

DEPARTMENT OF ECOLOGY

November 15, 1994

TO: John Glynn and Ed Abassi
Water Quality Program, NWRO

THROUGH: Will Kendra *wkc*
EILS Program, Watershed Assessments Section

FROM: Norm Glenn *norm*
Watershed Assessments Section

SUBJECT: City of Snohomish Basin Class II Inspection Summary

An announced Basin Class II inspection was conducted at the above facility during the week of August 16, 1993. My original intent was to provide the usual inspection report. However, due to the recent reprogramming of Class II activities in EILS, it became necessary to abbreviate the reporting effort on my remaining projects. This transmittal memo summarizes the significant findings from my review of the inspection data (attached):

- Metals were found in sufficient concentrations in effluent to be a cause for concern. All six metals analyzed for were detected; but only silver, mercury, and copper showed the potential to exceed water quality standards in the receiving water. A mixing zone study would be necessary to generate accurate information about background concentrations in the river, the dilution capacity of the river under critical design conditions, and thus the potential for toxicity to aquatic life.
- NPDES permit limits on TSS in effluent and TSS percent removal were not being met during the several days of the inspection - probably because of algal growth. Organic loading to the WWTP approached the design criterion for BOD₅, so planning should be considered for an upgrade to the plant.
- BOD₅ removal was good. Nitrification was effectively reducing ammonia concentrations, while denitrification was keeping nitrate-nitrite levels low.

If you have any questions concerning this memo, please contact me at 407-6683.

NLG:WK:blt
Attachments

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References:

APHA-AWWA-WEF, 1992. Standard Methods for the Examination of Water and Wastewater, 18 edition. American Public Health Association, American Water Works Association, Water Environment Federation, Washington D.C.

EPA, 1983. Methods for Chemical Analyses of Water and Waste. EPA-600/4-79-020 (Rev. March, 1983). Washington D.C.

