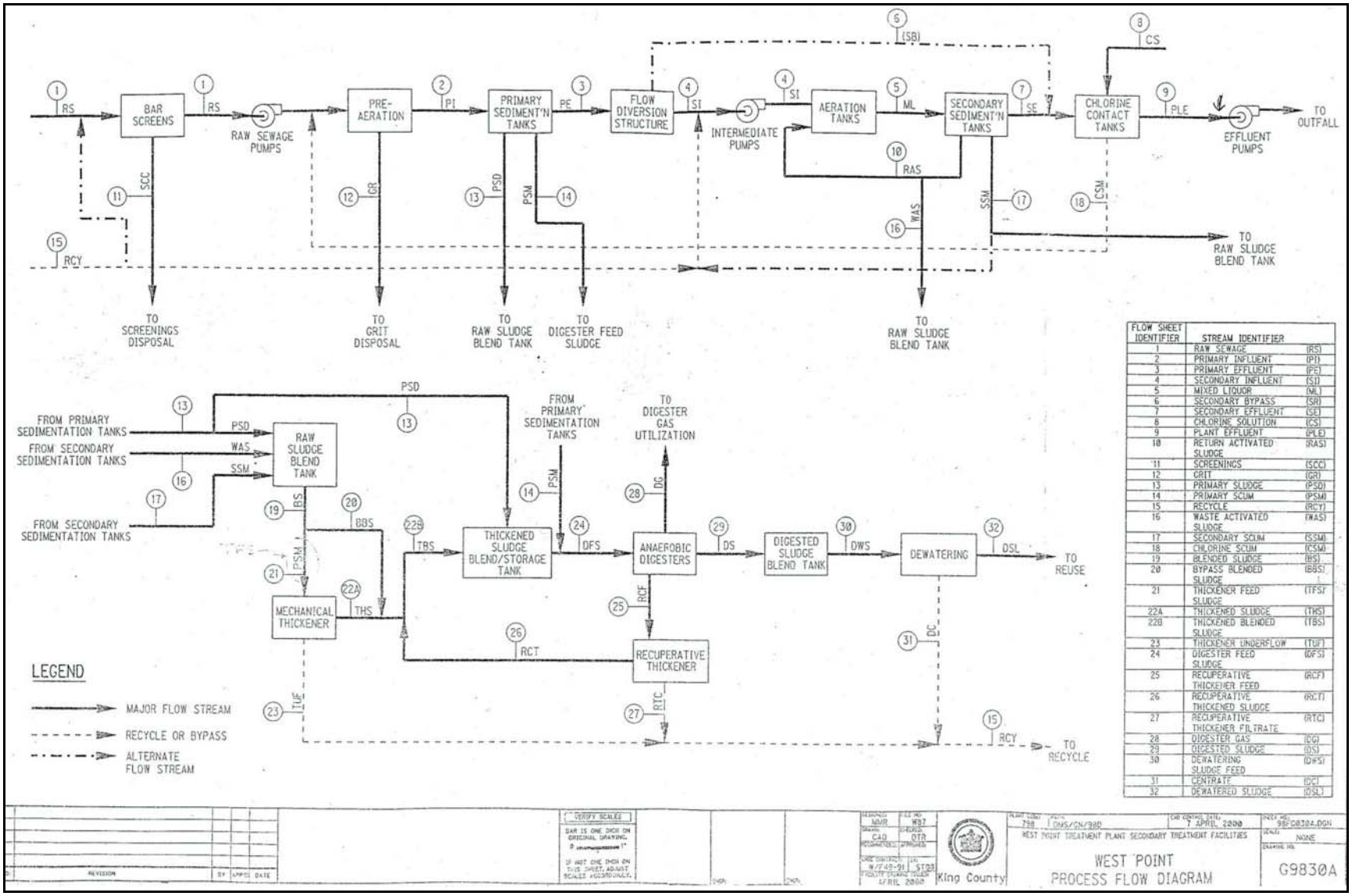
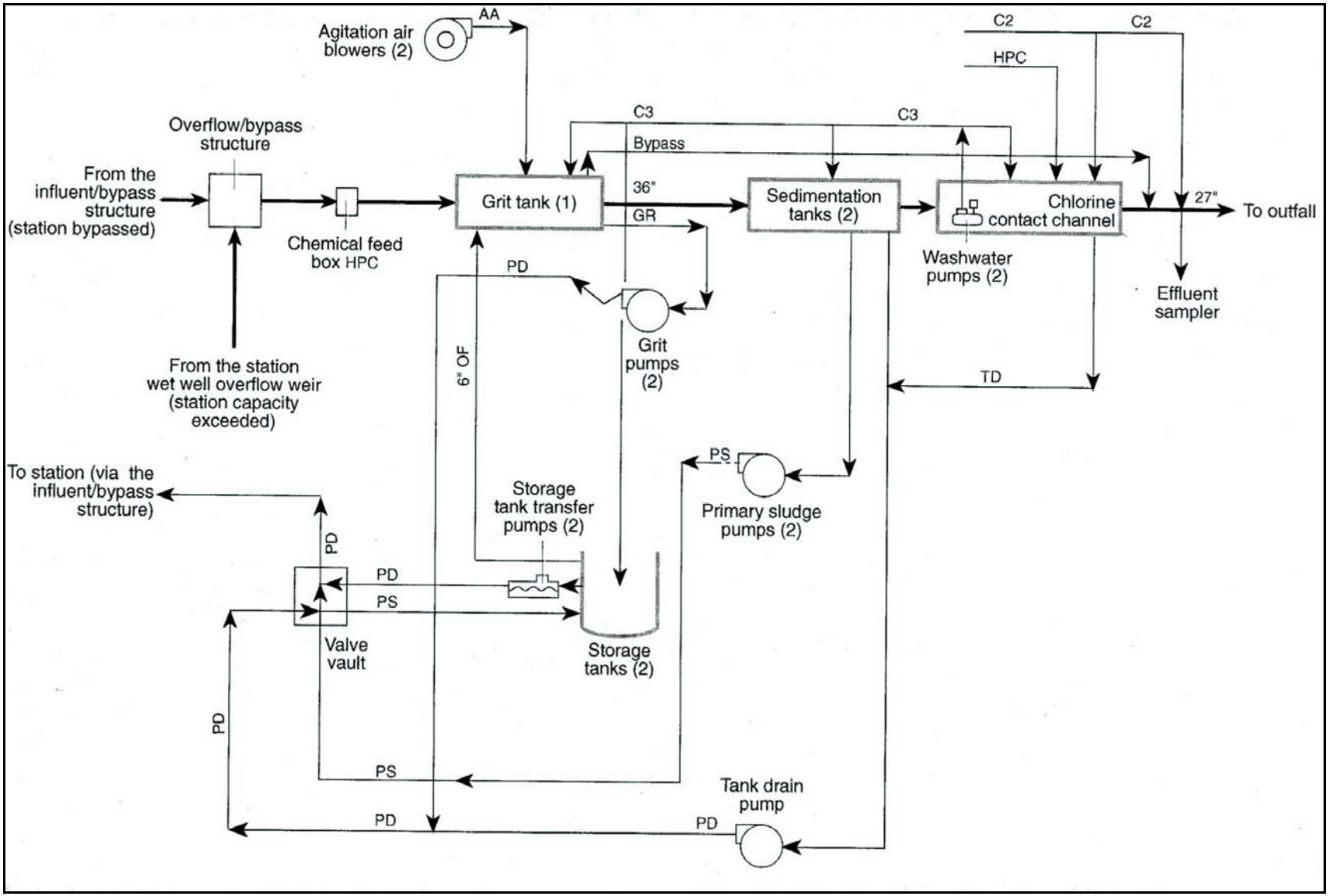
APPENDIX D – WEST POINT WWTP PROCESS FLOW DIAGRAM

