DEPARTMENT OF ECOLOGY

November 15, 1994

TO: John Glynn and Dave Wright
Water Quality Program, NWRO

THROUGH: Will Kendra
EILS Program, Watershed Assessments Section

FROM: Norm Glenn
Watershed Assessments Section

SUBJECT: City of Marysville 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):

- Short-circuiting of flow in the system, which was documented in the 1992 inspection report as contributing to the minimal nitrification, appears to have been corrected with recent system modifications. The system was nitrifying; nitrite-nitrate concentrations in effluent were elevated.

- Cadmium, copper, lead and zinc detected in effluent will likely pose no threat if the receiving water dilution factor at the zone of acute criteria exceedance is at least 4:1 under critical design conditions. [Note: A higher dilution factor may be required if background concentrations in the river of one or more of these pollutants of concern is elevated or if other effluent or receiving water conditions are more critical than those which were assumed]. The completed mixing zone study can provide this information.

- Several monthly average limits contained in the Order (Ecology, 1989) were exceeded during the inspection: five-day biochemical oxygen demand (BOD_5) and fecal coliform. While these results (from this 3-day inspection) are not enforceable violations, they reflect a recurring pattern. It is recommended that the facility be reinspected when the upgrade is completed.

- A number of "split" sample comparisons showed significant differences in results (Table 4). The 1992 inspection report (Glenn, 1992) pointed out a number of concerns with their sampling and preservation procedures, and it does not appear that these problems have been addressed:

- frequent cleaning of the compositor tubing. Flushing at least once a month with a chlorine solution avoids biomass build-up and nitrite problems that can affect sample representativeness;

- thoroughly mixing composited samples before dispensing to "split" samples (part of the sampling procedure) and before dispensing to aliquots in the lab (part of the analytical procedure). The procedures within Ecology call for samples to be "well-mixed" in order to entrain all solids from the compositor bottle (Glenn, in prep; Thomson, 1993).

- Results from two of four standards left by Ecology for analysis by the Marysville Lab were unacceptable: chlorine and TSS.

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

NLG:blt
Attachments

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.

Ecology, 1989. Administrative Order no. DE 89-N259, Washington State Department of Ecology, Northwest Regional Office.

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

Glenn, N., 1992. City of Marysville Class II Inspection, July 16-17, 1990. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia WA.

------, in prep. Generic Quality Assurance Project Plan for Basin Class II Inspections. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program, Olympia WA.

Thomson, D., 1993. Personal communication, December 29. Ecology Manchester Laboratory, Manchester WA.

