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DEPARTMENT OF ECOLOGY

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

THROUGH: Will Kendra
EILS Program, Watershed Assessments Section

FROM: Norm Glenn
Watershed Assessments Section

SUBJECT: Town of Sultan Basin Class II Inspection Summary

An announced Basin Class II inspection was conducted at the above facility during the week of August 23, 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):

- The different locations used by Sultan and Ecology for their effluent composite samplers (pre-chlorination vs. post-chlorination) did not produce significant differences in BOD_5 and TSS results. Nevertheless, it is recommended that their location be changed to post-chlorination.

- Flow through the WWTP was above normal because it rained for several days prior to the inspection. The flow rate recorded by the plant's instrumentation was dramatically different from the flow rate calculated during the inspection. An authorized technician should be retained to calibrate their instrumentation.

- Total residual chlorine readings were extraordinarily high. It is very doubtful that the river provides adequate dilution to protect aquatic life when readings are this high, especially if the levels are sustained for any period of time. Despite these high chlorine readings, fecal coliform counts were also elevated. A licensed engineer should examine the entire chlorination system and make recommendations for design changes.

- Copper from this plant would exceed aquatic life toxicity criteria unless one part effluent can be diluted with 5 parts receiving water within the zone of acute criteria exceedance.

- Ammonia in effluent exceeded the chronic water quality criterion. A dilution ratio of more than 6:1 at the mixing zone boundary would be required to meet water quality standards. [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]. It is recommended that more monitoring and receiving water studies be done in order to generate this information.

- The plant was very efficient at removing BOD_5 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.