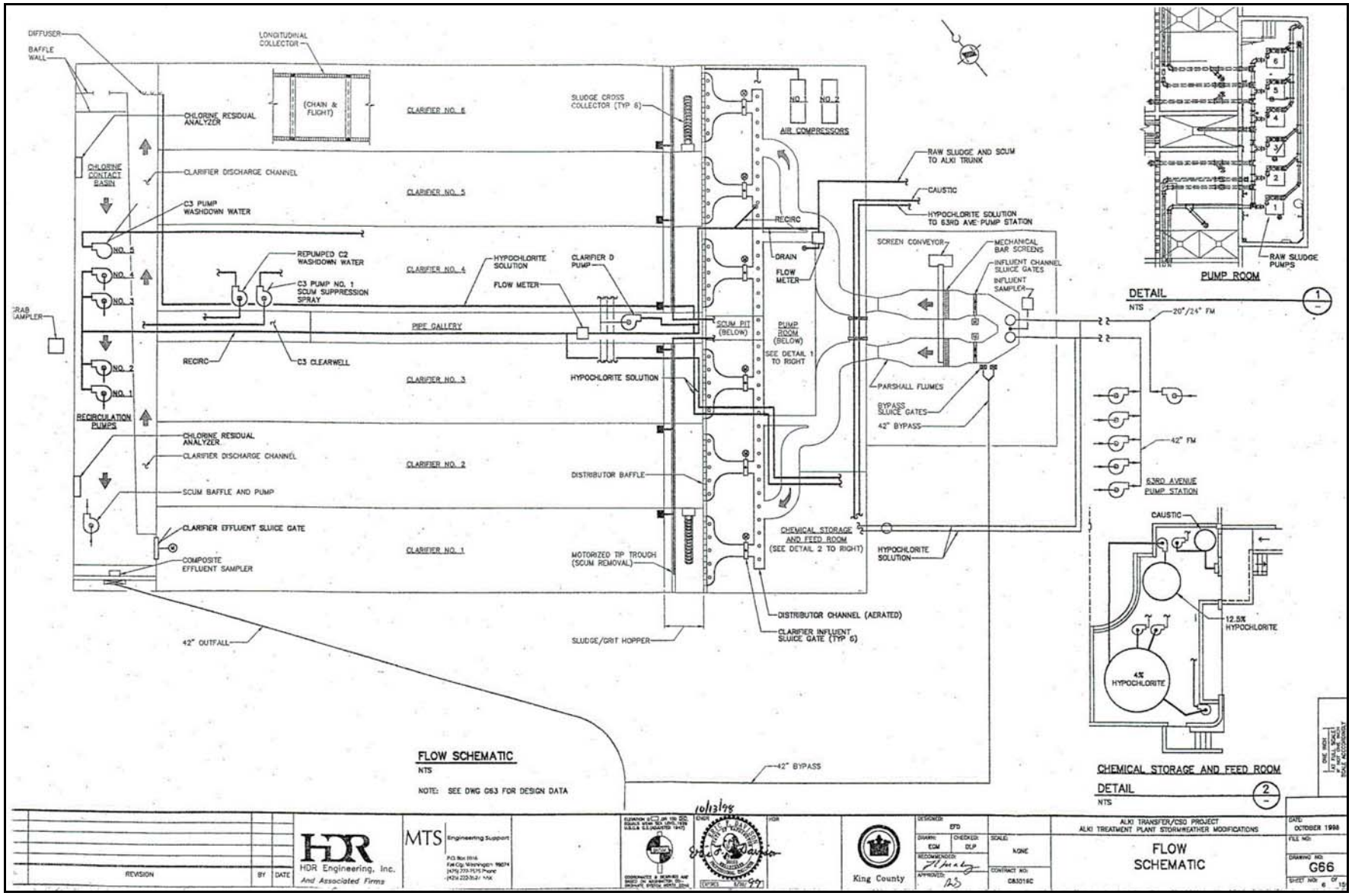


FLOW SHEET IDENTIFIER	STREAM IDENTIFIER	
1	RAW SEWAGE	(RS)
2	PRIMARY INFLUENT	(PI)
3	PRIMARY EFFLUENT	(PE)
4	SECONDARY INFLUENT	(SI)
5	MIXED LIQUOR	(ML)
6	SECONDARY BYPASS	(SB)
7	SECONDARY EFFLUENT	(SE)
8	CHLORINE SOLUTION	(CS)
9	PLANT EFFLUENT	(PLE)
10	RETURN ACTIVATED SLUDGE	(RAS)
11	SCREENINGS	(SCC)
12	GRIT	(GR)
13	PRIMARY SLUDGE	(PSD)
14	PRIMARY SCUM	(PSM)
15	RECYCLE	(RCY)
16	WASTE ACTIVATED SLUDGE	(WAS)
17	SECONDARY SCUM	(SSM)
18	CHLORINE SCUM	(CSM)
19	BLENDED SLUDGE	(BS)
20	BYPASS BLENDED SLUDGE	(BBS)
21	THICKENER FEED SLUDGE	(TFS)
22A	THICKENED SLUDGE	(THS)
22B	THICKENED BLENDED SLUDGE	(TBS)
23	THICKENER UNDERFLOW	(TUF)
24	DIGESTER FEED SLUDGE	(DFS)
25	RECUPERATIVE THICKENER FEED	(RCF)
26	RECUPERATIVE THICKENED SLUDGE	(RCT)
27	RECUPERATIVE THICKENER FILTRATE	(RTC)
28	DIGESTER GAS	(DG)
29	DIGESTED SLUDGE	(DS)
30	DEWATERING SLUDGE FEED	(DWS)
31	CENTRATE	(DC)
32	DEWATERED SLUDGE	(DSL)