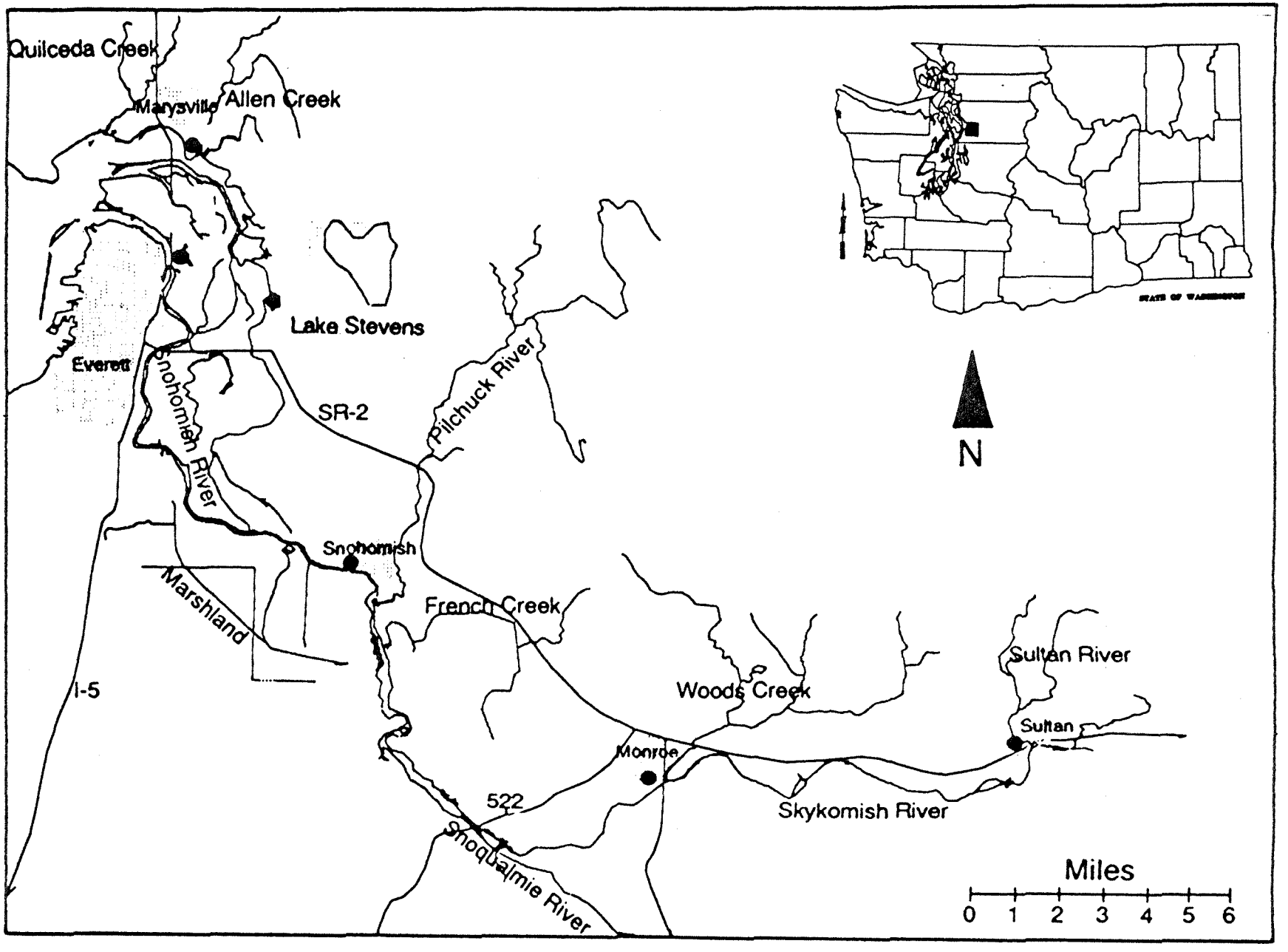

Figure 1. Location Map for WWTPs in Lower Snohomish TMDL Study Area, 8/93.

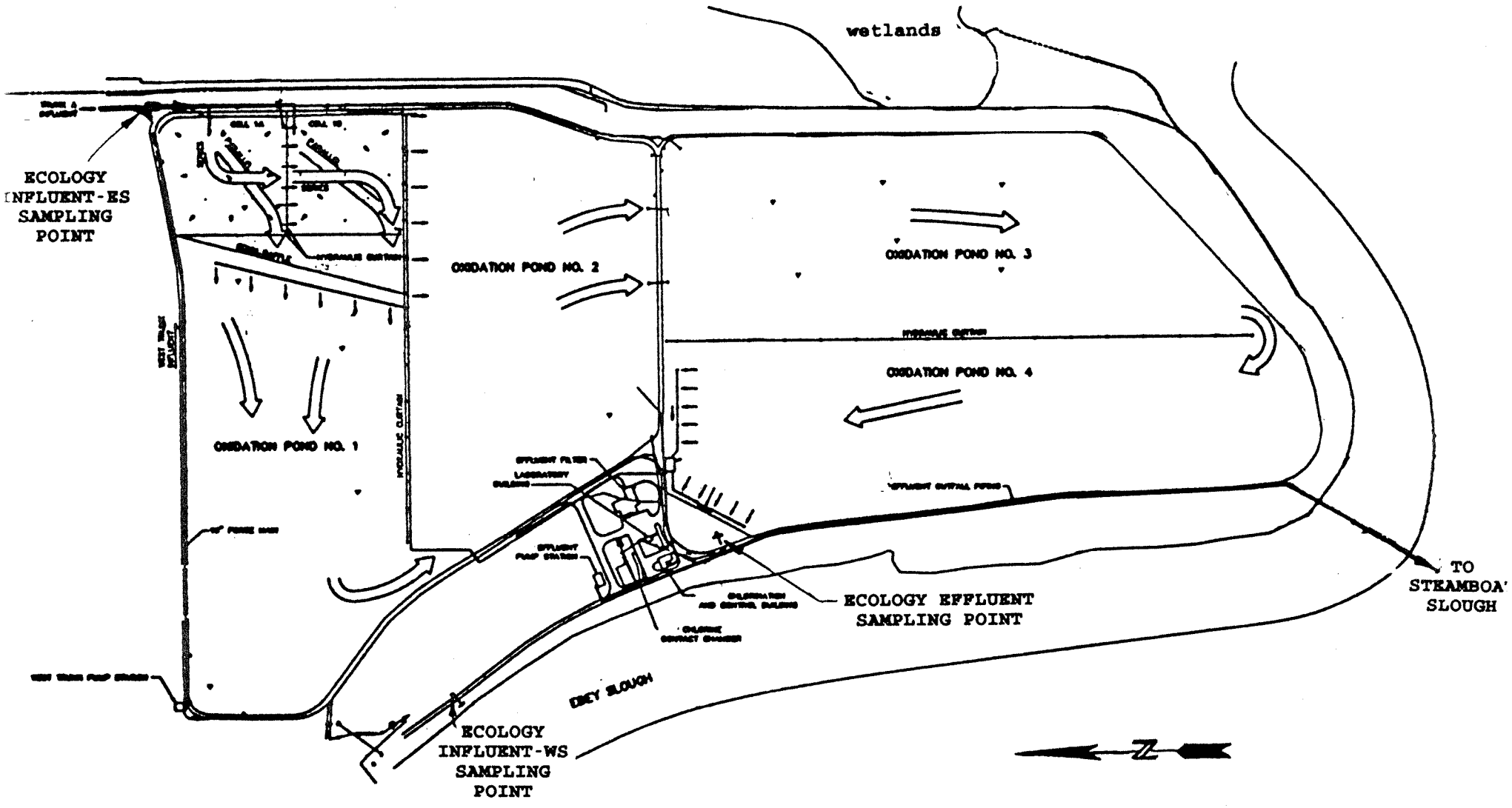

Figure 2. Plant Schematic - City of Marysville WWTP, 8/93.