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

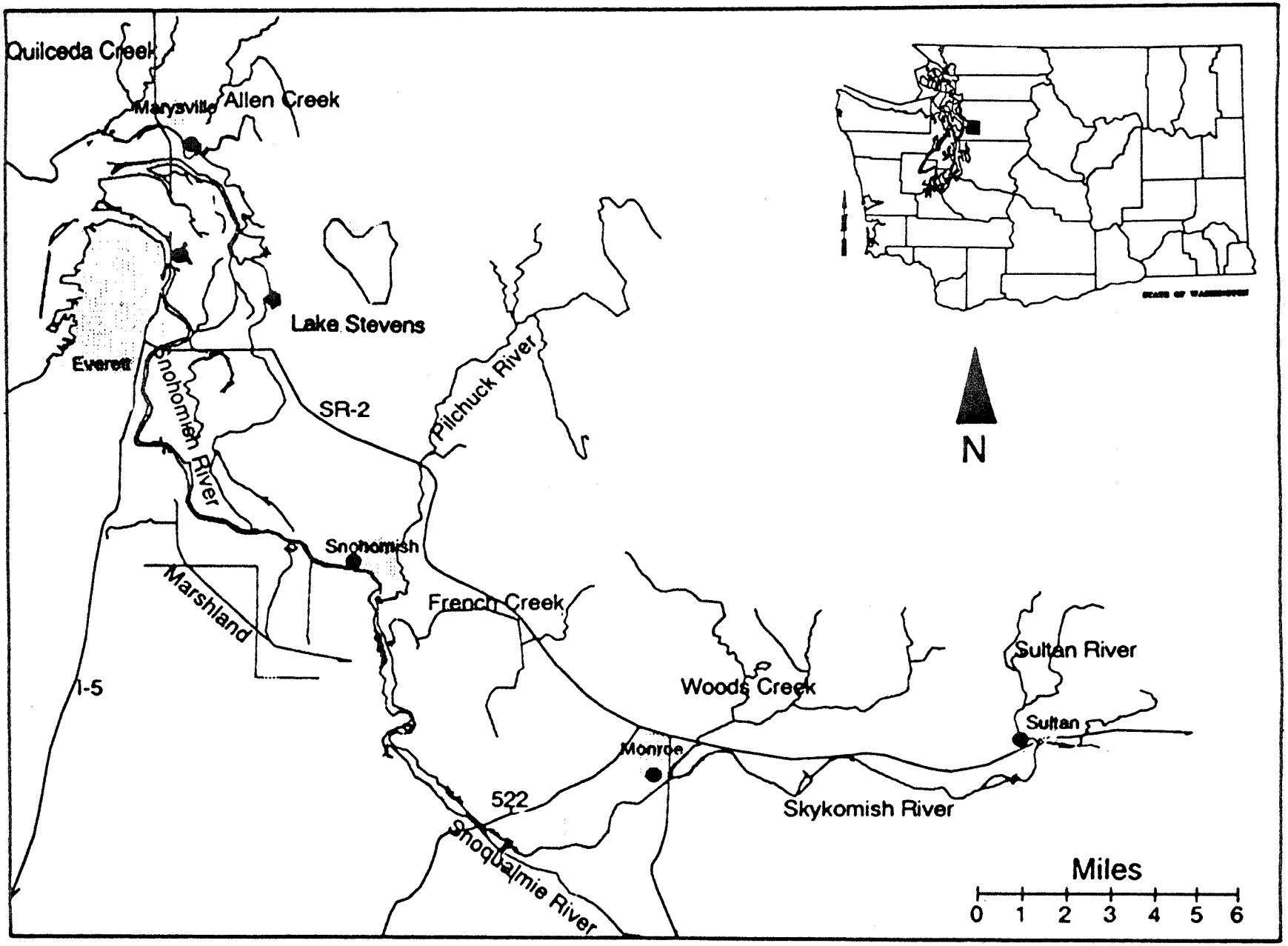

Figure 1. Location Map for WWTPs in Lower Snohomish TMDL Study Area, 8/93.

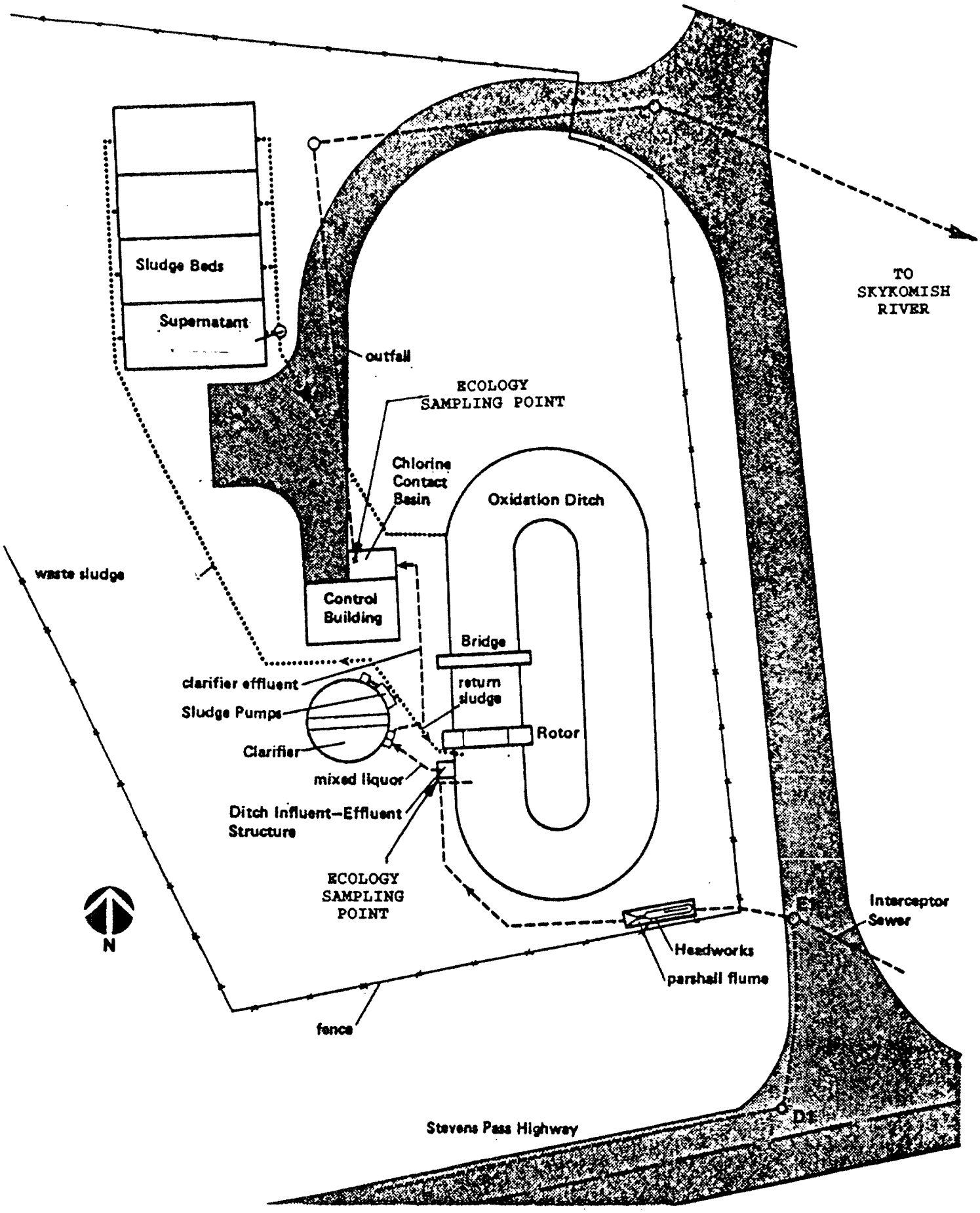

Figure 2. Plant Schematic - Town of Sultan WWTP, 8/93.