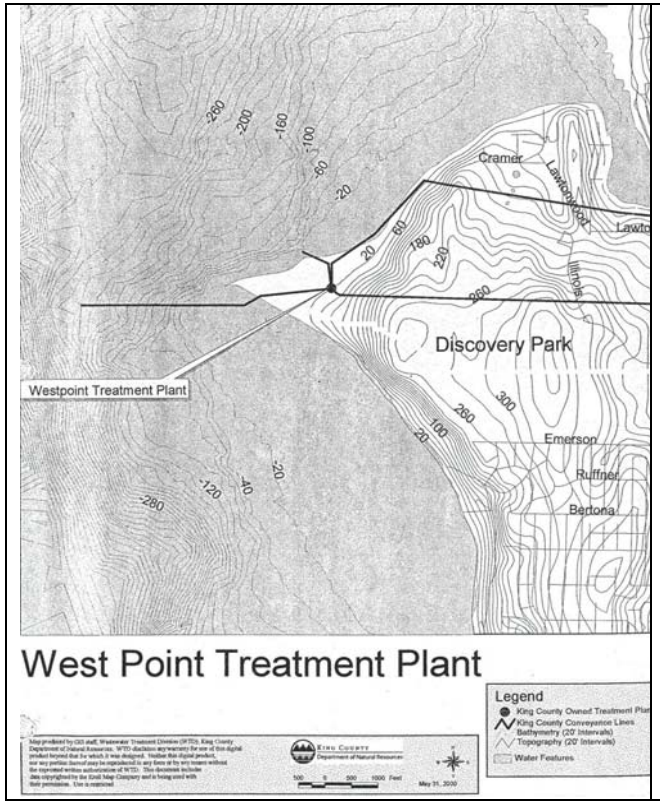
APPENDIX D – CARKEEK CSO TREATMENT PLANT PROCESS FLOW DIAGRAM

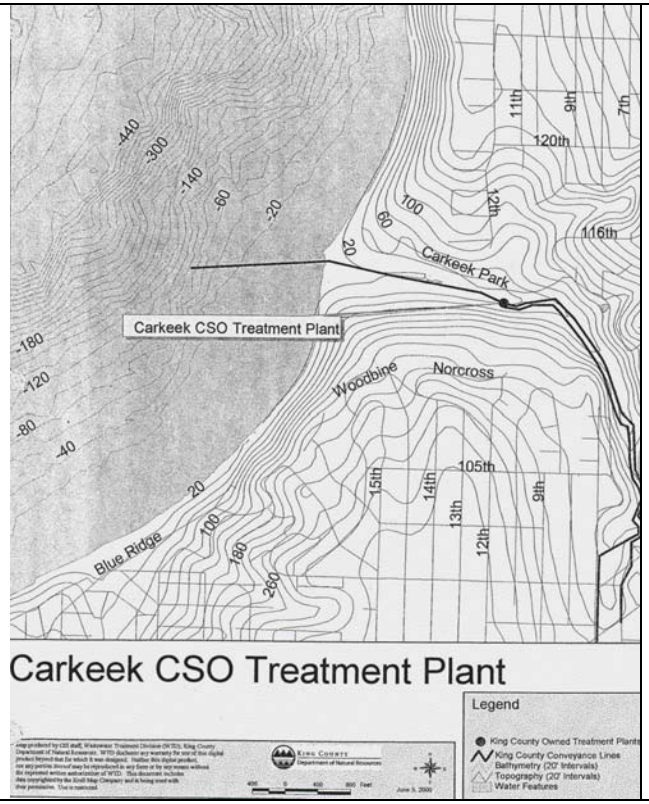


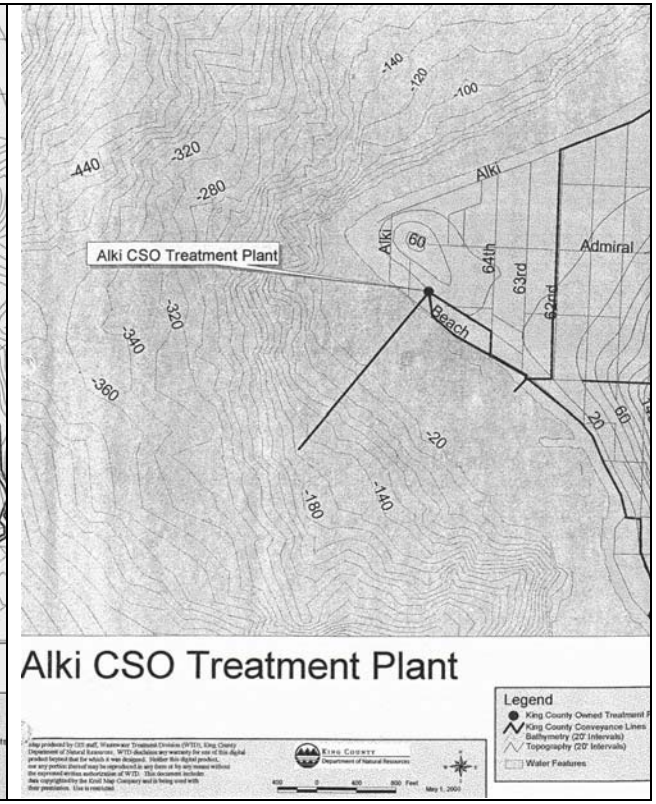
APPENDIX D – ALKI CSO TREATMENT PLANT PROCESS FLOW DIAGRAM



APPENDIX E – OUTFALL MAPS







Name METRO WEST POINT
Permit No. WA0029181D
Outfall No. 001

Analysis	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY PERCENT REMOVAL	CHLORINE, TOTAL RESIDUAL	CHLORINE, TOTAL RESIDUAL	CHLORINE, TOTAL RESIDUAL	COLIFORM, FECAL	COLIFORM, FECAL	CYANIDE	CYANIDE	CYANIDE	FLOW THRU PLANT	FLOW THRU PLANT	PH	PH	SOLIDS, SUSP., % REMOVAL	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED
Units	AVG LBS/DAY	AVG MG/L	AVW LBS/DAY	AVW MG/L	AVG PERCENT	AVG LBS/DAY	AVG UG/L	MAX UG/L	GEM #/100 ML	GM7 #/100 ML	AVG LBS/DAY	AVG UG/L	MAX UG/L	AVG MGD	MAX MGD	MAX S.U.	MIN S.U.	AVG PERCENT	AVG LBS/DAY	AVG MG/L	AVW LBS/DAY	AVW MG/L
Design Criteria														215								
Limit	54000	30	81000	45	85	387	216	546	200	400	38	21	42	183	na	9.0	6.0	85	54000	30	81000	45
1-Jan-96	14000	12	19000	18		50	54	360	7	46	0	5	6	149.76	270.39	7.3	6.8		17000	15	25000	23
1-Feb-96	20000	15	28000	21		60	43	400	18	29	0	0.005	0.005	167.13	361	7.3	6.2		20000	14	28000	16
1-Mar-96	19000	22	29000	32		50	70	330	15	29	0	0.005	0.005	98.39	153.15	7.2	6.6		17000	20	34000	38
1-Apr-96	16000	15	22000	16		80	90	160	13	24	0	5	6	122.6	341.84	7.1	6.3		12000	11	21000	13
1-May-96	19000	20	24000	24	86	60	80	240	108	1526	0	5	6.7	116.23		7.4	6.8	89	16000	16	27000	26
1-Jun-96	13000	16	14000	17	92	60	84	325	38	107	0	5	7	96.43		7.5	6.6	95	8000	10	10000	12
1-Jul-96	12000	16	16000	18	93	68	90	240	32	131	3.79	5	9	90.35		7.5	6.8	94	10000	13	12000	15
1-Aug-96	12000	16	13000	18	93	37	50	156	16	127	0	5	5	89.74	165.6	8	6.7	96	8000	10	7000	10
1-Sep-96	15000	19	16000	24	91	61	80	212	9	66	0	5	5	92.03	183	7.5	6.5	97	6000	7	8000	9
1-Oct-96	14000	16	17000	23	91	55	64	162	12	29	0	5	5	104.6	201.85	6.9	6.4	96	8000	8	11000	10
1-Nov-96	22000	21	32000	30		101	108	1560	5	11	0	5	5	115.42	311.6	7.2	6.6		19000	15	41000	22
1-Dec-96	27000	18	43000	25		140	89	820	5	9	0	5	5	163.38	406.09	6.9	6.5		36000	22	64000	37
1-Jan-97	45000	34	56000	47		123	84	380	19	72	0	5	5	178.87	370.94	7	6.2		60000	42	69000	59
1-Feb-97	16000	17	19000	19		86	85	300	3	4	0	5	5	114.62	178.87	6.7	6.2		11000	11	16000	16
1-Mar-97	27000	18	41000	19		109	87	280	8	49	0	5	5	167.68	376.68	6.6	6.2		31000	18	66000	27
1-Apr-97	17000	17	21000	22		98	87	212	2	24	0	5	5	128.84	264.93	6.8	6.2		8000	8	16000	12
1-May-97	22000	23	25000	26	88	102	114	288	5	8	0	5	5	113.89	240.3	7	6.4	93	13000	13	18000	17
1-Jun-97	20000	20	28000	26	90	102	112	350	6	20	0	5	5	110.55	180.04	6.9	6.3	95	10000	10	15000	15
1-Jul-97	17000	20	19000	21	90	71	86	184	15	150	0	5	5	100.17	206.96	6.9	6.6	95	8000	10	11000	14
1-Aug-97	13000	16	17000	18	92	55	69	185	22	32	0	5	6	96	156.67	7	6.4	95	9000	10	13000	14
1-Sep-97	15000	18	19000	20	91	73	94	370	32	39	0	5	5	96.43	193.19	7.1	6.3	95	8000	10	12000	13
1-Oct-97	17000	18	21000	22	90	110	122	520	23	103	0	5	5	114.51	255.55	6.9	6.3	96	9000	8	12000	10
1-Nov-97	15000	16	19000	17		119	112	560	24	69	0	5	5	117.61	223.19	7.4	6.7		10000	10	17000	15
1-Dec-97	15000	17	23000	25		63	66	380	22	42	4.7	6	11	108.4	264.92	7.3	6.6		10000	10	20000	14
1-Jan-98	22000	14	38000	19		124	78	380	17	26	0	5	5	177.22	369.1	7.1	6.4		26000	14	55000	25
1-Feb-98	11000	10	12000	11		79	75	350	6	15	0	5	8	131.54	265.56	7	6.5		8000	8	10000	9
1-Mar-98	12000	12	15000	13		81	78	240	1	2	0	5	5	120.38	204.42	7.1	6.5		8000	8	12000	10
1-Apr-98	10000	12	11000	14		100	126	830	2	6	0	5	5	95.66	185	7.1	6.7		5000	6	6000	7
1-May-98	12000	14	16000	15	94	83	96	304	4	11	0	5	5	101.07	173.69	7.1	6.8	96	8000	9	14000	13
1-Jun-98	12000	14	16000	17	94	89	105	370	20	57	0	5	5	97.39	167.91	7	6.2	96	8000	9	10000	11
1-Jul-98	12000	15	16000	20	94	82	104	246	14	26	5			94.63	134.77	7	6.6	95	8000	10	10000	14
1-Aug-98	10000	13	16000	20	95	93	116	300	43	53	5			96.16	131.53	7	6.4	96	7000	9	8000	10
1-Sep-98	12000	15	15000	17	94	92	112	410	121	232				96.2	163.29	7	6.8	96	8000	10	10000	12
1-Oct-98	13000	15	14000	14	94	86	105	500	36	48	0			101.92	187.71	7	6.6	96	10000	11	15000	14
1-Nov-98	21000	16	26000	17		137	108	410	40	57				145.69	393.25	7	6.4		14000	10	24000	13
1-Dec-98	25000	17	35000	22		164	119	330	22	128				168.17	348.31	7	6.1		1600	10	24000	15
1-Jan-99	49000	32	9000	47		134	102	249	15	47				169.05	298.2	7.1	6.4		35000	22	76000	40
1-Feb-99	47000	28	59000	34		181	106	430	16	23				200.45	339.73	7	6.6		28000	16	34000	20
1-Mar-99	31000	24	46000	29		188	153	450	11	26				149.62	265.33	7.1	6.7		19000	13	36000	20
1-Apr-99	19000	20	22000	24		91	98	301	8	15				110.8	185.8	7.1	6.7		10000	10	12000	13
1-May-99	14000	15	18000	20	93	68	75	189	9	30				106.44	143.25	7.1	6.7	94	11000	12	15000	16
1-Jun-99	16000	17	25000	22	92	65	74	140	29	78				107.45	184.37	7	6.5	94	12000	12	20000	7
1-Jul-99	15000	17	14000	18	92	56	66	139	31	50				100.84	158.9	7.2	6.7	94	11000	13	13000	16
1-Aug-99	17000	21	29000	32	91	55	66	350	52	132				99.3	127.04	7.4	6.9	93	13000	15	18000	19
1-Sep-99	14000	17	17000	21	93	60	76	250	39	220				94.16	120.58	7.2	6.6	95	10000	12	11000	13
1-Oct-99	14000	15	21000	18	94	52	58	100	13	43				104.36	224.04	7.1	6.5	95	10000	11	15000	14
1-Nov-99	17000	12	25000	14		124	84	260	26	90				173.49	356.21	7.2	6.5		18000	11	34000	15
1-Dec-99	14000	11	21000	13		100	87	220	9	27				143.3	257.86	7.2	6.4		11000	8	19000	11
1-Jan-00	14000	12	14000	13		67	62	116	4	13				128.77	218.79	6.9	6.8		15000	13	13000	14
1-Feb-00	13000	10	26000	18		83	71	142	5	7				141.36	268.11	7.1	6.6		15000	11	31000	21
1-Mar-00	12000	11	22000	14		71	67	130	6	25				126.5	190.1	7.2	6.8		13000	11	27000	18
1-Apr-00	11000	14	13000	15		61	78	225	9	19				94.83	142.84	7.1	6.6		7000	9	9000	11
1-May-00	12000	13	14000	14	93	65	74	210	12	45				107.74	179.54	7.1	6.6	95	9000	10	11000	12
1-Jun-00	10000	11	12000	12	94	60	67	115	48	59				108.15	162.97	7.2	6.7	96	9000	10	11000	12
1-Jul-00	12000	14	15000	17	93	57	67	220	106	198				102	124.47	7.2	6.8	94	12000	14	14000	15
1-Aug-00	13000	15	16000	17	93	60	71	168	130	249				100.42	129.51	7.2	6.7	93	13000	15	15000	17
1-Sep-00	15000	18	20000	22	92	60	72	250	38	321				99.46	143.37	7	6.7	94	12000	14	18000	20
1-Oct-00	12000	12	17000	14	94	104	109	369	21	51				109.42	205.44	7	6.5	94	12000	12	18000	15
1-Nov-00	9000	10	10000	11		109	131	302	16	40				100.85	262.35	7.2	6.7		9000	9	12000	12
1-Dec-00	12000	13	15000	16		166	177	540	7	14				108.36	187.97	7.7	6.7		9000	9	11000	11
1-Jan-01	11000	10	17000	13		108	110	312	9	59				117.94	238.45	7.5	6.6		12000	11	20000	14
1-Feb-01	9000	9	12000	13		109	105	248	3	4				121.92	198.65	7.1	6.8		8000	8	9000	9
1-Mar-01	10000	10	10000	12		88	92	230	6	17				114.05	182.87	7.1	6.7		9000	9	10000	10
1-Apr-01	11000	11	12000	11		111	112	190	25	29				117.99	170.94	7.2	6.9		10000	10	12000	12
1-May-01	12000	12	16000	16	95	94	106	300	24	47				108.71	173.68	7.2	6.7	95	10000	11	15000	13
1-Jun-01	13000	12	14000	12	94	117	122	250	35	58				114.75	224.86	7.2	6.7	95	11000	11	15000	13
1-Jul-01	9000	12	10000	12	95	94	120	369	17	99				93.38	130.72	7.2	6.6	96	7000	9	9000	10
1-Aug-01	15000	18	21000	22	93	125	142	380	41	79				100.35	267.92	7.2	6.7	92	15000	19	25000	27
1-Sep-01	10000	13	12000	15	94	101	130	228	12	21				93.29	131.42	7.1	6.8	96	7000	9	7000	9
1-Oct-01	15000	14	22000	19	93	83	88	270	32	583				114.58	190.63	7.3	6.1	95	13000	12	22000	20
1-Nov-01	18000	12	24000	14		186	126	470	24	33				165.08	339.3	7.3	6.3		23000	15	35000	19
1-Dec-01	12000	9	17000	11		142	114	240	2	3				159.34	354.27	6.9	6.4		11000	7	16000	9
1-Jan-02	19000	14	28000	18		133	96	260	4	14				158.28	367.2	7.2	6.4		20000	14	28000	19
1-Feb-02	18000	14	29000	17		87	69	112	6	17				146.39	335.18	7.5	6.4		18000	14	32000	18
1-Mar-02	12000	13	14000	16		70	70	200	3	6				119.8	211.87	7.3	6.8		7000	7	14000	10
1-Apr-02	12000	12	17000	14		64	71	150	3	17				110.7	135.42	7.2	6.6		7000	7	11000	9
1-May-02	12000	15	13000	17	92	58	75	200	3	11				91.49	115.02	7.2	6.4	95	8000	10	9000	12
1-Jun-02	11000	14	17000	17	93	50	69	130	4	16				88.45	183.08	7.1	6.8	96	7000	9	12000	12
1-Jul-02	12000	15	14000	18	93	73	89	150	59	100				98.46	162.7	7.1	6.7	94	12000	14	17000	17
1-Aug-02	9000	12	10000	14	94	48	65	116	24	79				88.99	97.87	7.2	6.9	95	9000	12	10000	14
1-Sep-02	10000	13	11000	14	95	56	77	240	95	148				87.11	110.48	7.2	6.8	96	9000	12	9000	13
1-Oct-02	9000	12	10000	14	95	60	84	290	14	42				87.23	144.06	7	6.6	96	7000	10	10000	12
1-Nov-02	9000	11	13000	13		50	63	280	8	13				89.82	188.24	7.4	6.6		9000	10	14000	15
1-Dec-02	9000	8	14000	10		68	70	300	6	10				118.15	315.24	7.1	6.6		12000	11	20000	13
1-Jan-03	13000	9	19000	13		122	92	450	10	29				155.1	289.38	7.2	6.3		16000	11	23000	14
1-Feb-03	10000	11	12000	14		74	83	223	5	12				101.26	179.03	6.9	6.6		10000	11	13000	15
1-Mar-03	12000	9	18000	12		89	77	155	5	7				137.24	323.76	7	6.4		14000	10	24000	14
Maximum	49000	34	59000	47	95	188	177	1560	130	1526	5	6	11	200.45	406.09	8	6.9	97	60000	42	76000	59
Minimum	9000	8	9000	10	86	37	43	100	1	2	0	0.005	0.005	87.11	97.87	6.6	6.1	89	1600	6	6000	7
Average	15494	15	19966	19	93	89	90	302	22	78	1	5	5	118	222	7	7	95	12639	12	19598	16