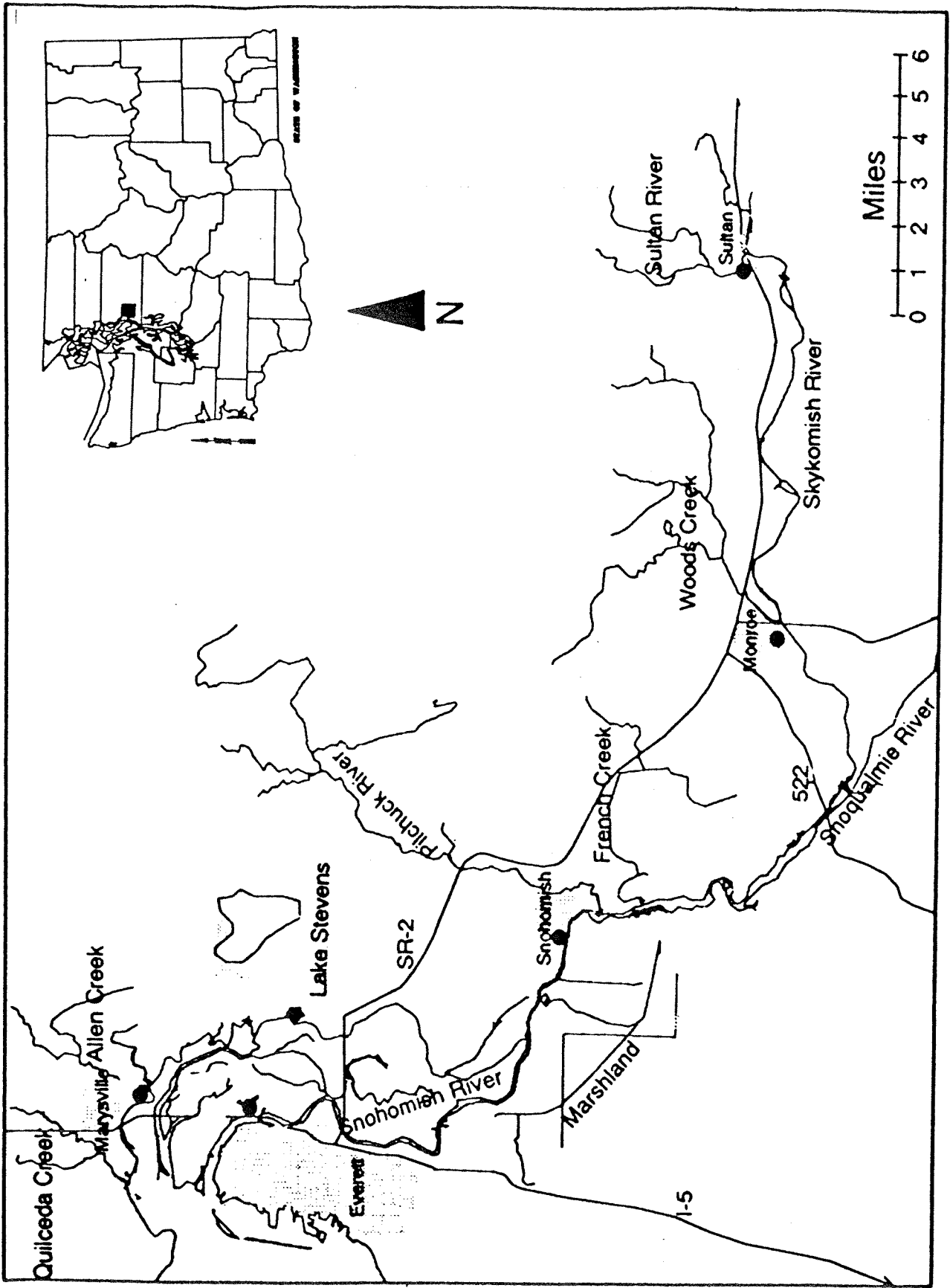


Figure 1. Location Map for WWTPs in Lower Snohomish TMDL Study Area, 8/93.