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

Location:	Blank-E	InfMA1-E	InfMA1-MA	InfMA2-E	InfMA2-MA	EffMA-E	EffMA-MA	EffMA-1	EffMA-2
Type:	Equip	Comp	Comp	Comp	Comp	Comp	Comp	Grab	Grab
Date:	8/17	8/18-19	8/18-19	8/18-19	8/18-19	8/18-19	8/18-19	8/18	8/19
Time:	1440	24 hour	24 hour	24 hour	24 hour	24 hour	24 hour	1330	1430
Parameter Lab Log #: 3482	-30	-31	-32	-37	-38	-33	-34	-35	-36
GENERAL CHEMISTRY									
Alkalinity (mg/L)		149		189		94		94	95
Chloride (mg/L)		89		34		57		56	57
SOLIDS 4 (mg/L)									
TS		607	620	596	499	361	364	367	474
TNVS		265	270	199	203	221	191	215	210
TSS		165	205	167	129	37	35	35	85
TNVSS		21	28	33	24	15	7	5	30
BOD5 (mg/L)		200	260	270	170	31	20	39	45
NH3-N (mg/L)		24		21		0.07		0.02J	0.54
NO2+NO3-N (mg/L)		0.06J		0.08J		3.94		3.59	3.99
Total Kjeldahl N (mg/L)		33		40		5.1		4.9	7.4
Phosphate - Ortho (mg/L)						4.73		4.55	4.54
Phosphate - Total (mg/L)		5.6		6.3		5.0		5.0	5.0
F-Coliform MF (#/100mL)								190	260
METALS (µg/L)									
Cadmium	0.20P					0.10U			0.19P
Copper	1.5P					4.3P			9.7P
Lead	3.1P					2.1P			8.9P
Mercury	0.05U					0.05U			0.05U
Silver	0.50U					0.50U			0.50U
Zinc	6.6PB					8.7PB			21PB
FIELD OBSERVATIONS									
Flow (MGD)		0.76		1.69		1.91			
Temperature (°C.)		8.7*		5.8*		7.4*		24	24.5
pH (s.u.)		7.3*		7.8*		7.9*		8.9	8.6
Conductivity (µmho/cm)		734		559		494		484	484
Chlorine, free (mg/L)								0.07	0.03
total (mg/L)								0.09	0.04

InfMA1 - Westside Influent; InfMA2 - Eastside Influent; EffMA - Effluent.

-E - Ecology sampler; -MA - Marysville sampler; -1 - Grab sample taken on 8/18; -2 - Grab sample taken on 8/19.

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.

J means the analyte was positively identified. The associated numerical result is an estimate.

B means the analyte was also found in the analytical method blank indicating the sample may have been contaminated.

* - Iced composite sample.

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

	NPDES Permit Limits*		Inspection Data		Loading and Performance			
Parameter	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)			248***					
(lbs/d)					---			
Effluent BOD5								
(mg/L)	30		31					
(lbs/d)	700				700	490	70	85
(% removal)	85****					88		
Influent TSS								
(mg/L)			166***					
(lbs/d)					---			
Effluent TSS								
(mg/L)	75		37					
(lbs/d)	1,750				1,750	590	34	85
Fecal Coliform								
(#/100 mL)	200			230(190;260)				
pH (s.u.)	6.0 ≤ pH ≤ 9.0			8.9;8.6				
Flow (MGD)					---	1.91		

* – Contained in Order on Consent no. DE 89-N259 (Ecology, 1989), Second Amendment.

** – Criteria contained in 1983 permit are no longer considered appropriate due to recent upgrades. Monthly average values for effluent contained in Second Amendment to Order will be used instead.

*** – Weighted average based on prorated flows from westside and eastside influent lines.

**** – During the months April through September only.

Table 4. Comparison of Laboratory Results of Sample Splits, City of Marysville – L. Snohomish River Basin Class II Inspections, 8/93.

Location:	InfMA1-E		InfMA1-MA		InfMA2-E		InfMA2-MA		EffMA-E		EffMA-MA	
Lab Log #:	348231		348232		348237		348238		348233		348234	
Date:	8/18-19		8/18-19		8/18-19		8/18-19		8/18-19		8/18-19	
Sampler:	Ecology		Marysville		Ecology		Marysville		Ecology		Marysville	
Laboratory:	Ecology	Marysville	Ecology	Marysville	Ecology	Marysville	Ecology	Marysville	Ecology	Marysville	Ecology	Marysville
BOD5 (mg/L)	200	*	260	398	270	*	170	304	31	*	20	52
TSS (mg/L)	165	*	205	341	167	*	129	162	37	*	35	42

* – Not analyzed for.