Name METRO WEST POINT
Permit No. WA0029181D
Influent Plant

Analysis	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED
Units	AVG	AVG	MAX	MAX	AVG	AVG	MAX
	LBS/DAY	MG/L	LBS/DAY	MG/L	LBS/DAY	MG/L	MG/L
Design Criteria	254000				274000		
85% Design	215900				232900		
1-Jan-96	115000	100	160000	157	184000	150	221
1-Feb-96	124000	103	179000	169	169000	131	213
1-Mar-96	158000	191	193000	279	157000	193	322
1-Apr-96	147000	160	215000	270	151000	162	204
1-May-96	13400	145	191000	220	124	148000	309000
1-Jun-96	160000	201	213000	277	162000	203	257
1-Jul-96	169000	223	216000	287	163000	216	257
1-Aug-96	161000	215	287000	331	163000	214	346
1-Sep-96	157000	212	221000	293	164000	220	314
1-Oct-96	144000	176	224000	267	162000	192	313
1-Nov-96	150000	170	188000	271	165000	178	233
1-Dec-96	151000	134	211000	223	155000	126	215
1-Jan-97	143000	112	247000	183	157000	116	266
1-Feb-97	152000	162	207000	211	148000	158	234
1-Mar-97	149000	120	213000	188	167000	128	210
1-Apr-97	154000	158	285000	358	167000	160	240
1-May-97	147000	185	297000	271	183000	195	301
1-Jun-97	172000	191	259000	314	180000	198	261
1-Jul-97	168000	204	228000	262	171000	205	249
1-Aug-97	170000	213	303000	320	16500	205	320
1-Sep-97	150000	195	232000	271	149000	189	265
1-Oct-97	164000	183	281000	300	171000	180	222
1-Nov-97	159000	174	245000	299	162000	171	277
1-Dec-97	160000	186	257000	298	159000	180	279
1-Jan-98	157000	122	213000	192	184000	131	213
1-Feb-98	155000	147	224000	252	167000	153	259
1-Mar-98	164000	170	256000	258	189000	193	265
1-Apr-98	159000	200	230000	263	159000	201	255
1-May-98	187000	226	294000	334	188000	226	359
1-Jun-98	185000	231	237000	323	189000	233	364
1-Jul-98	191000	242	271000	326	172000	217	252
1-Aug-98	192000	243	288000	360	185000	234	369
1-Sep-98	212000	265	328000	435	213000	266	495
1-Oct-98	205000	242	579000	826	217000	248	538
1-Nov-98	159000	160	216000	306	180000	165	265
1-Dec-98	166000	138	246000	284	188000	147	373
1-Jan-99	171000	46	308000	322	184000	143	330
1-Feb-99	158000	103	216000	170	177000	112	163
1-Mar-99	165000	139	266000	234	181000	150	280
1-Apr-99	181000	198	295000	314	170000	184	241
1-May-99	187000	211	242000	263	186000	209	262
1-Jun-99	197000	223	255000	263	185000	205	250
1-Jul-99	179000	214	23800	269	178000	212	286
1-Aug-99	186000	225	267000	328	185000	223	334
1-Sep-99	189000	241	298000	392	193000	245	405
1-Oct-99	195000	231	318000	388	196000	227	278
1-Nov-99	192000	155	393000	291	229000	170	412
1-Dec-99	154000	138	214000	209	181000	157	258
1-Jan-00	157000	151	246000	291	171000	163	390
1-Feb-00	148000	136	210000	190	170000	148	181
1-Mar-00	147000	144	225000	220	157000	152	199
1-Apr-00	145000	184	179000	247	152000	192	228
1-May-00	168000	188	243000	231	185000	204	238
1-Jun-00	179000	199	253000	267	203000	226	274
1-Jul-00	172000	203	234000	274	189000	222	288
1-Aug-00	179000	214	251000	300	192000	230	306
1-Sep-00	183000	221	264000	286	198000	239	300
1-Oct-00	194000	218	354000	311	190000	210	276
1-Nov-00	157000	198	226000	256	166000	206	296
1-Dec-00	185000	208	285000	254	186000	208	267
1-Jan-01	164000	173	294000	247	178000	185	246
1-Feb-01	184000	186	298000	282	193000	194	274
1-Mar-01	183000	196	256000	256	195000	205	287
1-Apr-01	199000	203	353000	301	217000	220	332
1-May-01	213000	237	273000	313	216000	237	369
1-Jun-01	202000	218	282000	280	216000	226	293
1-Jul-01	182000	235	245000	302	195000	249	332
1-Aug-01	197000	245	284000	362	207000	253	303
1-Sep-01	174000	224	219000	264	193000	247	329
1-Oct-01	175000	189	267000	247	212000	227	306
1-Nov-01	156000	141	251000	320	193000	161	261
1-Dec-01	133000	117	185000	189	168000	142	244
1-Jan-02	149000	123	262000	205	177000	144	221
1-Feb-02	153000	138	312000	329	176000	156	340
1-Mar-02	143000	149	183000	210	179000	184	245
1-Apr-02	139000	157	209000	207	181000	199	298
1-May-02	144000	189	189000	244	157000	205	315
1-Jun-02	139000	190	197000	232	171000	232	313
1-Jul-02	165000	203	248000	307	183000	224	311
1-Aug-02	160000	216	217000	297	191000	257	400
1-Sep-02	174000	240	360000	508	212000	293	836
1-Oct-02	165000	228	255000	294	187000	257	317
1-Nov-02	150000	213	249000	421	171000	231	297
1-Dec-02	141000	163	25200	358	169000	190	306
1-Jan-03	134000	118	190000	200	184000	155	224
1-Feb-03	143000	175	260000	341	164000	199	354
1-Mar-03	144000	138	247000	240	188000	176	299

Maximum	213000	265	579000	826	229000	148000	309000
Minimum	13400	46	23800	157	124	112	163
Average	163706	183	248391	285	176249	1894	3844

Name METRO WEST POINT
Permit No. WA0029181D
Outfall No. 46 Carkeek

Analysis	# OF EVENTS	BOD, 5-DAY (20 DEG. C)	CHLORINE, TOTAL RESIDUAL	CHLORINE, TOTAL RESIDUAL	COLIFORM, FECAL	COLIFORM, FECAL	FLOW, IN CONDUIT OR THRU	PH	PH	SOLIDS, SETTLEABLE	SOLIDS, SETTLEABLE	SOLIDS, TOTAL SUSPENDED
Units	MAX	MAX	AVG	MAX	AVG	MAX	MAX	MAX	MIN	AVG	MAX	MAX
	MG/L	MG/L	MG/L	MG/L	#/100 ML	#/100 ML	MGD	S.U.	S.U.	ML/L	ML/L	MG/L
Design Criteria												
Limit	na	na	na	na		na	na	na	na		1.9	na
1-Jan-96												
1-Jan-96												
1-Feb-96	2										0.5	
1-Feb-96												
1-Mar-96												
1-Mar-96												
1-Apr-96		22	2.48	3.5		3	10.6	6.9	6.6		1	102
1-Apr-96						80						
1-May-96												
1-May-96												
1-Jun-96	1										0.3	102
1-Jun-96												
1-Jul-96												
1-Jul-96												
1-Aug-96	0	0	0	0		0	0	0	0		0	0
1-Aug-96						0						
1-Sep-96	1	4	0.2	0.2		9000	0.02	6.8	6.8		1.5	49
1-Sep-96												
1-Oct-96	1	104	1.7	1.7		0	0.06	6.8	6.8		4	79
1-Oct-96						0						
1-Nov-96	1	20	1.28	2.2		155	2	7.1	7.1		0.6	47
1-Nov-96						24000						
1-Dec-96	3	62	0.9	1.9		7800	27.9	7.4	6.8		0.4	52
1-Dec-96						1.6						
1-Jan-97	2	82	1.3	1.9		5.14	23.8	8.3	6.5		0.1	58
1-Jan-97						7000						
1-Feb-97												
1-Feb-97												
1-Mar-97	2	61	1	2.1		16	15.21	7.4	6.8		1.4	58
1-Mar-97						160000						
1-Apr-97	1	14	3.3	3.6			0.66	6.7	6.7		0.1	27
1-Apr-97												
1-May-97	1	32	1.5	1.9			0.73	6.9	6.9		0.1	43
1-May-97												
1-Jun-97												
1-Jun-97												
1-Jul-97												
1-Jul-97												
1-Aug-97												
1-Aug-97												
1-Sep-97												
1-Sep-97												
1-Oct-97	3	30	0.95	1.5		815	1.57	8	7		0.1	44
1-Oct-97						300000						
1-Nov-97	1	55	0.92	0.92		16000	0.06	7.5	7.5		0.1	50
1-Nov-97						16000						
1-Dec-97												
1-Dec-97												
1-Jan-98	3	50	2.2	5		15	16.02	6.9	6		0.1	59
1-Jan-98						30000						
1-Feb-98												
1-Feb-98												
1-Mar-98												
1-Mar-98												
1-Apr-98												
1-Apr-98												
1-May-98												
1-May-98												
1-Jun-98												
1-Jun-98												
1-Jul-98												
1-Jul-98												
1-Aug-98												
1-Aug-98												
1-Sep-98												
1-Sep-98												
1-Oct-98												
1-Oct-98												
1-Nov-98	1	65	0.5	2.2		0	13.48	7.3	6.3			62
1-Nov-98						0					0.33	
1-Dec-98	3	71	1.8	2.2		22	15.72	7.4	6.2			57
1-Dec-98						160000					2.7	
1-Jan-99	2	55	2.9	3		3	8.26	7.3	6.5		0.1	32
1-Jan-99						5					0.1	
1-Feb-99	2	62	2.3	4		3	23.55	7.8	6.5		0.2	31
1-Feb-99						8					0.2	
1-Mar-99	1	49	2.7	2.7		0	0.06	7	7		0.1	25
1-Mar-99						0					0.1	
1-Apr-99												
1-Apr-99												
1-May-99												
1-May-99												
1-Jun-99	1	42	1.45	1.45		33	0.65	7.2	7.1		0.1	38
1-Jun-99						33						
1-Jul-99												
1-Jul-99												
1-Aug-99												
1-Aug-99												
1-Sep-99												
1-Sep-99												
1-Oct-99												
1-Oct-99												
1-Nov-99	2	119	0.63	0.76		36	6.89	7.7	6.8		0.13	34
1-Nov-99						39						
1-Dec-99	2	145	0.15	0.2		1700	0.52	7.2	6.8		0.1	35