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

Location:	Blank-E	InfSU-E	InfSU-SU	EffSU-E	EffSU-SU	EffSU-1	EffSU-2	EffSU-T
Type:	Equip	Comp	Comp	Comp	Comp	Grab	Grab	Grab
Date:	8/24	8/25-26	8/25-26	8/25-26	8/25-26	8/25	8/26	8/26
Time:	am	0001-2400	0800-0800	0800-0800	0800-0800	0900	0845	0900
Parameter Lab Log #: 3582	-30	-31	-32	-33	-34	-35	-36	-37
GENERAL CHEMISTRY								
Alkalinity (mg/L)		175		110		98	113	113
Chloride (mg/L)		36		32		31	32	32
SOLIDS 4 (mg/L)								
TS		675	507	210	246	201	219	210
TNVS		240	217	146	151	136	145	142
TSS		286	150	19	27	13	9	15
TNVSS		50	28	2	2	1U	2	6
BOD5 (mg/L)		270	230	6U	20	8U	6U	6U
NH3-N (mg/L)		22		11		9.1	11	11
NO2+NO3-N (mg/L)		0.19		0.06J		0.04J	0.02J	0.02J
Total Kjeldahl N (mg/L)		15		12.9		10	15	14
Phosphate - Ortho (mg/L)				0.85		0.41	0.48	0.48
Phosphate - Total (mg/L)		4.7		1.0		0.65	0.69	0.68
F-Coliform MF (#/100mL)						LAC	1,300	440
METALS (µg/L)								
Cadmium	0.10U			*			0.10U	
Copper	3.1P			*			17.4	
Lead	1.0U			*			1.3P	
Mercury	0.05U			*			0.05U	
Silver	0.50U			*			0.50U	
Zinc	4U			*			26P	
FIELD OBSERVATIONS								
Flow (MGD)								
Temperature (°C.)		3.1**		2.4**		16.9	17.0	
pH (s.u.)		7.3**		7.2**		7.0	7.0	
Conductivity (µmho/cm)		535		375		275	380	
Chlorine, free (mg/L)						0.40	1.60	
total (mg/L)						3.80	3.50	

InfSU - Influent; EffSU - Effluent; -E - Ecology sampler; -SU - Sultan sampler.
-1 - Grab sample taken on 8/25; -2 - Grab sample taken on 8/26; -T - Duplicate taken on 8/26.
J means the analyte was positively identified. The associated numerical result is an estimate.
U means the analyte was not detected at or above the reported result.
P means the analyte was detected above the instrument detection limit but below the established minimum quantitation limit.
LAC means Laboratory Accident.
* - Samples not collected.
** - Iced composite sample.

Table 3. Comparison of Inspection Results to NPDES Permit Limits, Town of Sultan – 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)			270					
(lbs/d)					320	225	70	85
Effluent BOD5								
(mg/L)	30	45	6U					
(lbs/d)	48	75				<5		
(% removal)	85					>97		
Influent TSS								
(mg/L)			286					
(lbs/d)								
Effluent TSS								
(mg/L)	30	45	19					
(lbs/d)	50	75				16		
(% removal)	85					93		
Fecal Coliform								
(#/100 mL)	200	400		760(1,300;440)				
pH (s.u.)	6.0 ≤ pH ≤ 9.0			7.0;7.0				
Flow (MGD)	0.2				0.20	0.10	50	85

U - Not detected at or above the reported result.

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

Location:	InfSU-E		InfSU-SU		EffSU-E		EffSU-SU	
Lab Log #:	358231		358232		358233		358234	
Date:	8/25-26		8/25-26		8/25-26		8/25-26	
Sampler:	Ecology		Sultan		Ecology		Sultan	
Laboratory:	Ecology	Sultan	Ecology	Sultan	Ecology	Sultan	Ecology	Sultan
BOD5 (mg/L)	270	- - -	230	230	6U	- - -	20	15
TSS (mg/L)	286	- - -	150	173	19	- - -	27	26