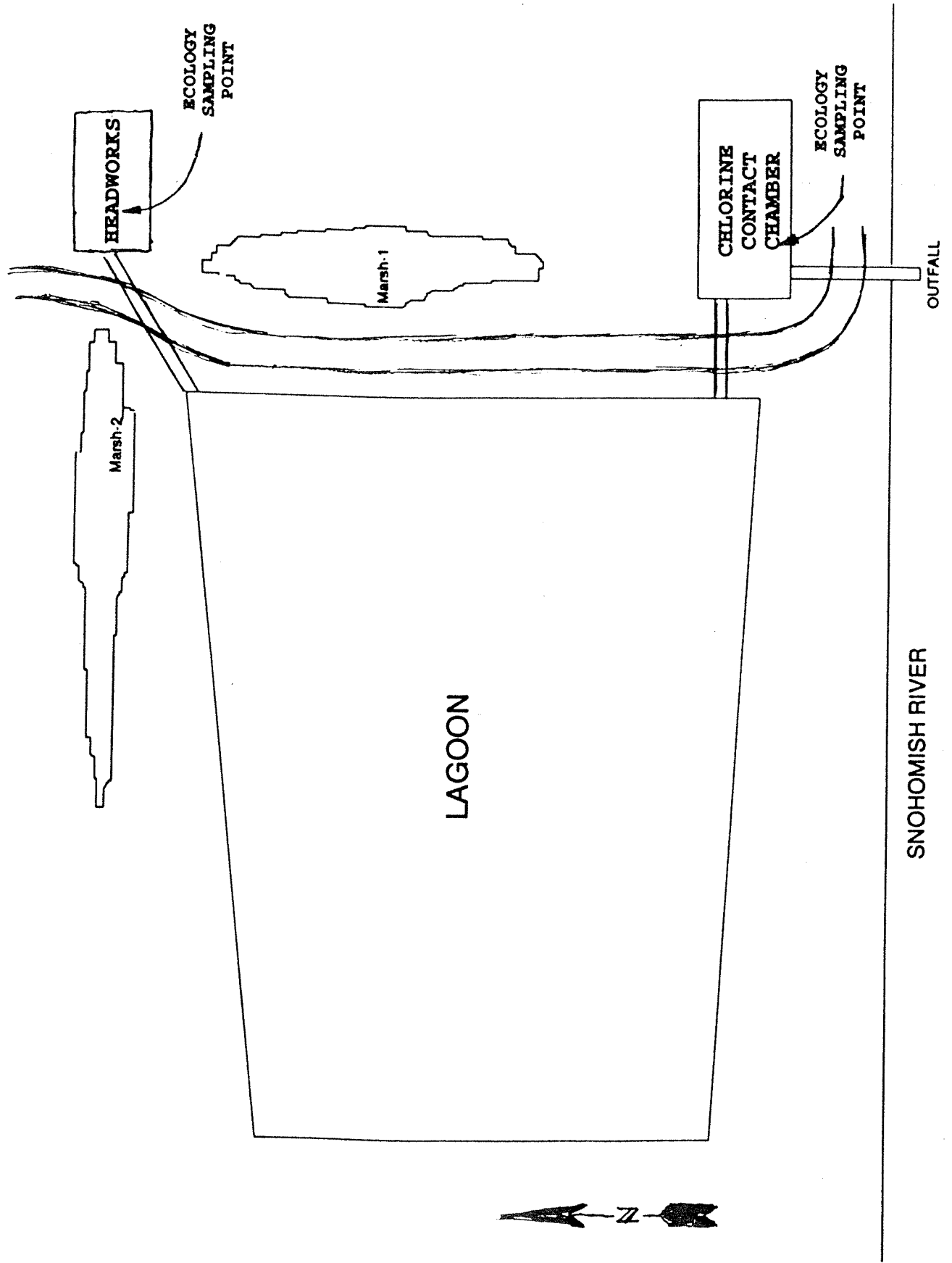


Figure 2. Plant Schematic - City of Snohomish WWTP, 8/93.

Table 1. Chemical Analytical Methods and Laboratories – City of Snohomish – L. Snohomish River Basin Class II Inspections, 8/93.

Parameter	Method	Lab used
Alkalinity	EPA, 1983: 310.1	Ecology; Manchester WA
Chloride	EPA, 1983: 330.0	Ecology; Manchester WA
SOLIDS		
Total solids (TS)	EPA, 1983: 160.3	Ecology; Manchester WA
Total non-volatile solids (TNVS)	EPA, 1983: 160.4	Ecology; Manchester WA
Total suspended solids (TSS)	EPA, 1983: 160.2	Ecology; Manchester WA
Total non-volatile suspended solids (TNVSS)	EPA, 1983: 160.4	Ecology; Manchester WA
Five-day biochemical oxygen demand (BOD5)	APHA, 1992: 5210	Sound Analytical Svcs.; Tacoma WA
NUTRIENTS		
Total ammonia, as nitrogen (NH3-N)	EPA, 1983: 350.1	Sound Analytical Svcs.; Tacoma WA
Nitrate-nitrite, as nitrogen (NO2+NO3-N)	EPA, 1983: 353.2	Sound Analytical Svcs.; Tacoma WA
Total Kjeldahl nitrogen	EPA, 1983: 351.2	Sound Analytical Svcs.; Tacoma WA
Ortho phosphate	EPA, 1983: 365.3	Ecology; Manchester WA
Total phosphorus	EPA, 1983: 365.3	Sound Analytical Svcs.; Tacoma WA
Fecal Coliform, by membrane filter technique	APHA, 1992:9222D	Ecology; Manchester WA
METALS		
Cadmium	EPA, 1983:213.2	Ecology; Manchester WA
Copper	EPA, 1983:220.2	Ecology; Manchester WA
Lead	EPA, 1983:239.2	Ecology; Manchester WA
Mercury	EPA, 1983:245.1	Ecology; Manchester WA
Silver	EPA, 1983:272.2	Ecology; Manchester WA
Zinc	EPA, 1983:200.7	Ecology; Manchester WA

Table 2. General Chemistry and Metals Results, City of Snohomish - L. Snohomish River Basin Class II Inspections, 8/93.