Name METRO WEST POINT
Permit No. WA0029181D
Outfall No. 46 Carkeek

Analysis	# OF EVENTS	BOD, 5-DAY (20 DEG. C)	CHLORINE, TOTAL RESIDUAL	CHLORINE, TOTAL RESIDUAL	COLIFORM, FECAL	COLIFORM, FECAL	FLOW, IN CONDUIT OR THRU	PH	PH	SOLIDS, SETTLEABLE	SOLIDS, SETTLEABLE	SOLIDS, TOTAL SUSPENDED
Units	MAX	MAX	AVG	MAX	AVG	MAX	MAX	MAX	MIN	AVG	MAX	MAX
	MG/L	MG/L	MG/L	MG/L	#/100 ML	#/100 ML	MGD	S.U.	S.U.	ML/L	ML/L	MG/L
Design Criteria												
Limit	na	na	na	na		na	na	na	na		1.9	na
1-Dec-99						1700						
1-Jan-00												
1-Jan-00												
1-Feb-00	1	43	1.8	1.8		0	0.32	7	7		0.1	58
1-Feb-00						0						
1-Mar-00												
1-Mar-00												
1-Apr-00												
1-Apr-00												
1-May-00												
1-May-00												
1-Jun-00												
1-Jun-00												
1-Jul-00												
1-Jul-00												
1-Aug-00												
1-Aug-00												
1-Sep-00												
1-Sep-00												
1-Oct-00	1		1.9	1.9		50	0.11	7.3	7.3			
1-Oct-00						50						
1-Nov-00												
1-Nov-00												
1-Dec-00												
1-Dec-00												
1-Jan-01												
1-Jan-01												
1-Feb-01												
1-Feb-01												
1-Mar-01												
1-Mar-01												
1-Apr-01												
1-Apr-01												
1-May-01												
1-May-01												
1-Jun-01												
1-Jun-01												
1-Jul-01												
1-Jul-01												
1-Aug-01		83	0.5	0.5		300000	0.31	6.2	6.2		4.7	279
1-Aug-01						300000						
1-Sep-01												
1-Sep-01												
1-Oct-01												
1-Oct-01												
1-Nov-01	3	125	1.1	1.3		34	1.68	7.4	5.5		0.82	37
1-Nov-01						333						
1-Dec-01	1	47	1.7	1.7		19	2.55	7.5	7.2		0.17	36
1-Dec-01						19						
1-Jan-02	1	31	1.9	1.9		1	3.92	7.4	7.3		0.3	22
1-Jan-02						1						
1-Feb-02	2	77	1	1.2		20	0.68	7.7	6.9		0.8	77
1-Feb-02						160000						
1-Mar-02												
1-Mar-02												
1-Apr-02							0.17					
1-Apr-02												
1-May-02												
1-May-02												
1-Jun-02												
1-Jun-02												
1-Jul-02												
1-Jul-02												
1-Aug-02												
1-Aug-02												
1-Sep-02												
1-Sep-02												
1-Oct-02												
1-Oct-02												
1-Nov-02												
1-Nov-02												
1-Dec-02	1	41	0	0		0	0.2	7.1	7.1		0.1	63
1-Dec-02						0						
1-Jan-03	1	36	0.63	0.63		6	0.57	7.1	7		0.1	41
1-Jan-03						6						
1-Feb-03												
1-Feb-03												
1-Mar-03	2	25	0.72	0.75		40	0.75	7.2	7		0.1	31

Maximum	3	145	3.3	5		300000	27.9	8.3	7.5		4.7	279
Minimum	0	0	0	0		0	0	0	0	0	0	0
Average	2	55	1	2		26697	6	7	7		1	56

Name METRO WEST POINT
Permit No. WA0029181D
Influent 46 Carkeek Park

Analysis	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED
Units	AVG	MAX	AVG	MAX
	MG/L	MG/L	MG/L	MG/L
Design Criteria				
Limit				
1-Jan-96				
1-Feb-96				
1-Mar-96				
1-Apr-96	74	89	83	160
1-May-96				
1-Jun-96				
1-Jul-96				
1-Aug-96				
1-Sep-96	73	73	144	175
1-Oct-96	101	181	192	314
1-Nov-96	106	118	164	192
1-Dec-96	88	170	123	257
1-Jan-97	125	452	260	812
1-Feb-97				
1-Mar-97	66	134	87	252
1-Apr-97	76	107	88	112
1-May-97	106	136	145	182
1-Jun-97	53	61	55	84
1-Jul-97	193	260	300	394
1-Aug-97	93	93	64	64
1-Sep-97	160	188	294	598
1-Oct-97	71	126	126	202
1-Nov-97	114	162	178	308
1-Dec-97	82	84	138	138
1-Jan-98	88	156	67	117
1-Feb-98	112	144	193	354
1-Mar-98	66	94	81	105
1-Apr-98	161	161	289	289
1-May-98				
1-Jun-98				
1-Jul-98	190	190	142	142
1-Aug-98				
1-Sep-98	115	115	208	208
1-Oct-98	139	149	210	273
1-Nov-98	65	138	87	166
1-Dec-98	79	140	88	128
1-Jan-99	60	88	85	165
1-Feb-99	87	211	137	404
1-Mar-99	72	95	76	94
1-Apr-99				
1-May-99				
1-Jun-99	144	144	260	260
1-Jul-99	130	130	572	572
1-Aug-99				
1-Sep-99				
1-Oct-99				
1-Nov-99	116	209	124	248
1-Dec-99	81	178	96	151
1-Jan-00	94	153	148	236
1-Feb-00	96	114	131	170
1-Mar-00	103	116	186	221
1-Apr-00				
1-May-00				
1-Jun-00				
1-Jul-00				
1-Aug-00				
1-Sep-00				
1-Oct-00		476		772
1-Nov-00	96	162	123	231
1-Dec-00	158	158	164	164
1-Jan-01				
1-Feb-01				
1-Mar-01				
1-Apr-01	206	206	564	564
1-May-01	200	223	190	347
1-Jun-01	103	138	186	324
1-Jul-01				
1-Aug-01	71	71	35	35
1-Sep-01				
1-Oct-01	154	154	250	250
1-Nov-01	101	380	106	202
1-Dec-01	66	119	92	165
1-Jan-02	72	163	60	108
1-Feb-02	77	104	98	120
1-Mar-02	87	87	143	143
1-Apr-02	93	93	239	239
1-May-02	117	117	113	113
1-Jun-02				
1-Jul-02				
1-Aug-02				
1-Sep-02				
1-Oct-02				
1-Nov-02				
1-Dec-02	102	164	156	297
1-Jan-03	70	123	101	132
1-Feb-03	100	100	112	112
1-Mar-03	56	64	61	78

Maximum	206	476	572	812
Minimum	53	61	35	35
Average	104	153	159	240

Name METRO WEST POINT
Permit No. WA0029181D
Outfall No. 91 Alki Point

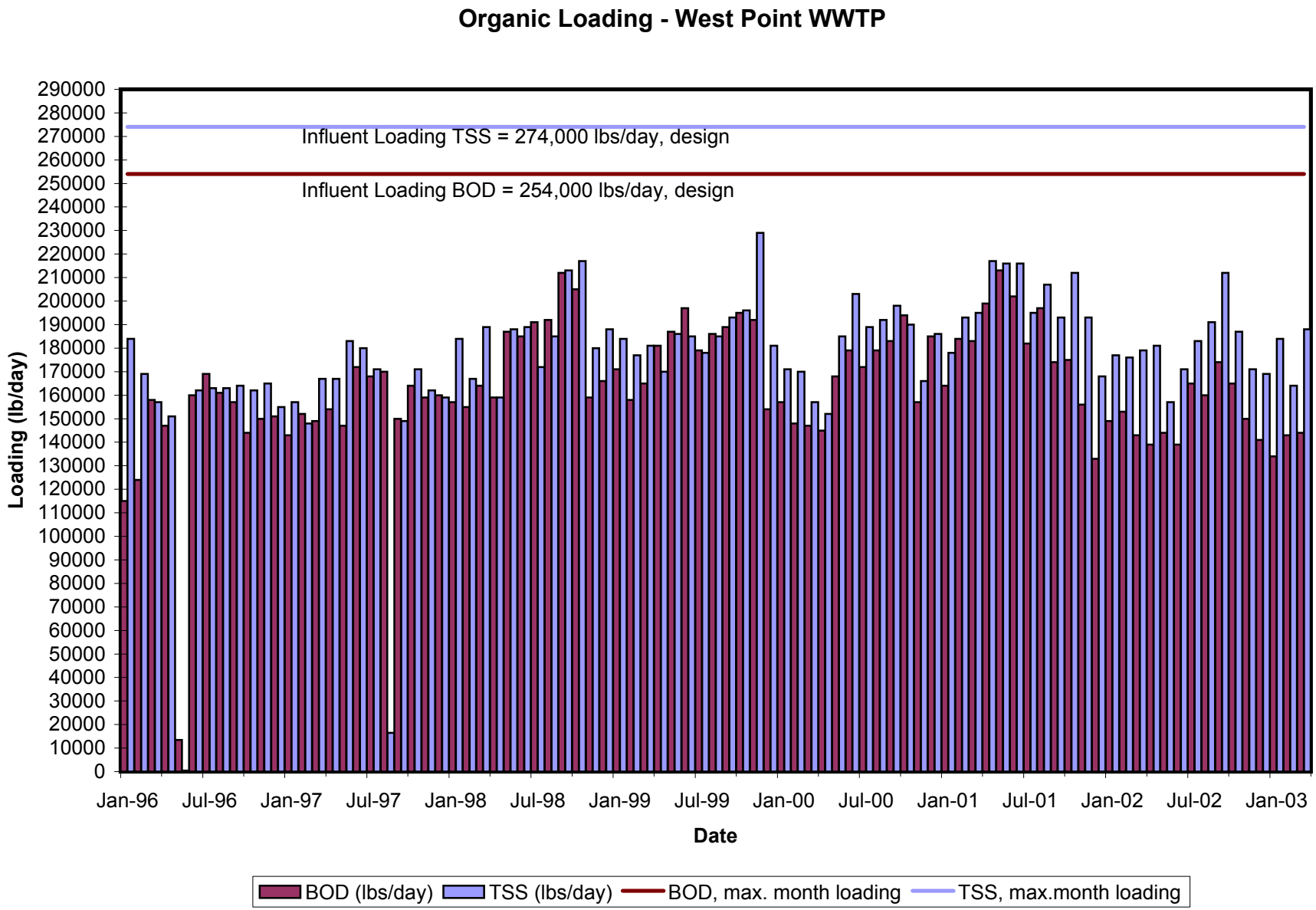
Analysis	# OF EVENTS	BOD, 5-DAY (20 DEG. C)	CHLORINE, TOTAL RESIDUAL	CHLORINE, TOTAL RESIDUAL	COLIFORM, FECAL	PH	PH	SOLIDS, SETTLEABLE	SOLIDS, SETTLEABLE	SOLIDS, SUSPENDED, % REMOVAL	SOLIDS, TOTAL SUSPENDED
Units	MAX	AVW	AVG	MAX	GEM	MAX	MIN	AVG	MAX	AVG	AVW
	# EVENTS	MG/L	MG/L	MG/L	#/100 ML	S.U.	S.U.	ML/L	ML/L	PERCENT	MG/L
Design Criteria											
Limit									1.9		
1-Nov-99	1	26.9	2.5	3.5	0	7.3	6.3	0.1	0.1	79	26
1-Dec-99											
1-Jan-00											
1-Feb-00	1	34.9	2.9	3	30	8.5	7.1	0.25	0.4	93	26.8
1-Mar-00											
1-Apr-00											
1-May-00											
1-Jun-00											
1-Jul-00											
1-Aug-00											
1-Sep-00											
1-Oct-00											
1-Nov-00											
1-Dec-00											
1-Jan-01											
1-Feb-01											
1-Mar-01											
1-Apr-01											
1-May-01											
1-Jun-01											
1-Jul-01											
1-Aug-01											
1-Sep-01											
1-Oct-01											
1-Nov-01	2	19.7	1	3	1270	7.4	6.8	0.3	0.3	46	32.4
1-Dec-01	2	29	0.7	3	103797	7.3	6.1	0.4	0.6	40	74
1-Jan-02	1	18	0.8	0.8	142	7.4	7.4	0.3	0.3	47	46
1-Feb-02	1	22	0.8	1.2	4	6.8	6.7	0.1	0.1	71	33
1-Mar-02											
1-Apr-02											
1-May-02											
1-Jun-02											
1-Jul-02											
1-Aug-02											
1-Sep-02											
1-Oct-02											
1-Nov-02											
1-Dec-02											
1-Jan-03	1	13	0.6	0.8	6	8	8	0.1	0.1		35
1-Feb-03											
1-Mar-03	1	13	0.6	0.8	6	8	8	0.1	0.1		35

