23	6.4	4.2	0.7	3.5		
Fourth Avenue	K 1	37	35	390	15	PVC	0.010	4.88	3.86	16.07	15.17	1.02	4.49	10.69	0.0026	0.0026	1.23	4.3	2.8	0.8	2.0		
Fourth Avenue	K 1	35	7	385	15	PVC	0.010	3.86	2.86	15.17	17.17	1.00	3.49	13.69	0.0026	0.0026	1.23	4.3	2.8	0.9	1.9		
Fourth Avenue	K 1	7	1	120	15	PVC	0.010	2.86	2.55	17.17	17.57	0.31	3.18	14.40	0.0026	0.0026	1.23	4.3	2.8	1.1	1.7		
across 4th Avenue	K 1	1	LS	40	15	PVC	0.010	2.55	2.27	17.57	17.57	0.28	2.90	14.68	0.0070	0.0070	1.23	7.0	4.6	1.3	3.3		
4th Avenue	K 3	15	14	127	15	CONC	0.013	65.60	64.96	71.11	71.40	60.31	#REF!	#REF!	0.0050	0.0050	1.23	4.6	3.0	1.3	1.7		
1st Avenue	K 6	4	3	398	15	CONC	0.013	5.73	4.82	22.33	21.62	0.91	5.47	16.15	0.0023	0.0023	1.23	3.1	2.0	1.3	0.7		
1st Avenue	K 6	3	LS	25	15	CONC	0.013	4.82	4.82	21.62	21.62	0.02	5.45	16.18	0.0010	0.0010	1.23	0.0	0.0	1.3	0.7		
4th Avenue	K 3	14	13	276	15	CONC	0.013	64.96	63.58	71.40	73.00	36.43	#REF!	#REF!	0.1320	0.0050	1.23	4.6	3.0	0.7	2.3		
Academy Street	K 3	27A	9	267	15	CONC	0.013	28.53	27.20	35.20	37.60	1.33	#REF!	#REF!	0.0050	0.0050	1.23	4.6	3.0	0.7	2.3		
5th Avenue	K 3	9	1	250	15	CONC	0.013	27.20	10.71	37.60	19.11	16.49	#REF!	#REF!	0.0660	0.0660	1.23	16.6	10.8	2.1	8.7		
5th Avenue	K 3	1	K-9-43	40	15	CONC	0.013	10.71	10.20	19.11	18.80	1.63	#REF!	#REF!	0.0408	0.0128	1.23	7.3	4.7	2.2	2.6		
Grade Street	K 9	43	42	254	15	CONC	0.013	9.08	8.12	17.76	18.27	0.96	#REF!	#REF!	0.0038	0.0038	1.23	4.0	2.6	0.7	1.9		
Grade Street	K 9	42	41	256	15	CONC	0.013	8.12	7.59	18.27	19.97	-5.39	#REF!	#REF!	-0.0211	0.0021	1.23	2.9	1.9	0.7	1.2		
Corduroy Road	K 10	31	30	353	15	CONC	0.013	13.51	13.04	27.80	16.20	2.25	#REF!	#REF!	0.0064	0.0013	1.23	2.4	1.5	0.7	0.8		
south of Allen Street	K 10	30	29	354	15	CONC	0.013	11.26	10.73	16.20	15.00	0.53	#REF!	#REF!	0.0015	0.0015	1.23	2.5	1.6	0.7	0.9		
south of Allen Street	K 10	29	28	312	15	CONC	0.013	10.73	10.26	15.00	15.40	0.47	#REF!	#REF!	0.0015	0.0015	1.23	2.5	1.6	0.7	0.9		
south of Allen Street	K 10	28	27	163	15	CONC	0.013	10.26	10.02	15.40	15.30	0.24	#REF!	#REF!	0.0015	0.0015	1.23	2.5	1.6	0.8	0.8		
south of Allen Street	K 10	27	26	320	15	CONC	0.013	10.02	9.54	15.30	14.00	0.48	#REF!	#REF!	0.0029	0.0015	1.23	2.5	1.6	0.8	0.8		