Parameter	Lab Log #	Blank-E	InflSN-E	InflSN-SN	EfflSN-E	EfflSN-SN	EfflSN-1	EfflSN-2	EfflSN-T
		Equip	Comp	Comp	Comp	Comp	Grab	Grab	Grab
		Date	Date	Date	Date	Date	Date	Date	Date
		Time	Time	Time	Time	Time	Time	Time	Time
		Lab Log #	Lab Log #	Lab Log #	Lab Log #	Lab Log #	Lab Log #	Lab Log #	Lab Log #
GENERAL CHEMISTRY									
Alkalinity (mg/L)			151		67		69	66	66
Chloride (mg/L)			32		29		30	30	30
SOLIDS 4 (mg/L)									
TS			468	*	330	*	269	368	319
TNVS			170	*	122	*	124J	137	147
TSS			144	*	83	*	47	96	83
TNVSS			19	*	13	*	3	27	13
BOD5 (mg/L)			200	*	27	*	16	19	22
NH3-N (mg/L)			21		0.19		0.86	0.02J	0.02J
NO2+NO3-N (mg/L)			0.09J		0.03J		0.03J	0.03J	0.02J
Total Kjeldahl N (mg/L)			31		13		8.7	11	13
Phosphate - Ortho (mg/L)					1.59		1.66	1.41	1.42
Phosphate - Total (mg/L)					2.7		2.5	2.7	2.2
F-Colliform MF (#/100mL)			5.6				3U	49	40
METALS (µg/L)									
Cadmium		0.36P			0.20P			0.10U	
Copper		1.0U			13.6			13.8	
Lead		2.1P			3.2P			1.2P	
Mercury		0.05U			0.6P			0.07P	
Silver		0.50U			1.0P			1.1P	
Zinc		6.1PB			17PB			16PB	
FIELD OBSERVATIONS									
Flow (MGD)					0.45				
Temperature (°C)			3.5**		7.5**		19.7	24.3	
pH (s.u.)			7.5**		7.8**		6.9	9.0	
Conductivity (µmho/cm)			480		290		320	285	
Chlorine, free (mg/L)							0.45	0.1	
total (mg/L)							0.7	0.4	

InflSN - Influent; EfflSN - Effluent.
 -E - Ecology sampler; -SN - Snohomish sampler; -1 - Grab sample taken on 8/18; -2 - Grab sample taken on 8/19; -T - Duplicate of EFFSN-2.
 J means the analyte was positively identified. The associated numerical result is an estimate.
 P means the analyte was detected above the instrument detection limit but below the established minimum quantitation limit.
 U means the analyte was not detected at or above the reported result.
 B means the analyte was also found in the analytical method blank indicating the sample may have been contaminated.
 * - Samples not collected.
 ** - Iced composite sample.

Table 3. Comparison of Inspection Results to NPDES Permit Limits, City of Snohomish – L. Snohomish River Basin Class II Inspections, 8/93

Parameter	NPDES Permit Limits		Inspection Data		Loading and Performance			
	Monthly Average	Weekly Average	Ecology Composite	Grab Samples	Design Criteria (DC)	Derived Results	Plant Loading (% of DC)	Planning to begin (% of DC)
Influent BOD5 (mg/L)			200		800	750	94	85
Influent BOD5 (lbs/d)								
Effluent BOD5 (mg/L)	30	45	27			100		
Effluent BOD5 (lbs/d)	250	375				86		
Effluent BOD5 (% removal)	85							
Influent TSS (mg/L)			144					
Influent TSS (lbs/d)								
Effluent TSS (mg/L)	75	110	83			310		
Effluent TSS (lbs/d)	625	917				42		
Effluent TSS (% removal)	85							
Fecal Coliform (#/100 mL)	200	400		3U;49;40				
pH (s.u.)	6.0 ≤ pH ≤ 9.0			6.9;9.0				
Flow (MGD)					1.0	0.45	45	85

U – Not detected at or above the reported result.