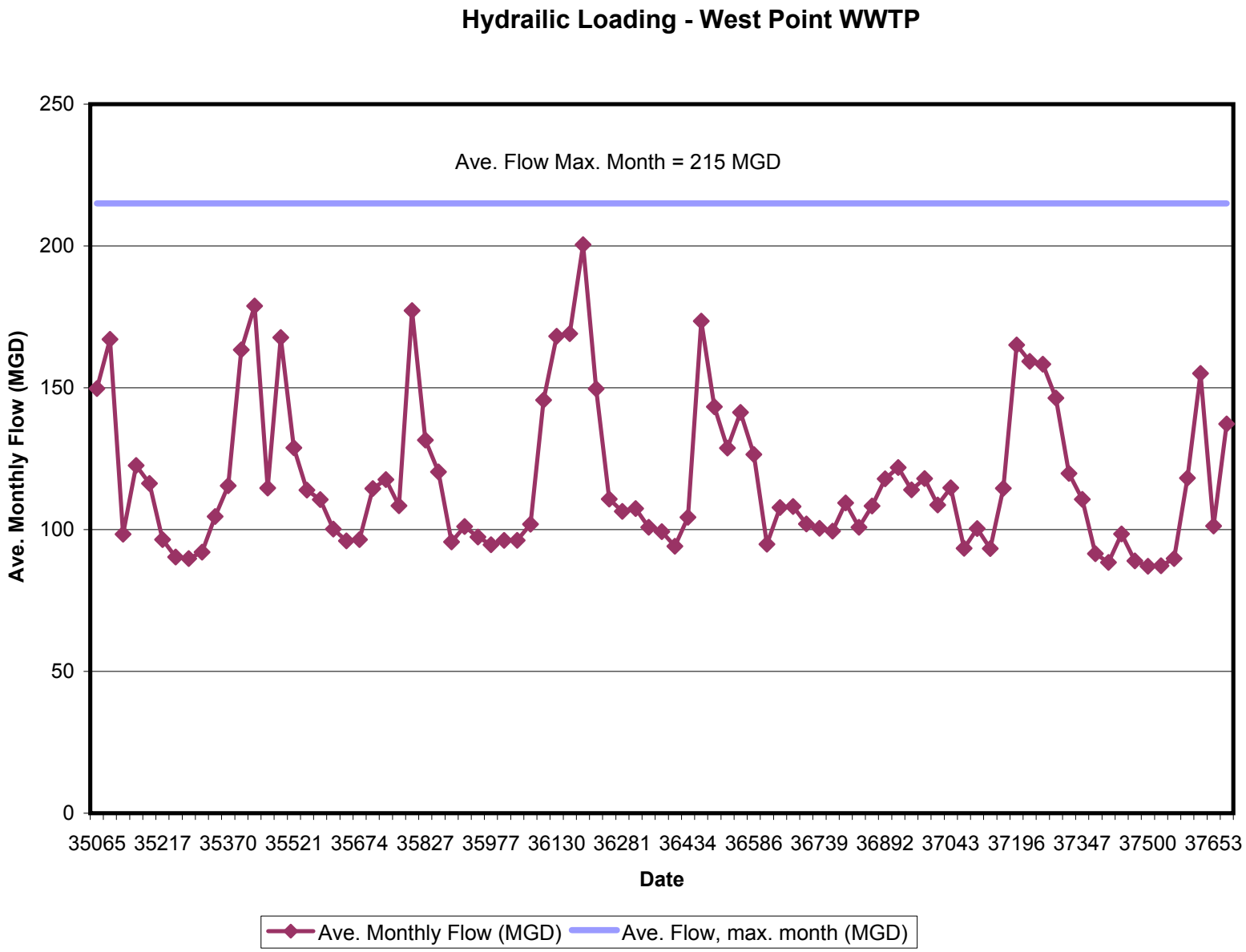
Maximum	2	34.9	2.9	3.5	103797	8.5	8	0.4	0.6	93	74
Minimum	1	13	0.6	0.8	0	6.8	6.1	0.1	0.1	40	26
Average	1	22	1	2	13157	8	7	0	0	63	39

Name METRO WEST POINT
Permit No. WA0029181D
Influent 91 Alki Point

Analysis	BOD, 5-DAY (20 DEG. C)	FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SOLIDS, TOTAL SUSPENDED
Units	MAX	MAX	MAX
	MG/L	MGD	MG/L
Design Criteria			
Limit			
1-Nov-99	26	0.2	41.4
1-Dec-99	46	1.39	166
1-Jan-00			
1-Feb-00	29	3.3	151
1-Mar-00			
1-Apr-00			
1-May-00			
1-Jun-00			
1-Jul-00			
1-Aug-00			
1-Sep-00			
1-Oct-00			
1-Nov-00			
1-Dec-00			
1-Jan-01			
1-Feb-01			
1-Mar-01			
1-Apr-01			
1-May-01			
1-Jun-01			
1-Jul-01			
1-Aug-01	84	0.04	148
1-Sep-01			
1-Oct-01			
1-Nov-01	32.5	21.56	76
1-Dec-01	42	20.16	156
1-Jan-02	32	0.6	77
1-Feb-02	29	2.6	126
1-Mar-02		0.06	
1-Apr-02			
1-May-02			
1-Jun-02			
1-Jul-02			
1-Aug-02			
1-Sep-02			
1-Oct-02			
1-Nov-02			
1-Dec-02			
1-Jan-03	26	9.87	84
1-Feb-03			
1-Mar-03	26	9.87	84

Maximum	84	21.56	166
Minimum	26	0.04	41.4
Average	37	6	111


Organic Loading - West Point WWTP
Influent Loading TSS = 274,000 lbs/day, design
Influent Loading BOD = 254,000 lbs/day, design
Loading (lb/day)
290000
280000
270000
260000
250000
240000
230000
220000
210000
200000
190000
180000
170000
160000
150000
140000
130000
120000
110000
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
Jan-96
Jul-96
Jan-97
Jul-97
Jan-98
Jul-98
Jan-99
Jul-99
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Date
BOD (lbs/day)
TSS (lbs/day)
BOD, max. month loading
TSS, max.month loading


Hydrailic Loading - West Point WWTP
Ave. Flow Max. Month = 215 MGD
Ave. Monthly Flow (MGD)
250
200
150
100
50
0
35065 35217 35370 35521 35674 35827 35977 36130 36281 36434 36586 36739 36892 37043 37196 37347 37500 37653
Date
Ave. Monthly Flow (MGD)
Ave. Flow, max. month (MGD)

Facility Criteria

FACILITY: West Point
FILENAME:
RUN DATE: 12/18/2003
PREPARED BY: Karen Burgess

WATER QUALITY CRITERIA (in ug/L unless otherwise noted)

						Water Quality Criteria		Marine		Metal Translators			Data from EPA Form 2A		
Pollutant	CAS. No.	Application Ref. No.	Based on Hardness	Priority Pollutant	Carcinogen	Marine-acute	Marine-chronic	Human Health Marine	Organoleptic Effects	MT-M-acute	MT-M-chronic	Source and Comments	Max Conc. Mg/L	# of Samples	ug/L
AMMONIA (total N)				N	N	233	35					WAC 173-201A	33.90	158	33900
BIS(2-ETHYLHEXYL) PHTHALATE	117817	13B		Y	Y	2944	3.40	5.9				Gold Book, NTR		12	5.56
CHLORINE	7782505			N	N	13	7.50					WAC 173-201A		1096	830.00
CHLOROFORM	67663	11V		Y	Y			470				Gold Book, NTR - HH		12	5.80
COPPER	744058	6M	50.0	Y	N	4.80	3.10		1000.00	0.83	0.83	WAC 173-201A	0.023	18	23.00
CYANIDE	57125	14M		Y	N	1.00	1.00	220000				WAC 173-201A, NTR	0.011	158	11.00
DIBUTYLPHTHALATE	84742			Y	N	2944	3.40	12000				Gold Book, NTR - HH		12	6.08
1,4 DICHLOROBENZENE	106467	22B		Y	N	1970		2600				NTR - HH		12	2.07
DICHLOROBROMOMETHANE	75274	12V		Y	Y			22				NTR		12	0.70
METHYLENE CHLORIDE	75092	22V		Y	Y			1600				NTR		12	3.00
PHENOL	108952	10A		Y	N	5800		4600000	300			Gold Book, NTR - HH		12	3.80
TETRACHLOROETHYLENE	127184	24V		Y	Y	10200	450	8.85				Gold Book, NTR - HH		12	3.21
TOLUENE	108883	25V		Y	N	6300	5000	200000				Gold Book, NTR - HH		12	1.26
ZINC	7440666	13M	50.0	Y	N	90.00	81.00		5000.00	0.946	0.946	WAC 173-201A,	0.051	18	51.00

Ammonia Water Quality Criteria Calculation

Calculation Of Ammonia Concentration and Criteria for fresh water. Based on EPA Quality Criteria for Water (EPA 400/5-86-001) and WAC 173-201A. Revised 1-5-94 (corrected total ammonia criterion). Revised 3/10/95 to calculate chronic criteria in accordance with EPA Memorandum from Heber to WQ Stds Coordinators dated July 30, 1992.