south of Allen Street	K 10	26	25	235	15	CONC	0.013	9.54	9.19	14.00	13.50	0.69	#REF!	#REF!	0.0015	0.0015	1.23	2.5	1.6	0.8	0.8		
south of Allen Street	K 10	25	24	174	15	CONC	0.013	8.85	8.59	13.50	12.00	0.26	#REF!	#REF!	0.0015	0.0015	1.23	2.5	1.6	0.5	1.1		
south of Allen Street	K 10	24	23	426	15	CONC	0.013	8.59	7.93	12.00	11.80	1.06	#REF!	#REF!	0.0025	0.0015	1.23	2.5	1.6	2.1	0.7		
south of Allen Street	K 10	23	22	163	15	CONC	0.013	7.93	7.80	11.80	14.00	0.41	#REF!	#REF!	0.0025	0.0008	1.23	1.8	1.2	2.1	0.7		
south of Allen Street	K 10	22	21	350	15	CONC	0.013	7.80	7.28	14.00	11.80	0.87	#REF!	#REF!	0.0025	0.0015	1.23	2.5	1.6	2.1	0.7		
south of Allen Street	K 10	21	20	350	15	CONC	0.013	7.28	6.75	11.80	12.00	0.87	#REF!	#REF!	0.0025	0.0015	1.23	2.5	1.6	2.1	0.7		
south of Allen Street	K 10	20	19	350	15	CONC	0.013	6.75	6.23	12.00	11.60	0.92	#REF!	#REF!	0.0026	0.0015	1.23	2.5	1.6	2.1	0.7		
south of Allen Street	K 10	19	18	250	15	CONC	0.013	6.18	5.66	11.60	7.60	0.62	#REF!	#REF!	0.0025	0.0021	1.23	3.0	1.9	2.1	0.7		
south of Allen Street	K 10	18	17	350	15	CONC	0.013	5.66	5.29	7.60	7.70	0.87	#REF!	#REF!	0.0025	0.0011	1.23	2.1	1.4	2.1	0.7		
south of Allen Street	K 10	17	16	350	15	CONC	0.013	5.29	4.77	7.70	7.40	0.87	#REF!	#REF!	0.0025	0.0015	1.23	2.5	1.6	2.1	0.7		
south of Allen Street	K 10	16	15	383	15	CONC	0.013	4.77	4.18	7.40	6.20	1.00	#REF!	#REF!	0.0026	0.0015	1.23	2.5	1.6	2.1	0.7		
east of Minor Road	K 10	15	14	336	15	CONC	0.013	4.13	3.63	6.20	7.00	0.89	#REF!	#REF!	0.0026	0.0015	1.23	2.5	1.6	2.1	0.7		
east of Minor Road	K 10	14	13	131	15	CONC	0.013	3.58	3.38	7.00	11.50	0.20	#REF!	#REF!	0.0015	0.0015	1.23	2.5	1.6	2.1	0.7		
east of Minor Road	K 10	13	12	388	15	CONC	0.013	3.38	2.80	11.50	8.34	0.65	#REF!	#REF!	0.0017	0.0015	1.23	2.5	1.6	1.0	0.7		
east of Minor Road	K 10	12	11	240	15	CONC	0.013	2.73	2.53	8.34	9.40	-13.98	#REF!	#REF!	-0.0583	0.0008	1.23	1.9	1.2	1.0	0.2		
Minor Road	K 10	82	81	300	15	CONC	0.013	5.42	5.02	11.60	13.02	0.42	5.77	7.25	0.0014	0.0013	1.23	2.4	1.5	0.1	1.5		
Minor Road	K 10	81	80	300	15	CONC	0.013	5.00	4.97	13.02	11.49	0.03	5.74	5.75	0.0001	0.0001	1.23	0.6	0.4	0.1	0.4		
Minor Road	K 10	80	79	235	15	CONC	0.013	4.97	4.62	11.49	9.94	0.45	5.29	4.65	0.0019	0.0015	1.23	2.5	1.6	0.1	1.6		

Description		MH Reach		Length L	Dia. D	Mat'l	N	MH Inv Elev.		MH Rim Elev.		Head Loss	Dnstrm HGL	Excess Head	HL/L	Pipe Slope	Pipe Area	Full Flow Capacity	Projected PWWF Capacity	Excess Pipe Capacity	
		Up- strm	Dr- strm					ft	ft	ft	ft										ft
Input		Input		ft	in	Input	Input	ft	ft	ft	ft	ft	ft	ft	ft	ft	Eqns/Output	mgd	Eqn/Output		
Minor Road	K 10	79	78	384	15	CONC	0.013	4.52	3.35	9.94	9.38	1.25	4.04	5.34	0.0033	0.0030	1.23	3.6	2.3	0.1	2.2
Minor Road	K 10	78	77	375	15	CONC	0.013	3.27	3.29	9.38	8.38	0.03	4.01	4.37	0.0001	-0.0001	1.23	###	###	0.1	###
Minor Road	K 10	77	11	375	15	CONC	0.013	3.26	2.50	8.38	9.40	-40.15	44.16	****	-0.1071	0.0020	1.23	2.9	1.9	0.1	1.8
Pacific Hwy.	K 14	6	5	387	15	CONC	0.013	43.99	43.41	50.15	51.13	0.58	44.16	6.97	0.0015	0.0015	1.23	2.5	1.6	0.1	1.6
Pacific Hwy.	K 14	5	4	421	15	CONC	0.013	43.41	42.78	51.13	50.93	0.63	43.53	7.40	0.0015	0.0015	1.23	2.5	1.6	0.1	1.5
Pacific Hwy.	K 14	4	3	232	15	CONC	0.013	42.78	34.40	50.93	41.63	8.38	35.15	6.48	0.0361	0.0361	1.23	12.3	8.0	0.1	7.9
Pacific Hwy.	K 14	3	2	169	15	CONC	0.013	34.40	28.34	41.63	34.13	6.06	29.09	5.04	0.0359	0.0359	1.23	12.3	7.9	0.1	7.8
Pacific Hwy.	K 14	2	1	161	15	CONC	0.013	28.34	22.78	34.13	29.14	27.10	1.99	27.15	0.1683	0.0345	1.23	12.0	7.8	0.1	7.7
Talley Way	K 17	30	29	377	15	CONC	0.013	1.24	0.67	8.15	8.65	0.57	1.42	7.23	0.0015	0.0015	1.23	2.5	1.6	0.2	1.5
Talley Way	K 17	29	28	350	15	CONC	0.013	0.67	0.14	8.85	4.00	0.53	0.89	3.11	0.0015	0.0015	1.23	2.5	1.6	0.2	1.4
Talley Way	K 17	28	27	275	15	CONC	0.013	0.14	-0.43	4.00	4.35	0.57	0.32	4.03	0.0021	0.0021	1.23	2.9	1.9	0.3	1.6
Talley Way	K 17	27	24	361	15	CONC	0.013	-0.43	-0.98	4.35	8.70	-6.83	7.15	1.55	-0.0189	0.0015	1.23	2.5	1.6	0.4	1.3
north of Division Street	K 1	83	84	154	18	CONC	0.013	6.40	5.42	15.00	14.95	1.64	5.51	9.44	0.0106	0.0064	1.77	8.4	5.4	0.0	5.4
Ross Street	K 1	84	58	159	18	CONC	0.013	4.76	4.57	14.95	15.03	0.19	5.32	9.71	0.0012	0.0012	1.77	3.6	2.3	0.1	2.3
Ross Street	K 1	58	57	296	18	CONC	0.013	4.57	4.21	15.03	14.90	0.36	4.96	9.94	0.0012	0.0012	1.77	3.7	2.4	0.1	2.3
Ross Street	K 1	57	34	312	18	CONC	0.013	4.21	3.84	14.90	15.75	0.37	4.59	11.16	0.0012	0.0012	1.77	3.6	2.3	0.1	2.2
Red Path Street	K 1	34	33	118	18	CONC	0.013	3.84	3.70	15.75	15.50	0.14	4.45	11.05	0.0012	0.0012	1.77	3.6	2.3	0.2	2.2
Scott Road	K 1	33	32	257	18	CONC	0.013	3.70	3.37	15.50	12.90	0.33	4.12	8.78	0.0013	0.0013	1.77	3.8	2.4	0.2	2.3
Scott Road	K 1	32	31	228	18	CONC	0.013	3.37	3.10	12.90	12.30	0.27	3.85	8.45	0.0012	0.0012	1.77	3.6	2.3	0.2	2.1
Scott Road	K 1	31	30	213	18	CONC	0.013	3.10	2.84	12.30	14.50	0.26	3.59	10.91	0.0012	0.0012	1.77	3.7	2.4	0.3	2.1
across Scott Road	K 1	30	30A	193	18	CONC	0.013	2.84	2.61	14.50	16.20	0.23	3.36	12.84	0.0012	0.0012	1.77	3.6	2.4	0.3	2.1
east of 4th Avenue	K 1	30A	LS	35	18	CONC	0.013	2.61	2.57	16.20	16.20	0.04	3.32	12.88	0.0012	0.0012	1.77	3.6	2.3	0.3	2.0
Pacific Hwy.	K 14	1	16,12	400	18	CONC	0.013	22.78	22.30	29.14	30.13	0.48	#REF!	#REF!	0.0012	0.0012	1.77	3.6	2.4	0.2	2.2
Pacific Hwy.	K 16	126	125	175	18	CONC	0.013	22.30	22.09	30.13	31.81	0.21	#REF!	#REF!	0.0012	0.0012	1.77	3.6	2.4	0.4	2.0
Pacific Hwy.	K 16	125	124	160	18	CONC	0.013	22.09	21.63	31.81	29.03	0.46	#REF!	#REF!	0.0029	0.0029	1.77	5.6	3.7	0.4	3.3
Pacific Hwy.	K 16	124	123	132	18	CONC	0.013	21.63	21.26	29.03	25.13	3.30	#REF!	#REF!	0.0250	0.0028	1.77	5.6	3.6	0.4	3.2
Pacific Hwy.	K 16	123	119	43	18	CONC	0.013	18.33	18.21	25.13	24.13	0.12	#REF!	#REF!	0.0028	0.0028	1.77	5.6	3.6	0.4	3.2
Pacific Hwy.	K 16	119	118	133	18	AC	0.013	18.21	18.07	24.13	23.13	0.14	#REF!	#REF!	0.0011	0.0011	1.77	3.4	2.2	0.4	1.8
Pacific Hwy.	K 16	118	117	389	18	CONC	0.013	18.07	17.60	23.13	22.13	0.47	#REF!	#REF!	0.0012	0.0012	1.77	3.7	2.4	0.4	2.0
Pacific Hwy.	K 16	117	116	388	18	CONC	0.013	17.60	17.13	22.13	22.13	0.47	#REF!	#REF!	0.0012	0.0012	1.77	3.7	2.4	0.4	2.0
Pacific Hwy.	K 16	116	15	350	18	CONC	0.013	17.13	16.71	22.13	23.38	0.42	#REF!	#REF!	0.0012	0.0012	1.77	3.6	2.4	0.6	1.8
Pacific Hwy.	K 16	15	14	290	18	CONC	0.013	16.71	16.37	23.38	24.69	0.34	#REF!	#REF!	0.0012	0.0012	1.77	3.6	2.3	0.3	2.0
Pacific Hwy.	K 16	14	13	99	18	CONC	0.013	16.37	16.25	24.69	25.42	0.12	#REF!	#REF!	0.0012	0.0012	1.77	3.7	2.4	0.3	2.1
Pacific Hwy.	K 16	13	12	122	18	CONC	0.013	16.25	16.11	25.42	26.48	0.14	#REF!	#REF!	0.0011	0.0011	1.77	3.6	2.3	0.3	2.0
Pacific Hwy.	K 16	12	11	392	18	CONC	0.013	16.11	15.64	26.48	27.91	0.47	#REF!	#REF!	0.0012	0.0012	1.77	3.6	2.4	0.3	2.0
Pacific Hwy.	K 16	11	10	335	18	CONC	0.013	15.64	15.24	27.91	18.51	0.40	#REF!	#REF!	0.0012	0.0012	1.77	3.6	2.4	0.3	2.0
Pacific Hwy.	K 16	10	9	365	18	CONC	0.013	15.24	14.80	18.51	22.67	0.44	#REF!	#REF!	0.0012	0.0012	1.77	3.7	2.4	0.3	2.1
Pacific Hwy.	K 16	9	8	348	18	CONC	0.013	14.80	14.38	22.67	18.75	0.42	#REF!	#REF!	0.0012	0.0012	1.77	3.7	2.4	0.3	2.1
Pacific Hwy.	K 16	8	7	212	18	CONC	0.013	14.38	14.13	18.75	17.71	0.25	#REF!	#REF!	0.0012	0.0012	1.77	3.6	2.3	0.3	2.0
Pacific Hwy.	K 16	7	6	450	18	AC	0.013	14.13	13.59	17.71	21.46	0.54	#REF!	#REF!	0.0012	0.0012	1.77	3.7	2.4	0.3	2.1

Description		Basin ID	Area	MH Up	MH Reach	Length	Dia.	Mat'l	N	MH Inv Elev.	Up-Down-Strm	ft	MH Rim Elev.	Up-Down-Strm	ft	Head Loss	HGL	Excess Head	HL/L	Pipe Slope	Pipe Area	Full Flow Capacity	Projected PWWF Capacity	Excess Capacity	
Input				strm	strm	ft	in			ft	ft	ft	ft	strm	ft	ft	ft	ft	ft/ft	sq ft	Eqns/Output	mgd	Link	Eqn/Output	
	Pacific Hwy.	K	16	6	5	316	18	CONC	0.013	13.59	13.21	21.46	17.72	17.72	1.94	#REF!	#REF!	#REF!	0.0061	0.0012	1.77	3.7	2.4	0.3	2.0
	Pacific Hwy.	K	16	5	1	365	18	CONC	0.013	11.65	10.76	17.72	17.53	17.53	12.63	#REF!	#REF!	#REF!	0.0346	0.0024	1.77	5.2	3.4	0.3	3.0
	Talley Way	K	17	24	23	319	18	CONC	0.013	-0.98	-1.36	8.70	6.00	6.00	0.38	#REF!	#REF!	#REF!	0.0012	0.0012	1.77	3.6	2.3	0.4	2.0
	Talley Way	K	17	23	20	270	18	CONC	0.013	-1.36	-1.68	6.00	9.00	9.00	-8.95	#REF!	#REF!	#REF!	-0.0331	0.0012	1.77	3.6	2.3	0.4	1.9
	Vine Street	K	9	41	40	294	21	CONC	0.013	7.59	6.99	19.97	12.97	12.97	0.60	#REF!	#REF!	#REF!	0.0020	0.0020	2.41	7.2	4.6	0.7	4.0
	Vine Street	K	9	40	37	296	21	CONC	0.013	6.99	6.38	12.97	12.97	12.97	0.61	#REF!	#REF!	#REF!	0.0021	0.0021	2.41	7.2	4.7	0.7	4.0
	Vine Street	K	9	37	34	253	21	CONC	0.013	6.38	5.86	12.97	10.67	10.67	0.52	#REF!	#REF!	#REF!	0.0021	0.0021	2.41	7.2	4.7	0.8	3.8
	Vine Street	K	9	34	6	245	21	CONC	0.013	5.86	5.36	10.67	10.67	10.67	0.37	#REF!	#REF!	#REF!	0.0138	0.0020	2.41	7.2	4.6	1.0	3.6
	south of Minor Road	K	10	11	10	333	21	CONC	0.013	2.49	2.14	9.40	18.44	18.44	0.38	#REF!	#REF!	#REF!	0.0011	0.0011	2.41	5.2	3.3	2.5	0.8
	across Interstate 5	K	10	10	9	120	21	CONC	0.013	2.11	1.96	18.44	11.96	11.96	0.15	#REF!	#REF!	#REF!	0.0013	0.0013	2.41	5.6	3.6	0.3	3.3
	north of Coweeman River	K	10	9	8	372	21	CONC	0.013	1.96	1.36	11.96	7.88	7.88	0.60	#REF!	#REF!	#REF!	0.0016	0.0016	2.41	6.4	4.1	0.3	3.8
	north of Coweeman River	K	10	8	7	275	21	CONC	0.013	1.36	1.03	7.88	10.20	10.20	0.33	#REF!	#REF!	#REF!	0.0012	0.0012	2.41	5.5	3.6	0.3	3.2
	north of Coweeman River	K	10	7	6	426	21	CONC	0.013	1.03	0.52	10.20	12.78	12.78	0.51	#REF!	#REF!	#REF!	0.0012	0.0012	2.41	5.5	3.6	0.3	3.2
	north of Coweeman River	K	10	6	5	156	21	CONC	0.013	0.52	0.33	12.78	14.24	14.24	6.94	#REF!	#REF!	#REF!	0.0445	0.0012	2.41	5.5	3.6	0.3	3.3
	west of Coweeman River	K	10	5	4	175	21	CONC	0.013	0.33	-0.80	14.24	9.59	9.59	1.13	3.65	5.94	0.0065	0.0065	2.41	12.8	8.3	3.2	5.0	
	west of Coweeman River	K	10	4	3	211	21	CONC	0.013	-0.80	-1.05	9.59	8.24	8.24	1.07	2.58	5.66	0.0051	0.0012	2.41	5.5	3.5	7.3	****	
	west of Coweeman River	K	10	3	2	221	21	CONC	0.013	-1.05	-1.32	8.24	7.07	7.07	1.12	1.46	5.61	0.0051	0.0012	2.41	5.6	3.6	7.3	****	
	east of Chestnut Street	K	10	2	1	61	21	CONC	0.013	-1.32	-1.39	7.07	8.00	8.00	-6.44	7.90	0.10	-0.1056	0.0011	2.41	5.4	3.5	7.3	****	
	10th Avenue	K	9	6	5	150	24	CMP	0.025	5.36	5.05	10.97	12.27	12.27	0.31	7.59	4.68	0.0021	0.0021	3.14	5.4	3.5	2.7	0.8	
	south of Ash Street	K	9	5	4	405	24	CONC	0.013	5.05	4.22	12.97	13.67	13.67	0.83	6.76	6.91	0.0020	0.0020	3.14	10.3	6.6	0.7	5.9	
	south of Ash Street	K	9	4	3	373	24	CONC	0.013	4.22	3.46	13.67	20.41	20.41	0.76	6.00	14.41	0.0020	0.0020	3.14	10.2	6.6	0.7	5.9	
	south of Ash Street	K	9	3	2	274	24	CONC	0.013	3.46	2.89	20.41	19.97	19.97	0.57	5.43	14.54	0.0021	0.0021	3.14	10.4	6.7	0.7	6.0	
	Pacific Hwy.	K	9	2	1	318	24	CONC	0.013	2.89	2.24	19.97	22.40	22.40	4.98	0.45	21.95	0.0157	0.0020	3.14	10.3	6.6	0.7	5.9	
	Chestnut Street	K	7	1	1A	135	24	CONC	0.013	-2.09	-1.73	6.56	6.97	6.97	0.77	-0.32	7.29	0.0057	-0.0027	3.14	###	###	7.1	****	
	Talley Way	K	17	20	19	291	24	CONC	0.013	-2.18	-2.48	9.00	9.71	9.71	0.70	-1.02	10.73	0.0024	0.0010	3.14	7.3	4.7	7.2	****	
	Talley Way	K	17	19	18	330	24	CONC	0.013	-2.48	-2.81	9.71	10.35	10.35	0.81	-1.82	12.17	0.0024	0.0010	3.14	7.2	4.6	7.2	****	
	Talley Way	K	17	18	17	440	24	CONC	0.013	-2.81	-3.25	10.35	6.25	6.25	1.09	-2.92	9.17	0.0025	0.0010	3.14	7.2	4.6	7.3	****	
	Talley Way	K	17	17	10	443	24	CONC	0.013	-3.25	-4.04	6.25	9.70	9.70	1.12	-4.04	13.74	0.0025	0.0018	3.14	9.6	6.2	7.4	****	
	Talley Way	K	17	10	9	28	24	CONC	0.013	-4.04	-4.55	9.70	10.65	10.65	-4.43	0.39	10.26	-0.1582	0.0182	3.14	30.6	19.8	7.4	12.3	
	across Pacific Hwy.	K	9	1	K-7.3	180	30	CONC	0.013	2.24	0.39	22.40	13.91	13.91	2.79	-0.55	14.46	0.0155	0.0103	4.91	41.7	26.9	7.2	19.8	
	Twelfth Avenue	K	7	3	2	412	30	CONC	0.013	0.39	-0.55	13.91	7.95	7.95	0.94	-0.55	8.50	0.0023	0.0023	4.91	19.6	12.7	3.6	9.1	
	Twelfth Avenue	K	7	2	1	504	30	CONC	0.013	-0.55	-2.22	7.95	6.53	6.53	-0.55	0.00	6.53	-0.0011	0.0033	4.91	23.7	15.3	3.6	11.7	
	Chestnut Street	K	10	1	K-7.1	405	30	CONC	0.013	-1.39	-2.22	9.00	6.53	6.53	0.91	#REF!	#REF!	#REF!	0.0022	0.0020	4.91	18.6	12.0	7.3	4.7
	Thirteen Avenue	K	7	1A	K-17.50	430	36	CONC	0.013	-1.88	-2.30	7.42	11.79	12.93	0.42	#REF!	#REF!	#REF!	0.0010	0.0010	7.07	20.9	13.5	7.3	6.2
	Thirteen Avenue	K	17	50	49	345	36	CONC	0.013	-2.30	-2.41	11.79	12.93	12.93	0.11	#REF!	#REF!	#REF!	0.0003	0.0003	7.07	11.9	7.7	7.4	0.3
	west of Coweeman River	K	17	49	48	243	36	CONC	0.013	-2.41	-2.46	12.93	12.91	12.91	0.07	#REF!	#REF!	#REF!	0.0003	0.0002	7.07	9.6	6.2	7.5	****
	west of Coweeman River	K	17	48	47	313	36	CONC	0.013	-2.46	-2.88	12.91	11.13	11.13	0.42	#REF!	#REF!	#REF!	0.0013	0.0013	7.07	24.5	15.8	7.6	8.2
	west of Coweeman River	K	17	47	46	234	36	CONC	0.013	-2.88	-2.91	11.13	9.41	9.41	0.08	#REF!	#REF!	#REF!	0.0003	0.0001	7.07	7.6	4.9	7.7	****
	west of Coweeman River	K	17	46	45	58	36	CONC	0.013	-2.91	-2.92	9.41	10.04	10.04	0.02	#REF!	#REF!	#REF!	0.0003	0.0002	7.07	8.8	5.7	7.9	****
	west of Coweeman River	K	17	45	44	289	36	CONC	0.013	-2.92	-2.99	10.04	10.98	10.98	0.10	#REF!	#REF!	#REF!	0.0003	0.0002	7.07	10.4	6.7	8.0	****

COWLITZ SEWER OPERATING BOARD																								
GENERAL SEWER PLAN																								
COLLECTION SYSTEM HYDRAULIC ANALYSIS - 0-5 YEAR PLANNING PEAK FLOW CONDITIONS																								
Description	Basin ID	Area	MH Reach	Up- str	Dn- str	Length L	Dia. D	Mat'l	N	MH Inv Elev.		MH Rim Elev.		Head Loss	Dnstrm HGL	Excess Head	HL/L	Pipe Slope	Pipe Area	Full Flow Capacity	Projected PWWF Capacity	Excess Pipe Capacity		
										ft	strm	ft	strm										ft	ft
Input			Input																					
west of Coweeman River	K 17		43	44	43	353	36	AC	0.013	-2.99	-3.41	10.98	9.49	0.42	#REF!	#REF!	0.0012	0.0012	7.07	23.1	14.9	8.1	6.8	
west of Coweeman River	K 17		42	43	42	375	36	CONC	0.013	-3.41	-3.56	9.49	8.75	0.15	#REF!	#REF!	0.0004	0.0004	7.07	13.4	8.6	8.2	0.5	
west of Coweeman River	K 17		41	42	41	375	36	CONC	0.013	-3.56	-3.57	8.75	9.86	0.14	#REF!	#REF!	0.0004	0.0004	7.07	3.5	2.2	8.3	****	
west of Coweeman River	K 17		40	41	40	372	36	CONC	0.013	-3.57	-3.57	9.86	8.82	0.90	#REF!	#REF!	0.0024	0.0000	7.07	0.0	0.0	8.4	****	
west of Coweeman River	K 17		39	40	39	375	42	CONC	0.013	-4.33	-4.35	8.82	8.60	0.06	#REF!	#REF!	0.0002	0.0001	9.62	7.4	4.8	8.5	****	
west of Coweeman River	K 17		38	39	38	477	42	CONC	0.013	-4.35	-4.61	8.60	10.60	0.26	#REF!	#REF!	0.0005	0.0005	9.62	23.6	15.2	8.6	6.6	
west of Coweeman River	K 17		9	8	9	450	48	AC	0.013	-4.61	-4.73	10.60	11.36	#REF!	#REF!	#REF!	0.0002	0.0003	9.62	16.5	10.6	8.7	1.9	
Colorado Street	K 17		8	7	8	250	48	AC	0.013	-5.09	-5.13	11.36	15.09	0.04	#REF!	#REF!	0.0002	0.0002	12.57	18.2	11.8	10.0	1.8	
Colorado Street	K 17		7	6	7	322	48	CONC	0.013	-5.13	-5.19	15.09	15.45	#REF!	#REF!	#REF!	#REF!	0.0003	0.0005	12.57	30.6	19.8	#REF!	#REF!
south of Colorado Street	K 17		6	5	6	639	48	CONC	0.013	-5.19	-5.29	15.45	15.91	#REF!	#REF!	#REF!	#REF!	0.0003	0.0003	12.57	25.4	16.4	#REF!	#REF!
south of Colorado Street	K 17		5	4	5	362	48	AC	0.013	-5.29	-5.51	15.91	15.35	#REF!	#REF!	#REF!	#REF!	0.0017	0.0017	12.57	26.7	17.3	#REF!	#REF!
north of Cowlitz River	K 17		4	3	4	579	48	AC	0.013	-5.51	-6.13	15.35	14.89	#REF!	#REF!	#REF!	#REF!	0.0005	0.0005	12.57	59.6	38.5	#REF!	#REF!
north of Cowlitz River	K 17		3	2	3	755	48	AC	0.013	-6.13	-6.42	14.89	16.69	#REF!	#REF!	#REF!	#REF!	0.0002	0.0002	12.57	32.2	20.8	#REF!	#REF!
north of Cowlitz River	K 17		2	1	2	755	48	AC	0.013	-6.42	-6.60	16.69	12.98	#REF!	#REF!	#REF!	#REF!	0.0005	0.0002	12.57	22.2	14.4	#REF!	#REF!
north of Cowlitz River	K 17		1	PS	1	115	48	AC	0.013	-6.60	-6.97	12.98	17.94	#REF!	-4.74	22.68	#REF!	0.0005	0.0005	12.57	31.9	20.6	#REF!	#REF!
north of Cowlitz River	K 17									-6.97	-6.76	17.94	17.94	0.02	-4.76	22.70	0.0001	-0.0018	12.57	###	###	11.1	****	



TO CAF
C-K-17

STATE 5

K-15

K-17A
FUTURE
(SHORT TERM)

C-K-12

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 38
- 39
- 40
- 41
- 42
- 43
- 44
- 45
- 46
- 47
- 48
- 49
- 116
- 117
- 118
- 119
- 123
- 124
- 125
- 126