INPUT

1. Ambient Temperature (deg C; 0<T<30)	12.0
2. Ambient pH (6.5<pH<9.0)	8.00
3. Acute TCAP (Salmonids present- 20; absent- 25)	20
4. Chronic TCAP (Salmonids present- 15; absent- 20)	15

OUTPUT

1. Intermediate Calculations:		
Acute FT	1.74	
Chronic FT	1.74	
FPH	1.00	
RATIO	14	
pKa	9.66	
Fraction Of Total Ammonia Present As Un-ionized	2.1307%	
2. Un-ionized Ammonia Criteria		
Acute (1-hour) Un-ionized Ammonia Criterion (ug NH3/L)	149.5	
Chronic (4-day) Un-ionized Ammonia Criterion (ug NH3/L)	34.1	
3. Total Ammonia Criteria:		
Acute Total Ammonia Criterion (mg NH3+ NH4/L)	7.0	
Chronic Total Ammonia Criterion (mg NH3+ NH4/L)	1.6	
4. Total Ammonia Criteria expressed as Nitrogen:		
Acute Ammonia Criterion as mg N	5.8	5766.54
Chronic Ammonia Criterion as N	1.31	1314.31

Reasonable Potential

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure inTechnical Support Document for Water Quality-based Toxics Control U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

CALCULATIONS

	Metal Criteria Translator as decimal		Ambient Concentration	State Water Quality Standard		Max concentration at edge of Mixing Zone					Max effluent conc. Measured					Dilution Factor		
	Acute	Chronic	(metals as dissolved)	Acute	Chronic	Acute	Chronic	**LIMIT REQ'D?**	Effluent percentile value		(metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute	Chronic	
Parameter			*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*			*Pn*	*ug/L*	*CV*	*s*	*n*				COMMENTS
AMMONIA (as N)				5766.54	1314.31	832.51	174.12	NO	0.95	0.981	33900.00	0.60	0.55	158	0.79	32	153	
BIS(2-ETHYLHEXYL) PHTHALATE				2944	3.40	0.28	0.06	NO	0.95	0.779	5.56	0.60	0.55	12	1.63	32	153	
CHLORINE				13	7.50	13.83	2.89	YES	0.95	0.997	830.00	0.60	0.55	1096	0.53	32	153	
CHLOROFORM						0.49	0.10	NO	1.95	0.779	5.80	1.60	1.13	12	2.68	32	153	
COPPER	0.83	0.83		4.80	3.10	1.45	0.30	NO	2.95	0.847	23.00	2.60	1.43	18	2.44	32	153	
CYANIDE				1.00	1.00	0.17	0.04	NO	3.95	0.981	11.00	3.60	1.62	158	0.49	32	153	
DIBUTYLPHTHALATE				2944	3.40	0.89	0.19	NO	4.95	0.779	6.08	4.60	1.76	12	4.67	32	153	
1,4 DICHLOROBENZENE				1970		0.33	0.07	NO	5.95	0.779	2.07	5.60	1.86	12	5.12	32	153	
DICHLOROBROMOMETHANE						0.12	0.03	NO	6.95	0.779	0.70	6.60	1.95	12	5.51	32	153	
METHYLENE CHLORIDE						0.55	0.11	NO	7.95	0.779	3.00	7.60	2.02	12	5.86	32	153	
PHENOL				5800		0.73	0.15	NO	8.95	0.779	3.80	8.60	2.08	12	6.17	32	153	
TETRACHLOROETHYLENE				10200	450	0.65	0.14	NO	9.95	0.779	3.21	9.60	2.13	12	6.46	32	153	
TOLUENE				6300	5000	0.26	0.06	NO	10.95	0.779	1.26	10.60	2.17	12	6.72	32	153	
ZINC	0.946	0.946		90.00	81.00	5.99	1.25	NO	11.95	0.847	51.00	11.60	2.22	18	3.97	32	153	

Human Health

Parameter	Ambient Concentration ug/L	Water Quality Criteria for Protection of Human ug/L	Max concentration at edge of chronic mixing zone. ug/L	LIMIT REQ'D?	Expected Number of Compliance Samples per	AVERAGE MONTHLY ug/L	MAXIMUM DAILY ug/L	Estimated Percentile at 95% Confidence	Pn	Max effluent ug/L	Coeff Variation CV	S	# of samples from which # n	Multiplier	Calculated 50th percentile Effluent Conc.	Dilution Factor
BIS(2-ETHYLHEXYL) PHTHALATE	0.00	5.9	0.02	**NO**	**1**	**NONE**	**NONE**	0.50	0.78	5.56	0.60	0.6	12	0.65	0.00	153.0
CHLOROFORM	0.00	470	0.02	**NO**	**1**	**NONE**	**NONE**	0.50	0.78	5.80	0.60	0.6	12	0.65	0.00	153.0
CYANIDE	0.00	220000	0.02	**NO**	**1**	**NONE**	**NONE**	0.50	0.98	11.00	0.60	0.6	158	0.32	0.00	153.0
DIBUTYLPHTHALATE	0.00	12000	0.03	**NO**	**1**	**NONE**	**NONE**	0.50	0.78	6.08	0.60	0.6	12	0.65	0.00	153.0
1,4 DICHLOROBENZENE	0.00	2600	0.01	**NO**	**1**	**NONE**	**NONE**	0.50	0.78	2.07	0.60	0.6	12	0.65	0.00	153.0
DICHLOROBROMOMETHANE	0.00	22	0.00	**NO**	**1**	**NONE**	**NONE**	0.50	0.78	0.70	0.60	0.6	12	0.65	0.00	153.0
METHYLENE CHLORIDE	0.00	1600	0.01	**NO**	**1**	**NONE**	**NONE**	0.50	0.78	3.00	0.60	0.6	12	0.65	0.00	153.0
PHENOL	0.00	4600000	0.02	**NO**	**1**	**NONE**	**NONE**	0.50	0.78	3.80	0.60	0.6	12	0.65	0.00	153.0
TETRACHLOROETHYLENE	0.00	8.85	0.01	**NO**	**1**	**NONE**	**NONE**	0.50	0.78	3.21	0.60	0.6	12	0.65	0.00	153.0
TOLUENE	0.00	200000	0.01	**NO**	**1**	**NONE**	**NONE**	0.50	0.78	1.26	0.60	0.6	12	0.65	0.00	153.0

Water Quality Based Limit Calculations

	Permit Limit Calculation										Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations							Statistical variables for permit limit calculation				
PARAMETER	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translat or Acute	Metal Criteria Translat or Chronic	Ambient Concentr ation *ug/L*	Water Quality Standard Acute *ug/L*	Water Quality Standard Chronic *ug/L*	Average Monthly Limit (AML) ug/L	Maximum Daily Limit (MDL) ug/L	Comments	WLA Acute *ug/L*	WLA Chronic *ug/L*	LTA Acute *ug/L*	LTA Chronic *ug/L*	LTA Coeff. Var. (CV) *decimal*	LTA Prob'y Basis *decimal*	Limiting LTA *ug/L*	Coeff. Var. (CV) *decimal*	AML Prob'y Basis *decimal*	MDL Prob'y Basis *decimal*	# of Samples per Month *n*	
Chlorine	32.0	153.00				13	7.50	**158.9**	**416.0**		416	1147.50	133.6	605.2	0.60	0.99	133.6	0.60	0.95	0.99	30.00	1.00
								mg/L 0.16	**mg/L 0.42**													

This spreadsheet calculates water quality based permit limits based on the two value steady state model using the State Water Quality standards contained in WAC 173-201A. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 99. Last revision date 9/98. Written by G. Shervey

FACILITY: King County - Carkeek CSO Treatment Plant
FILENAME:
RUN DATE: 12/18/2003
PREPARED BY: Karen Burgess

WATER QUALITY CRITERIA (in ug/L unless otherwise noted)

						Water Quality Criteria				Human Health Criteria		Organoleptic Effects	Metals Translators				
						Fresh		Marine		Fresh	Marine		Fresh		Marine		
Pollutant	CAS. No.	Application Ref. No.	Based on Hardness	Priority Pollutant	Carcinogen	WQ-F-acute	WQ-M-chronic	WQ-M-acute	WQ-M-chronic	HH-F	HH-M	Organoleptic Effects	MT-F-acute	MT-F-Chronic	MT-M-acute	MT-M-chronic	Source and Comments
ALUMINUM, total recoverable	7429905			N	N	750	87										EPA 440/5-86-008
BARIUM	7440393			N	N		EPA recommends 1 mg/L for drinking water										Gold Book
BIS(2-ETHYLHEXYL) PHTHALATE	117817	13B		Y	Y	940	3	2944	3.40	1.8	5.9						Gold Book, NTR
CHLOROFORM	67663	11V		Y	Y	28900	1240			5.70	470						Gold Book, NTR - HH
COPPER	744058	6M	50.0	Y	N	8.86	6.28	4.80	3.10			1000.00	0.996	0.996	0.83	0.83	WAC 173-201A
DIETHYLPHTHALATE	84662	24B		Y	N	940	3	2944	3.40	23000	120000						Gold Book, NTR - HH
IRON	7439896			N	N		1000			300.00							Gold Book
MANGANESE	7439965			N	N		See Gold Book			50.00	100.00						FR 63, 237-HH
METHYLENE CHLORIDE	75092	22V		Y	Y					4.7	1600						NTR
PHENOL	108952	10A		Y	N	10200	2560	5800		21000	4600000	300					Gold Book, NTR - HH
TOLUENE	108883	25V		Y	N	17500		6300	5000	6800	200000						Gold Book, NTR - HH
ZINC	7440666	13M	50.0	Y	N	63.61	58.09	90.00	81.00			5000.00	0.996	0.996	0.946	0.946	WAC 173-201A,
CHLORINE	7782505			N	N	19	11	13	7.50								WAC 173-201A

King County - Carkeek CSO Treatment Plant
Priority Pollutant

Parameters with WQ Standard listed	Units	1/28/1999	1/29/1999	2/6/1999	2/7/1999	2/8/1999	Average	Max	# of samples	Max (ug/L)
ALUMINUM, total recoverable	**mg/L**	0.7960	0.3700	0.8660	0.7150	0.5820	0.6658	0.87	5.00	866.00
BARIUM	**mg/L**	0.0184	0.0182	0.0172	0.0154	0.0169	0.0172	0.02	5.00	18.40
BIS(2-ETHYLHEXYL) PHTHALATE	ug/L	11.0000	12.8000	23.0000	52.3000	19.0000	23.6200	52.30	5.00	52.30
CHLOROFORM	ug/L	2.8400	2.8800	3.0400	2.7900	2.7100	2.8520	3.04	5.00	3.04
COPPER	**mg/L**	0.0190	0.0220	0.0024	0.0200	0.0201	0.0167	0.02	5.00	22.00
DIETHYLPHTHALATE	ug/L	4.5200	5.4200	5.6900	5.3400	5.4900	5.2920	5.69	5.00	5.69
IRON	**mg/L**	0.6470	0.3850	0.6420	0.4550	0.4140	0.5086	0.65	5.00	647.00
MANGANESE	**mg/L**	0.0506	0.0610	0.0515	0.0514	0.0534	0.0536	0.06	5.00	61.00
METHYLENE CHLORIDE	ug/L	18.0000	1.6000				9.8000	18.00	2.00	18.00
PHENOL	ug/L			4.1000			4.1000	4.10	1.00	4.10
TOLUENE	ug/L		1.2000				1.2000	1.20	1.00	1.20
ZINC	**mg/L**	0.0439	0.0792	0.0470	0.0445	0.0419	0.0513	0.08	5.00	79.20

WQ Human Health Criteria
BIS(2-ETHYLHEXYL) PHTHALATE
CHLOROFORM
DIETHYLPHTHALATE
MANGANESE
METHYLENE CHLORIDE
PHENOL
TOLUENE

Calculation Of Ammonia Concentration and Criteria for fresh water. Based on EPA Quality Criteria for Water (EPA 400/5-86-001) and WAC 173-201A. Revised 1-5-94 (corrected total ammonia criterion). Revised 3/10/95 to calculate chronic criteria in accordance with EPA Memorandum from Heber to WQ Stds Coordinators dated July 30, 1992.

INPUT	
1. Ambient Temperature (deg C; 0<T<30)	12.0
2. Ambient pH (6.5<pH<9.0)	8.00
3. Acute TCAP (Salmonids present- 20; absent- 25)	20
4. Chronic TCAP (Salmonids present- 15; absent- 20)	15

OUTPUT	
1. Intermediate Calculations:	
Acute FT	1.74
Chronic FT	1.74
FPH	1.00
RATIO	14
pKa	9.66
Fraction Of Total Ammonia Present As Un-ionized	2.1307%
2. Un-ionized Ammonia Criteria	
Acute (1-hour) Un-ionized Ammonia Criterion (ug NH3/L)	149.5
Chronic (4-day) Un-ionized Ammonia Criterion (ug NH3/L)	34.1
3. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (mg NH3+ NH4/L)	7.0
Chronic Total Ammonia Criterion (mg NH3+ NH4/L)	1.6
4. Total Ammonia Criteria expressed as Nitrogen:	
Acute Ammonia Criterion as mg N	5.8
Chronic Ammonia Criterion as N	1.31

Resonable Potential to Exceed Water Quality Standard Carkeek CSO Treatment Plant Outfall

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure inTechnical Support Document for Water Quality-based Toxics Control U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

CALCULATIONS

	Metal Criteria Translator as decimal		Ambient Concentration	State Water Quality Standard		Max concentration at edge of Mixing Zone					Max effluent conc. Measured					Dilution Factor		
	Acute	Chronic	(metals as dissolved)	Acute	Chronic	Acute	Chronic	LIMIT REQ'D?	Effluent percentile value		(metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute	Chronic	
Parameter			ug/L	ug/L	ug/L	ug/L	ug/L			Pn	ug/L	CV	s	n				COMMENTS
ALUMINUM, total recoverable						52.97	10.22	NO	0.95	0.549	866.00	0.60	0.55	5	2.32	38	197	
BARIUM						1.13	0.22	NO	0.95	0.549	18.40	0.60	0.55	5	2.32	38	197	
BIS(2-ETHYLHEXYL) PHTHALATE				2944	3.40	3.20	0.62	NO	0.95	0.549	52.30	0.60	0.55	5	2.32	38	197	
CHLORINE				13	7.50	103.54	19.97	YES	1.95	0.908	3300.00	0.60	0.55	31	1.19	38	197	
CHLOROFORM						0.19	0.04	NO	0.95	0.549	3.04	0.60	0.55	5	2.32	38	197	
COPPER	0.83	0.83		4.80	3.10	1.12	0.22	NO	0.95	0.549	22.00	0.60	0.55	5	2.32	38	197	
DIETHYLPHTHALATE				2944	3.40	0.35	0.07	NO	0.95	0.549	5.69	0.60	0.55	5	2.32	38	197	
IRON						44.02	8.49	NO	0.95	0.473	647.00	0.60	0.55	4	2.59	38	197	
MANGANESE						3.73	0.72	NO	0.95	0.549	61.00	0.60	0.55	5	2.32	38	197	
METHYLENE CHLORIDE						1.80	0.35	NO	0.95	0.224	18.00	0.60	0.55	2	3.79	38	197	
PHENOL				5800		4.40	0.85	NO	1.95	0.050	4.10	1.60	1.13	1	40.74	38	197	
TOLUENE				6300	5000	3.50	0.68	NO	2.95	0.050	1.20	2.60	1.43	1	110.96	38	197	
ZINC	0.946	0.946		90.00	81.00	23.31	4.50	NO	3.95	0.549	79.20	3.60	1.62	5	11.82	38	197	

Human Health Criteria

Carkeek CSO Treatment Plant Outfall

Revised 3/00

Parameter	Ambient Concentration (Geometric Mean)	Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone.	**LIMIT REQ'D?**	**Expected Number of Compliance Samples per Month**	**AVERAGE MONTHLY EFFLUENT LIMIT**	**MAXIMUM DAILY EFFLUENT LIMIT**	Estimated Percentile at 95% Confidence		Max effluent conc. measured	Coeff Variation		# of samples from which # in col. K was taken	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
	ug/L	*ug/L*	*ug/L*			*ug/L*	*ug/L*		*Pn*	*ug/L*	*CV*	**S**	*n*			
BIS(2-ETHYLHEXYL) PHTHALATE	0.00	5.9	0.25	**NO**	**1**	**NONE**	**NONE**	0.50	0.55	52.30	0.60	0.6	5	0.93	0.00	197.0
CHLOROFORM	0.00	470	0.01	**NO**	**1**	**NONE**	**NONE**	0.50	0.55	3.04	0.60	0.6	5	0.93	0.00	197.0
DIETHYLPHTHALATE	0.00	120000	0.03	**NO**	**1**	**NONE**	**NONE**	0.50	0.55	5.69	0.60	0.6	5	0.93	0.00	197.0
MANGANESE	0.00	100.00	0.29	**NO**	**1**	**NONE**	**NONE**	0.50	0.55	61.00	0.60	0.6	5	0.93	0.00	197.0
METHYLENE CHLORIDE	0.00	1600	0.14	**NO**	**1**	**NONE**	**NONE**	0.50	0.22	18.00	0.60	0.6	2	1.52	0.00	197.0
PHENOL	0.00	4600000	0.05	**NO**	**1**	**NONE**	**NONE**	0.50	0.05	4.10	0.60	0.6	1	2.49	0.00	197.0
TOLUENE	0.00	200000	0.02	**NO**	**1**	**NONE**	**NONE**	0.50	0.05	1.20	0.60	0.6	1	2.49	0.00	197.0

Limit Calculations Carkeek CSO Treatment Plant Outfall

Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.

	Permit Limit Calculation Summary										Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations							Statistical variables for permit limit calculation				
	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translator	Metal Criteria Translator	Ambient Concentration	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	Comments	WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	LTA Prob'y Basis	Limiting LTA	Coeff. Var. (CV)	AML Prob'y Basis	MDL Prob'y Basis	# of Samples per Month	
PARAMETER			Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	ug/L	ug/L		*ug/L*	*ug/L*	*ug/L*	*ug/L*	*decimal*	*decima*	*ug/L*	*decima*	*decimal*	*decimal*	*n*	
Chlorine	38.0	197.00				13	7.50	**246.2**	**494.0**		494	1477.50	158.6	779.3	0.60	0.99	158.6	0.60	0.95	0.99	4.00	1.00

This spreadsheet calculates water quality based permit limits based on the two value steady state model using the State Water Quality standards contained in WAC 173-201A. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 99. Last revision date 9/98. Written by G. Shervey

FACILITY: King County - Alki CSO Treatment Plant
FILENAME:
RUN DATE: 12/18/2003
PREPARED BY: Karen Burgess

WATER QUALITY CRITERIA (in ug/L unless otherwise noted)

						Water Quality Criteria				Human Health Criteria		Organoleptic Effects	Metals Translators				
						Fresh		Marine		Fresh	Marine		Fresh		Marine		
Pollutant	CAS. No.	Application Ref. No.	Based on Hardness	Priority Pollutant	Carcinogen	WQ-F-acute	WQ-M-chronic	WQ-M-acute	WQ-M-chronic	HH-F	HH-M	Organoleptic Effects	MT-F-acute	MT-F-Chronic	MT-M-acute	MT-M-chronic	Source and Comments
CHLORINE	7782505			N	N	19	11	13	7.50								WAC 173-201A

Calculation Of Ammonia Concentration and Criteria for fresh water. Based on EPA Quality Criteria for Water (EPA 400/5-86-001) and WAC 173-201A. Revised 1-5-94 (corrected total ammonia criterion). Revised 3/10/95 to calculate chronic criteria in accordance with EPA Memorandum from Heber to WQ Stds Coordinators dated July 30, 1992.

INPUT

1. Ambient Temperature (deg C; 0<T<30)	12.0
2. Ambient pH (6.5<pH<9.0)	8.00
3. Acute TCAP (Salmonids present- 20; absent- 25)	20
4. Chronic TCAP (Salmonids present- 15; absent- 20)	15

OUTPUT

1. Intermediate Calculations:	
Acute FT	1.74
Chronic FT	1.74
FPH	1.00
RATIO	14
pKa	9.66
Fraction Of Total Ammonia Present As Un-ionized	2.1307%
2. Un-ionized Ammonia Criteria	
Acute (1-hour) Un-ionized Ammonia Criterion (ug NH3/L)	149.5
Chronic (4-day) Un-ionized Ammonia Criterion (ug NH3/L)	34.1
3. Total Ammonia Criteria:	
Acute Total Ammonia Criterion (mg NH3+ NH4/L)	7.0
Chronic Total Ammonia Criterion (mg NH3+ NH4/L)	1.6
4. Total Ammonia Criteria expressed as Nitrogen:	
Acute Ammonia Criterion as mg N	5.8
Chronic Ammonia Criterion as N	1.31

Resonable Potential to Exceed Water Quality Standard Alki CSO Treatment Plant

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

CALCULATIONS

	Metal Criteria Translator as decimal		Ambient Concentration	State Water Quality Standard		Max concentration at edge of Mixing Zone					Max effluent conc. Measured					Dilution Factor		
	Acute	Chronic	(metals as dissolved)	Acute	Chronic	Acute	Chronic	**LIMIT REQ'D?**	Effluent percentile value		(metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute	Chronic	
Parameter			*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*			*Pn*	*ug/L*	*CV*	*s*	*n*				COMMENTS
CHLORINE				13	7.50	90.99	17.55	YES	1.95	0.908	2900.00	0.60	0.55	31	1.19	38	197	

Limit Calculations Alki CSO Treatment Plant

Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.

			Permit Limit Calculation Summary								Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations							Statistical variables for permit limit calculation				
PARAMETER	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translator Acute	Metal Criteria Translator Chronic	Ambient Concentration *ug/L*	Water Quality Standard Acute *ug/L*	Water Quality Standard Chronic *ug/L*	Average Monthly Limit (AML) ug/L	Maximum Daily Limit (MDL) ug/L	Comments	WLA Acute *ug/L*	WLA Chronic *ug/L*	LTA Acute *ug/L*	LTA Chronic *ug/L*	LTA Coeff. Var. (CV) *decimal*	LTA Prob'y Basis *decimal*	Limiting LTA *ug/L*	Coeff. Var. (CV) *decimal*	AML Prob'y Basis *decimal*	MDL Prob'y Basis *decimal*	# of Samples per Month *n*	
Chlorine	22.0	120.00				13	7.50	**142.6**	**286.0**		286	900.00	91.8	474.7	0.60	0.99	91.8	0.60	0.95	0.99	4.00	1.00

This spreadsheet calculates water quality based permit limits based on the two value steady state model using the State Water Quality standards contained in WAC 173-201A. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 99. Last revision date 9/98. Written by G. Shervey

Revised 3/00

Parameter	Ambient Concentration (Geometric Mean) ug/L	Water Quality Criteria for Protection of Human Health ug/L	Max concentration at edge of chronic mixing zone. ug/L	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT ug/L	MAXIMUM DAILY EFFLUENT LIMIT ug/L	Estimated Percentile at 95% Confidence	Pn	Max effluent conc. measured ug/L	Coeff Variation CV	S	# of samples from which # in col. K was taken n	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor