

JAPAN INTERNATIONAL COOPERATION AGENCY

**CHITTAGONG WATER SUPPLY AND SEWERAGE AUTHORITY
MINISTRY OF LOCAL GOVERNMENT, RURAL DEVELOPMENT
AND CO-OPERATIVES**

**THE FEASIBILITY STUDY
OF
EXTENSION AND EXPANSION
OF
MOHARA WATER TREATMENT PLANT
IN
CHITTAGONG
IN
THE PEOPLE'S REPUBLIC OF BANGLADESH**

FINAL REPORT

(SUPPORTING REPORT)

DECEMBER 2000

NJS CONSULTANTS CO., LTD.

FINAL REPORT
(Supporting Report)

TABLE OF CONTENTS

The Supporting Report is comprised of supplemental data and information for the Main Report. Numbers of each title correspond to section numbers of the Main Report.

CHAPTER 4 EXISTING WATER SUPPLY SYSTEM

4.1	Review of Existing Water Treatment Plants	
4.1-1	Turbidity and Water Level of Halda River-----	4.1-1-1
4.1-2	Fluctuation of Intake Flow and River Water Level-----	4.1-2-1
4.1-3	Operational Status of Transmission Pumps of Mohara WTP -----	4.1-3-1
4.1-4	Sludge Removal Efficiency of Desilting Basin in Mohara WTP-----	4.1-4-1
4.1-5	Concentration of Sludge discharged from Each Facility in Mohara WTP ---	4.1-5-1
4.1-6	Filtration Run Time of Mohara WTP -----	4.1-6-1
4.1-7	Thickness of Sand Layer of Filters in Mohara WTP-----	4.1-7-1
4.1-8	Facilities of Existing Mohara WTP (Figures) -----	4.1-8-1
4.1-9	Results of Jar Tests-----	4.1-9-1
4.1-10	Sampling Point for Water Quality Analysis in Kalurghat IRP & BPS -----	4.1-10-1
4.1-11	Monthly Water Production of Existing Facilities (1999) -----	4.1-11-1

CHAPTER 6 STUDY ON MANAGERIAL ASPECTS OF WATER WORKS

6.2	Study on Chittagong Water Supply and Sewerage Authority	
6.2-1	Organization/Institution of CWASA-----	6.2-1-1
6.5	Inhabitant's Awareness Survey on Water Supply and Environmental Sanitation	
6.5-1	Questionnaire Form-----	6.5-1-1

CHAPTER 7 BASIC PLAN FOR DEVELOPMENT OF WATER SUPPLY SYSTEM

7.4	Recommended Chittagong Water Supply System	
7.4-1	Comparison Study for Location of Distribution Reservoir-----	7.4-1-1
7.4-2	Layout of Proposed Facilities	
7.4-2-1	Proposed Karnaphuli Water Treatment Plant -----	7.4-2-1
7.4-2-2	Proposed Salimpur Reservoir -----	7.4-2-2
7.4-2-3	Proposed Transmission /Distribution Network (B/P Phase 1, 2005) -----	Attached
7.4-2-4	Proposed Transmission /Distribution Network (B/P Phase 2, 2010) -----	Attached

7.4-3	Hydraulic Analysis of Transmission/Distribution Network for Basic Plan -	7.4-3-1
7.4-3-1	Hourly Fluctuation of Distribution Flow-----	7.4-3-2
7.4-3-2	Hydraulic Analysis for Basic Plan Phase 1 (2005)-----	7.4-3-3
7.4-3-3	Hydraulic Analysis for Basic Plan Phase 2 (2010)-----	7.4-3-42
7.4-3-4	Relationship between Nodes and Wards (B/P Phase 1, 2005)---	7.4-3-107
7.4-3-5	Relationship between Nodes and Wards (B/P Phase 2, 2010)---	7.4-3-112
7.4-4	Cross Section of Karnaphuli River at Proposed WTP Site -----	7.4-4-1
7.4-5	Comparison Study on Natural Gas Engine Generator -----	7.4-5-1
7.4-6	Flow Balance of Proposed Chittagong Water Supply System	
7.4-6-1	Basic Plan Phase 1 (2005)-----	7.4-6-1
7.4-6-2	Basic Plan Phase 2 (2010)-----	7.4-6-2
7.5	Project Cost	
7.5-1	Cost Estimates for Basic Plan Phase 1 Project -----	7.5-1-1
7.5-2	Cost Estimates for Basic Plan Phase 2 Project -----	7.5-2-1

CHAPTER 8 FEASIBILITY STUDY ON PRIORITY PROJECT

8.3	Water Treatment Plant	
8.3-1	Comparison of Water Treatment Method -----	8.3-1-1
8.3-2	Examination on Production Loss at Water Treatment Plant-----	8.3-2-1
8.3-3	Mohara WTP Capacity Calculation -----	8.3-3-1
8.3-4	Hydraulic Analysis of Inplant Piping in Mohara WTP -----	8.3-4-1
8.3-4-1	Study on Proposed Intake Pump Capacity -----	8.3-4-1
8.3-4-2	Study on Existing Intake Pump Capacity -----	8.3-4-2
8.3-4-3	Connection Pipe (1)-----	8.3-4-3
8.3-4-4	Connection Pipe (2)-----	8.3-4-4
8.3-4-5	Connection Pipe (3)-----	8.3-4-5
8.3-4-6	Connection Pipe (4)-----	8.3-4-6
8.3-4-7	Connection Pipe (5)-----	8.3-4-7
8.3-4-8	Connection Pipe (6)-----	8.3-4-8
8.3-5	Proposed Facilities in Mohara WTP (Figures) -----	8.3-5-1
8.3-6	Proposed Facilities in Kalurghat IRP & BPS (Figures)-----	8.3-6-1
8.3-7	Proposed Patenga Reservoir & BPS (Figures)-----	8.3-7-1
8.3-8	Equipment and Power Supply in Existing Mohara WTP	
8.3-8-1	Equipment List of Existing Mohara Water Treatment Plant-----	8.3-8-1
8.3-8-2	Power Requirement of Equipment in Existing Mohara WTP-----	8.3-8-5
8.3-8-3	Summary of Power Failures at Mohara WTP -----	8.3-8-6
8.3-9	Profile of Proposed Transmission Pipeline-----	8.3-9-1

CHAPTER 10 FINANCIAL ANALYSIS

10.2 Financial Analysis

10.2-1 Results of Calculation -----10.2-1-1

10.2-2 Financial Plan -----10.2-2-1

10.2-3 Forecast of Water Tariff Revenue-----10.2-3-1

10.2-4 Supplementary Data of Table FIRR related with Tariff Rate
in Main Report -----10.2-4-1

10.4 Consideration of Water Tariff

10.4-1 Recommendable Water Tariff-----10.4-1-1

CHAPTER 4

EXISTING WATER SUPPLY SYSTEM

4.1-1 Turbidity and Water Level of Halda River

Turbidity of raw water and water level of Halda River from 1st May 1998 to 30th July 2000 are presented in Table 4.1-1. Raw water turbidity is measured every 4 hours, 6 times a day. The table shows values of highest, lowest and average in a day.

The highest turbidity during the period is 830NTU, on 13th August 1999. That is the highest record in past operation of Mohara WTP.

In a year, turbidity becomes lower from the latter half of October to the beginning of November. Low turbidity continues to the end of April with values ranging from 30NTU to 80NTU, though sometimes it records more than 100 NTU. Turbidity increases by rainfall after the middle of May, and high values continue to the beginning of August. In August and September, high turbidity is measured intermittently. Then it becomes lower. Figure 4.1-1-1 shows highest and lowest turbidities everyday. The highest turbidity from 1st May 1998 to 31st April 2000 is 830NTU, while the lowest is 20 NTU, and average is 159NTU. Number of days exceeding average turbidity is 293 days or 40%, and 499 days with more than 100NTU or 68%.

As shown in figures 4.1-1-2 and 4.1-1-3, high turbidity continued more than one month from middle of May. Especially, during 50 days from 20th May to 8th July 1998, average turbidity was 485NTU, while the highest was 645NTU, and the lowest was 285NTU. Those values were also considered in the planning of facilities as the turbidity continuing about 2 months, in addition to the highest value of 830NTU, and the average value of 159NTU.

As shown in Figure 4.1-1-4, the period of high turbidity is the time when river water level is high and flow is much.

Table 4.1-1-1 Raw Water Turbidity and Water Level of Harda River									
for Mohara Treatment Plant									
Month	Day	Turbidity (N.T.U)			Harda River Water Level (feet)			Remark	
		Min.	Max	Average	Min.	Max.	Average		
May '98	1	40	60	50					
May '98	2	40	70	55					
May '98	3	50	70	60					
May '98	4	50	70	60					
May '98	5	40	60	50					
May '98	6	40	70	55					
May '98	7	50	70	60					
May '98	8	50	70	60					
May '98	9	50	70	60					
May '98	10	40	70	55					
May '98	11	40	70	55					
May '98	12	50	70	60					
May '98	13	50	70	60					
May '98	14	40	70	55					
May '98	15	40	70	55					
May '98	16	40	70	55					
May '98	17	40	60	50					
May '98	18	40	70	55					
May '98	19	50	140	95					
May '98	20	200	450	325					
May '98	21	200	450	325					
May '98	22	550	740	645					
May '98	23	550	680	615				Turbidity	
May '98	24	540	600	570				MAX in May 740	
May '98	25	510	600	555				AVE in May 245	
May '98	26	540	620	580				MIN in May 40	
May '98	27	520	640	580					
May '98	28	580	660	620				MAX Ave in May 278	
May '98	29	500	580	540				AVE Ave in May 245	
May '98	30	500	600	550				MIN Ave in May 212	
May '98	31	550	620	585					
June '98	1	530	640	585					
June '98	2	510	600	555					
June '98	3	560	630	595					
June '98	4	450	600	525					
June '98	5	450	600	525					
June '98	6	440	590	515					
June '98	7	350	580	465					
June '98	8	400	600	500					
June '98	9	520	680	600					
June '98	10	400	620	510					
June '98	11	400	550	475					
June '98	12	360	550	455					
June '98	13	450	580	515					
June '98	14	460	600	530					
June '98	15	450	600	525					
June '98	16	460	590	525					
June '98	17	450	580	515					
June '98	18	400	470	435					
June '98	19	320	560	440					
June '98	20	300	450	375					
June '98	21	240	370	305					
June '98	22	250	350	300					
June '98	23	240	370	305				Turbidity	
June '98	24	250	400	325				MAX in June 680	
June '98	25	260	400	330				AVE in June 443	
June '98	26	280	400	340				MIN in June 220	
June '98	27	270	390	330					
June '98	28	230	390	310				MAX Ave in June 515	
June '98	29	240	370	305				AVE Ave in June 443	
June '98	30	220	350	285				MIN Ave in June 371	
July '98	1	240	370	305					
July '98	2	250	340	295					
July '98	3	250	350	300					
July '98	4	270	380	325					
July '98	5	280	550	415	2	10.67	6.34		
July '98	6	500	620	560	2.5	11	6.75		
July '98	7	450	610	530	3.44	11.5	7.47		
July '98	8	300	440	370	2.75	11.5	7.13	May20-July8 (Ave.) 458	
July '98	9	250	300	275	2.16	12.16	7.16	May20-July8 (Max.) 645	
July '98	10	140	230	185	2	12.16	7.08	May20-July8 (Min.) 285	
July '98	11	120	180	150	2	12.33	7.17		
July '98	12	140	300	220	2.5	12.83	7.67		
July '98	13	340	450	395	2.33	12	7.17		
July '98	14	420	600	510	2.83	12.67	7.75		
July '98	15	500	630	565	4.33	12	8.17		
July '98	16	480	600	540	5.33	11.5	8.42		
July '98	17	450	600	525	4.5	12.42	8.46		
July '98	18	390	500	445	3.5	10.83	7.17		
July '98	19	250	390	320	3.33	11	7.17		
July '98	20	200	320	260	3.25	11.25	7.25		
July '98	21	180	260	220	2.58	11.5	7.04		
July '98	22	150	220	185	2	11.58	6.79		
July '98	23	180	420	300	1.68	12.16	6.92		
July '98	24	450	680	565	2.33	12.5	7.42		
July '98	25	450	620	535	2.33	12.33	7.33		
July '98	26	340	470	405	2.42	12.5	7.46		
July '98	27	240	370	305	2.33	12.5	7.42		
July '98	28	220	290	255	3.67	12.5	8.09		

Month	Day	Turbidity (N.T.U)			Halda River Water Level (feet)			Remark
		Min.	Max.	Average	Min.	Max.	Average	
July '98	29	230	280	255	3.5	11.5	7.50	
July '98	30	210	290	250	3	11	7.00	
July '98	31	180	250	215	2	10.5	6.25	
August '98	1	150	200	175	2.08	9.67	5.88	
August '98	2	140	180	160	3	9.5	6.25	
August '98	3	230	400	315	2.5	10.33	6.42	
August '98	4	250	390	320	1.33	10.5	5.92	
August '98	5	240	300	270	1.5	11.16	6.33	
August '98	6	200	280	240	1.33	11.75	6.54	
August '98	7	100	150	125	1.16	11	6.08	
August '98	8	100	150	125	1.16	12	6.58	
August '98	9	100	130	115	1.5	12.25	6.88	
August '98	10	100	130	115	1.67	12.5	7.09	
August '98	11	110	150	130	1.5	12.5	7.00	
August '98	12	140	400	270	1.33	12.5	6.92	
August '98	13	390	600	495	4	12.67	8.34	
August '98	14	280	440	360	3.25	12.5	7.88	
August '98	15	200	280	240	2	11.33	6.67	
August '98	16	200	260	230	2.16	10.5	6.33	
August '98	17	190	270	230	1.5	10.33	5.92	
August '98	18	130	220	175	1	10.33	5.67	
August '98	19	120	180	150	0.5	10.5	5.50	
August '98	20	100	150	125	0	10.5	5.25	
August '98	21	100	140	120	0.16	10.67	5.42	
August '98	22	100	130	115	0.5	11.67	6.09	
August '98	23	130	180	155	0.5	11.5	6.00	
August '98	24	150	220	185	1	11.58	6.29	
August '98	25	110	150	130	1.5	12.33	6.92	
August '98	26	130	280	205	1.67	12	6.84	
August '98	27	170	220	195	2	11.5	6.75	
August '98	28	180	220	200	2	11.5	6.75	
August '98	29	180	330	255	1.83	11	6.42	
August '98	30	300	460	380	2.67	10.5	6.59	
August '98	31	300	400	350	1.83	9.5	5.67	
September '98	1	250	280	265	2	9.5	5.75	
September '98	2	130	200	165	1	9.67	5.34	
September '98	3	120	180	150	1	10.9	5.95	
September '98	4	130	180	155	1	10.5	5.75	
September '98	5	140	180	160	1.42	11	6.21	
September '98	6	120	180	150	1.33	11.83	6.58	
September '98	7	120	170	145	1.33	12.16	6.75	
September '98	8	110	170	140	2	12.5	7.25	
September '98	9	100	130	115	2	12.67	7.34	
September '98	10	100	140	120	2	12.42	7.21	
September '98	11	110	140	125	1.75	12	6.88	
September '98	12	100	140	120	1.33	11.5	6.42	
September '98	13	90	150	120	1	11	6.00	
September '98	14	110	150	130	0.5	10	5.25	
September '98	15	110	150	130	0.33	8.5	4.42	
September '98	16	120	150	135	0.33	9	4.67	
September '98	17	120	160	140	0	9.33	4.67	
September '98	18	120	150	135	0.33	10	5.17	
September '98	19	110	160	135	0.33	10.58	5.46	
September '98	20	100	170	135	0.33	10.83	5.58	
September '98	21	180	250	215	0.33	10.83	5.58	
September '98	22	230	340	285	0.33	11	5.67	
September '98	23	150	280	215	0.33	11	5.67	
September '98	24	160	230	195	0.5	10.5	5.50	
September '98	25	280	300	290	0.5	10.5	5.50	
September '98	26	240	280	260	0	10.5	5.25	
September '98	27	200	250	225	0	10	5.00	
September '98	28	110	190	150	0	10	5.00	
September '98	29	110	150	130	0	8.5	4.25	
September '98	30	110	140	125	0.5	7.75	4.13	
Oct '98	1	100	140	120	0	8	4.00	
Oct '98	2	110	150	130	-1	9.16	4.08	
Oct '98	3	100	140	120	0	10	5.00	
Oct '98	4	100	130	115	0	10.5	5.25	
Oct '98	5	110	140	125	0	11.5	5.75	
Oct '98	6	100	140	120	0.5	11.67	6.09	
Oct '98	7	100	130	115	0.5	11.83	6.17	
Oct '98	8	100	170	135	1	11.5	6.25	
Oct '98	9	90	130	110	0.33	11	5.67	
Oct '98	10	90	140	115	0	12.16	6.08	
Oct '98	11	100	140	120	0.25	11.16	5.71	
Oct '98	12	100	130	115	0	9.67	4.84	
Oct '98	13	100	140	120	0.33	10	5.17	
Oct '98	14	100	140	120	0	8.5	4.25	
Oct '98	15	110	150	130	0	9	4.50	
Oct '98	16	90	150	120	0.5	9.33	4.92	
Oct '98	17	100	140	120	0.5	9.83	5.17	
Oct '98	18	100	140	120	1	10.75	5.88	
Oct '98	19	100	140	120	0.58	10.5	5.54	
Oct '98	20	110	160	135	0.67	10.83	5.75	
Oct '98	21	90	140	115	0.67	10.83	5.75	
Oct '98	22	90	130	110	0.58	10.5	5.54	
Oct '98	23	100	130	115	0.67	10.33	5.50	
Oct '98	24	90	130	110	-1	10	4.50	
Oct '98	25	100	130	115	0.67	9.16	4.92	
Oct '98	26	100	140	120	0.5	9.67	5.09	
Oct '98	27	90	140	115	-0.75	9.5	4.38	

Month	Day	Turbidity (N.T.U)			Halda River Water Level (feet)			Remark
		Min.	Max.	Average	Min.	Max.	Average	
Oct '98	28	100	130	115	1.58	8.08	4.83	
Oct '98	29	100	130	115	-1	8.5	3.75	
Oct '98	30	100	130	115	-0.5	8.33	3.92	
Oct '98	31	100	140	120	-0.67	8.5	3.92	
November '98	1	110	140	125	-0.67	8.25	3.79	
November '98	2	100	130	115	-2	8.58	3.29	
November '98	3	80	120	100	-1.5	9.58	4.04	
November '98	4	100	150	125	-1.25	10	4.38	
November '98	5	120	170	145	-1.25	10	4.38	
November '98	6	220	290	255	-1.33	9.5	4.09	
November '98	7	250	400	325	-1.5	9.67	4.09	
November '98	8	240	370	305	-1.5	9.83	4.17	
November '98	9	150	240	195	-1.5	9.33	3.92	
November '98	10	120	160	140	-1.83	9.08	3.63	
November '98	11	80	140	110	-1.33	7.75	3.21	
November '98	12	70	120	95	-0.5	7.42	3.46	
November '98	13	70	90	80	-0.5	8	3.75	
November '98	14	60	90	75	-1.33	8	3.34	
November '98	15	50	90	70	-1.33	8.16	3.42	
November '98	16	60	90	75	-1.25	8.16	3.46	
November '98	17	50	90	70	-1.16	9.83	4.34	
November '98	18	50	80	65	-0.33	9.33	4.50	
November '98	19	70	100	85	-0.33	10.16	4.92	
November '98	20	80	100	90	-1.67	10	4.17	
November '98	21	100	140	120	-0.5	9.67	4.59	
November '98	22	120	180	150	0.42	12	6.21	
November '98	23	160	240	200	0.75	11	5.88	
November '98	24	100	150	125	0	9.5	4.75	
November '98	25	70	100	85	-0.5	9.67	4.59	
November '98	26	60	90	75	-1	8.5	3.75	
November '98	27	70	90	80	-1	7.75	3.38	
November '98	28	50	80	65	-1.5	8.33	3.42	
November '98	29	60	90	75	-1.5	8.16	3.33	
November '98	30	70	100	85	-1.5	8.5	3.50	
December '98	1	70	120	95	-0.58	8.5	3.96	
December '98	2	70	100	85	-1.33	8.16	3.42	
December '98	3	60	90	75	-1.67	8.58	3.46	
December '98	4	70	90	80	-1.5	8.83	3.67	
December '98	5	80	100	90	-1.83	9.33	3.75	
December '98	6	80	110	95	-1.67	9.08	3.71	
December '98	7	80	100	90	-1.33	9	3.84	
December '98	8	80	100	90	-1.67	8.25	3.29	
December '98	9	70	100	85	-2	8.5	3.25	
December '98	10	70	90	80	-2	8.5	3.25	
December '98	11	60	90	75	-1.5	7.16	2.83	
December '98	12	80	100	90	-1.67	7	2.67	
December '98	13	80	120	100	-2	7.16	2.58	
December '98	14	80	130	105	-2	7.42	2.71	
December '98	15	80	110	95	-1.5	6.33	2.42	
December '98	16	70	100	85	-1.67	7.16	2.75	
December '98	17	80	110	95	-1.5	7.33	2.92	
December '98	18	80	120	100	-1.5	7.5	3.00	
December '98	19	90	130	110	-2	8.33	3.17	
December '98	20	80	130	105	-2	8.5	3.25	
December '98	21	100	140	120	-1.5	8.67	3.59	
December '98	22	110	150	130	-1.67	8.67	3.50	
December '98	23	100	140	120	-1.33	8	3.34	
December '98	24	100	150	125	-1.5	8	3.25	
December '98	25	110	150	130	-2	8.4	3.20	
December '98	26	110	140	125	-2.16	6.83	2.34	
December '98	27	80	120	100	-2.33	7.67	2.67	
December '98	28	70	100	85	-2	6.5	2.25	
December '98	29	60	80	70	-2	6.67	2.34	
December '98	30	50	80	65	-2	8.33	3.17	
December '98	31	40	60	50	-2.16	7.33	2.59	
January '99	1	40	60	50	-1.92	8.5	3.29	
January '99	2	40	60	50	-1.83	7.67	2.92	
January '99	3	40	60	50	-2	8	3.00	
January '99	4	50	80	65	-1.83	7.67	2.92	
January '99	5	60	110	85	-1.5	7.75	3.13	
January '99	6	60	120	90	-1.5	7.67	3.09	
January '99	7	70	120	95	-2	7.67	2.84	
January '99	8	100	120	110	-2	7.67	2.84	
January '99	9	70	120	95	-2.25	7.67	2.71	
January '99	10	70	120	95	-2.33	6.5	2.09	
January '99	11	70	110	90	-2.16	6.67	2.26	
January '99	12	70	110	90	-2.16	7.16	2.50	
January '99	13	80	120	100	-2	7	2.50	
January '99	14	80	110	95	-2.25	7.33	2.54	
January '99	15	80	100	90	-1	6.16	2.58	
January '99	16	90	100	95	-2	7.5	2.75	
January '99	17	80	110	95	-2.5	7	2.25	
January '99	18	60	100	80	-2.33	7.5	2.59	
January '99	19	70	100	85	-2.33	7.5	2.59	
January '99	20	80	110	95	-2.33	7.33	2.50	
January '99	21	70	100	85	-2.33	7.5	2.59	
January '99	22	80	110	95	-2.5	7.5	2.50	
January '99	23	100	120	110	-2.67	7.33	2.33	
January '99	24	100	120	110	-2.67	7	2.17	
January '99	25	100	130	115	-2.5	6.58	2.04	
January '99	26	110	130	120	-2.5	6.67	2.09	

Month	Day	Turbidity (N.T.U)			Halda River Water Level (feet)			Remark
		Min.	Max.	Average	Min.	Max.	Average	
January '99	27	110	150	130	-2.5	7	2.25	
January '99	28	120	150	135	-2.33	7	2.34	
January '99	29	120	150	135	-2	6.33	2.17	
January '99	30	110	150	130	-2.42	7.67	2.63	
January '99	31	120	150	135	2.42	6.67	2.13	
February '99	1	110	150	130	-2.5	6.58	2.04	
February '99	2	110	150	130	-2.5	7.5	2.50	
February '99	3	120	150	135	-2.33	7.5	2.59	
February '99	4	130	150	140	-2	7.5	2.75	
February '99	5	120	150	135	-2	7.5	2.75	
February '99	6	110	150	130	-2.16	7.5	2.67	
February '99	7	110	140	125	-2	6.75	2.38	
February '99	8	80	120	100	-2	6.67	2.34	
February '99	9	70	110	90	-2.5	6.67	2.09	
February '99	10	60	90	75	-2.42	6.67	2.13	
February '99	11	50	80	65	-2	6.83	2.42	
February '99	12	30	70	50	-2	7	2.50	
February '99	13	30	60	45	-2	5.83	1.92	
February '99	14	30	60	45	-2.33	6.33	2.00	
February '99	15	30	50	40	-2.5	7.33	2.42	
February '99	16	20	50	35	-2	7.67	2.84	
February '99	17	20	40	30	-2.33	8.5	3.09	
February '99	18	20	40	30	-2.33	8.67	3.17	
February '99	19	20	50	35	-1.83	8.5	3.34	
February '99	20	20	40	30	-2	8.42	3.21	
February '99	21	20	50	35	-2.33	8	2.84	
February '99	22	40	80	60	-2.5	7.5	2.50	
February '99	23	40	70	55	-2.16	7.5	2.67	
February '99	24	50	80	65	-2.5	6.83	2.17	
February '99	25	40	70	55	-2	7.42	2.71	
February '99	26	30	60	45	-2.16	7.16	2.50	
February '99	27	30	60	45	-2	6.5	2.25	
February '99	28	20	60	40	-2	7	2.50	
March '99	1	20	60	40	-2.5	7	2.25	
March '99	2	20	50	35	-2.5	7.5	2.50	
March '99	3	30	60	45	-2.5	7.67	2.59	
March '99	4	40	60	50	-2.33	7.92	2.80	
March '99	5	50	80	65	-2.5	8	2.75	
March '99	6	40	70	55	-2.33	8	2.84	
March '99	7	30	60	45	-2.5	7.67	2.59	
March '99	8	30	50	40	-2.42	7.16	2.37	
March '99	9	30	80	55	-2	7	2.50	
March '99	10	50	80	65	-2.33	7	2.34	
March '99	11	30	70	50	-2	7	2.50	
March '99	12	30	60	45	-2.33	6.67	2.17	
March '99	13	20	50	35	-2	7.25	2.63	
March '99	14	30	50	40	-2	7.33	2.67	
March '99	15	30	50	40	-2.16	7.33	2.59	
March '99	16	30	50	40	-2	8	3.00	
March '99	17	30	60	45	-2.33	8.16	2.92	
March '99	18	30	80	55	-1.33	9	3.84	
March '99	19	30	60	45	-2	9	3.50	
March '99	20	40	80	60	-2	9.33	3.67	
March '99	21	40	90	65	-2	9	3.50	
March '99	22	50	90	70	-1.5	8.67	3.59	
March '99	23	50	80	65	-2.16	8.33	3.09	
March '99	24	40	70	55	-2	8.16	3.08	
March '99	25	30	70	50	-2	7.83	2.92	
March '99	26	30	70	50	-2.5	8	2.75	
March '99	27	30	60	45	-1.25	8.5	3.63	
March '99	28	30	60	45	-1	7.33	3.17	
March '99	29	30	60	45	-1	8.67	3.84	
March '99	30	40	60	50	-2	7.83	2.92	
March '99	31	30	50	40	-1.5	8	3.25	
April '99	1	30	50	40	-2.42	8.58	3.08	
April '99	2	30	60	45	2	8.67	5.34	
April '99	3	40	70	55	-1.5	8.67	3.59	
April '99	4	30	60	45	-2	8.67	3.34	
April '99	5	40	60	50	-1.5	9	3.75	
April '99	6	40	60	50	-1.83	8.58	3.38	
April '99	7	30	90	60	-2	7.5	2.75	
April '99	8	30	60	45	-1.67	7.33	2.83	
April '99	9	40	60	50	-1.25	7.25	3.00	
April '99	10	30	60	45	-1.5	6.33	2.42	
April '99	11	40	70	55	-2	7	2.50	
April '99	12	30	70	50	-2	8.33	3.17	
April '99	13	30	70	50	-1.5	8.5	3.50	
April '99	14	40	70	55	-2	8.42	3.21	
April '99	15	40	70	55	-1.5	9.16	3.83	
April '99	16	40	70	55	-1.5	10.5	4.50	
April '99	17	80	175	128	-1	10.5	4.75	
April '99	18	120	160	140	-1.33	10.42	4.55	
April '99	19	150	180	165	-1.67	10.33	4.33	
April '99	20	160	200	180	-2	9.67	3.84	
April '99	21	180	230	205	-1.5	9	3.75	
April '99	22	140	250	195	-1.33	8.5	3.59	
April '99	23	140	200	170	-1.67	8.33	3.33	Turbidity Yearly MAX 740
April '99	24	150	200	175	-1.33	8	3.34	Yearly AVE
April '99	25	150	200	175	-0.67	8.5	3.92	Yearly MIN 20
April '99	26	150	210	180	-1	8.67	3.84	
April '99	27	160	220	190	-1	8.58	3.79	MAX Ave 204

Month	Day	Turbidity (N.T.U)			Halda River Water Level (feet)			Remark	
		Min.	Max.	Average	Min.	Max.	Average		
April '99	28	120	180	150	-1	9	4.00		AVE Ave 174
April '99	29	100	150	125	-0.67	9.67	4.50		MIN Ave 143
April '99	30	100	150	125	-1.5	9.83	4.17		
May '99	1	70	120	95	-1	9.83	4.42	days(<100)	140
May '99	2	80	110	95	-1.42	9.83	4.21	Nov12-Apr16(<100)	121
May '99	3	60	110	85	-1.33	9.58	4.13		86 %
May '99	4	60	110	85	-1.42	9.5	4.04	Nov12-Apr16(Ave)	77
May '99	5	60	100	80	-1.33	9.25	3.96	Nov12-Apr16(<80)	83
May '99	6	70	130	100	-1	9	4.00		59 %
May '99	7	120	250	185	-1	9	4.00	Nov12-Apr16(<60)	59
May '99	8	150	250	200	-1	8	3.50		42 %
May '99	9	200	290	245	-1	7.67	3.34		
May '99	10	220	300	260	-1	8	3.50		
May '99	11	200	280	240	-1	8.16	3.58		
May '99	12	150	200	175	-1.5	9	3.75		
May '99	13	150	180	165	-1.5	9.42	3.96		
May '99	14	140	180	160	-1.33	10.16	4.42		
May '99	15	130	170	150	-1.33	10.5	4.59		
May '99	16	130	160	145	-1.33	10.58	4.63		
May '99	17	160	240	200	-1.67	10.58	4.46		
May '99	18	210	250	230	-0.67	10.33	4.83		
May '99	19	150	220	185	-1.67	10	4.17		
May '99	20	80	170	125	-1.5	10	4.25		
May '99	21	80	140	110	-1	10.16	4.58		
May '99	22	80	110	95	-1	9	4.00		
May '99	23	120	280	200	-0.16	8.75	4.30		
May '99	24	280	350	315	-1.16	8.5	3.67		
May '99	25	200	280	240	-0.33	8.5	4.09		
May '99	26	220	280	250	-1	9	4.00		
May '99	27	160	230	195	-1.25	9.67	4.21		
May '99	28	120	190	155	-1	9.67	4.34		
May '99	29	120	180	150	0	10.67	5.34		
May '99	30	170	450	310	1	11	6.00		
May '99	31	350	450	400	0.42	11	5.71		
June '99	1	180	250	215	0	10.67	5.34		
June '99	2	100	180	140	0	10.16	5.08		
June '99	3	100	150	125	0	10.08	5.04		
June '99	4	150	200	175	-0.67	10	4.67		
June '99	5	160	200	180	-0.67	9.16	4.25		
June '99	6	190	280	235	-0.5	9	4.25		
June '99	7	290	380	335	-1.33	8.58	3.63		
June '99	8	300	400	350	-1.33	8.5	3.59		
June '99	9	290	380	335	-1.5	9.16	3.83		
June '99	10	250	340	295	-1	10	4.50		
June '99	11	260	380	320	-0.5	11.25	5.38		
June '99	12	280	360	320	0	11.16	5.58		
June '99	13	280	350	315	0	11	5.50		
June '99	14	260	350	305	-0.5	11	5.25		
June '99	15	220	360	290	-0.25	11.16	5.46		
June '99	16	200	350	275	0	11.25	5.63		
June '99	17	230	280	255	-0.5	11.33	5.42		
June '99	18	200	270	235	-0.75	10.5	4.88		
June '99	19	200	250	225	-0.5	9.83	4.67		
June '99	20	150	220	185	-0.67	9.42	4.38		
June '99	21	180	250	215	-0.83	9.5	4.34		
June '99	22	250	350	300	0	10	5.00		
June '99	23	350	660	505	2.42	10.33	6.38		
June '99	24	450	640	545	3.5	11.33	7.42		
June '99	25	500	650	575	2	10.67	6.34		
June '99	26	460	640	550	2.5	11	6.75		
June '99	27	450	600	525	3.5	11.5	7.50		
June '99	28	400	580	490	3	11.5	7.25		
June '99	29	320	500	410	2.5	12	7.25		
June '99	30	250	400	325	3	11.58	7.29		
July '99	1	250	300	275	2.83	11.83	7.33		
July '99	2	240	300	270	2.75	11.67	7.21		
July '99	3	200	280	240	3	11.33	7.17		
July '99	4	180	230	205	2.67	11	6.84		
July '99	5	160	240	200	2	11	6.50		
July '99	6	160	210	185	1.58	10.16	5.87		
July '99	7	140	250	195	0.67	9.5	5.09		
July '99	8	160	230	195	0.33	9.5	4.92		
July '99	9	160	220	190	0.5	10.16	5.33		
July '99	10	170	240	205	1	10.67	5.84		
July '99	11	230	560	395	0.67	11.5	6.09		
July '99	12	600	780	690	2.83	13	7.92		
July '99	13	450	640	545	5.16	13.33	9.25		
July '99	14	340	450	395	6	13.5	9.75		
July '99	15	320	460	390	5.33	13.5	9.42		
July '99	16	320	440	380	4.16	13	8.58		
July '99	17	190	340	265	3.33	12	7.67		
July '99	18	140	210	175	3	11.16	7.08		
July '99	19	150	220	185	2	10.67	6.34		
July '99	20	180	440	310	2	10.67	6.34		
July '99	21	290	410	350	2.5	10.16	6.33		
July '99	22	160	340	250	2	9.5	5.75		
July '99	23	180	250	215	2	9.92	5.96		
July '99	24	150	220	185	2	10	6.00		
July '99	25	190	280	235	1	10.33	5.67		
July '99	26	180	290	235	0.5	10.5	5.50		
July '99	27	180	260	220	0.83	11	5.92		

Month	Day	Turbidity (N.T.U)			Halda River Water Level (feet)			Remark
		Min.	Max.	Average	Min.	Max.	Average	
July '99	28	160	230	195	0.83	11.5	6.17	
July '99	29	160	240	200	1.16	11.42	6.29	
July '99	30	150	230	190	0.67	11.42	6.05	
July '99	31	150	230	190	0.5	11.42	5.96	
August '99	1	170	220	195	0.83	11.67	6.25	
August '99	2	150	200	175	1	11.5	6.25	
August '99	3	160	220	190	1	11	6.00	
August '99	4	140	200	170	1	10.83	5.92	
August '99	5	120	200	160	1	10.5	5.75	
August '99	6	180	180	180	1	10.67	5.84	
August '99	7	90	160	125	0.5	10.5	5.50	
August '99	8	100	160	130	0.5	11	5.75	
August '99	9	110	260	185	0.33	11.33	5.83	
August '99	10	280	380	330	1.67	12.16	6.92	
August '99	11	350	540	445	1	12.16	6.58	
August '99	12	550	820	685	3	12.58	7.79	
August '99	13	680	830	755	3	12.67	7.84	
August '99	14	600	780	690	3.33	12.5	7.92	
August '99	15	450	620	535	3	12.16	7.58	
August '99	16	320	600	460	3	11.5	7.25	
August '99	17	150	380	265	2.42	11.16	6.79	
August '99	18	120	180	150	1.83	10.5	6.17	
August '99	19	120	160	140	1.33	9.5	5.42	
August '99	20	120	160	140	1	9.08	5.04	
August '99	21	120	150	135	1	8.5	4.75	
August '99	22	120	140	130	0	8.75	4.38	
August '99	23	110	140	125	-0.33	9	4.34	
August '99	24	90	130	110	-0.25	10	4.88	
August '99	25	110	140	125	-0.5	10.16	4.83	
August '99	26	90	130	110	-0.5	10.67	5.09	
August '99	27	130	380	255	0.67	11.5	6.09	
August '99	28	250	360	305	1.33	11.16	6.25	
August '99	29	240	350	295	1	12	6.50	
August '99	30	200	280	240	1.5	12	6.75	
August '99	31	180	230	205	1.33	11.42	6.38	
September '99	1	120	200	160	1	10.83	5.92	
September '99	2	160	350	255	0.83	10.5	5.67	
September '99	3	130	190	160	0.67	10.16	5.42	
September '99	4	130	180	155	0.25	10.33	5.29	
September '99	5	120	180	150	-0.5	9.5	4.50	
September '99	6	100	160	130	-0.5	9.42	4.46	
September '99	7	100	150	125	0.58	9.75	5.17	
September '99	8	120	190	155	0.67	10.58	5.63	
September '99	9	100	170	135	0.5	11.75	6.13	
September '99	10	200	280	240	1	11.33	6.17	
September '99	11	260	350	305	0.83	12.5	6.67	
September '99	12	200	320	260	0.67	11.83	6.25	
September '99	13	240	300	270	0.5	11.16	5.83	
September '99	14	160	240	200	0	10.58	5.29	
September '99	15	100	230	165	0.33	10.33	5.33	
September '99	16	90	180	135	0	9.67	4.84	
September '99	17	110	150	130	0	8.5	4.25	
September '99	18	120	160	140	-0.5	8	3.75	
September '99	19	150	190	170	-0.33	7.5	3.59	
September '99	20	160	280	220	-0.16	7.5	3.67	
September '99	21	210	250	230	-0.5	8.75	4.13	
September '99	22	210	280	245	0	9.67	4.84	
September '99	23	200	260	230	0	10.33	5.17	
September '99	24	120	200	160	0	10.67	5.34	
September '99	25	100	140	120	-0.58	10.5	4.96	
September '99	26	90	130	110	-0.5	10.42	4.96	
September '99	27	90	130	110	0.5	11	5.75	
September '99	28	90	120	105	-0.25	10.67	5.21	
September '99	29	90	120	105	-0.42	10.33	4.96	
September '99	30	90	140	115	-0.5	9.67	4.59	
October '99	1	80	110	95	-0.67	10.16	4.75	
October '99	2	80	100	90	-0.33	9.16	4.42	
October '99	3	80	160	120	-1.33	8.58	3.63	
October '99	4	90	150	120	-1	8.83	3.92	
October '99	5	100	140	120	-0.67	9	4.17	
October '99	6	90	120	105	-1	9.5	4.25	
October '99	7	90	120	105	-0.67	9.83	4.58	
October '99	8	100	120	110	-1	10	4.50	
October '99	9	90	120	105	-0.25	10.33	5.04	
October '99	10	90	120	105	-0.5	10	4.75	
October '99	11	90	120	105	-0.33	10	4.84	
October '99	12	90	120	105	-0.5	9.67	4.59	
October '99	13	80	120	100	-0.5	9.83	4.67	
October '99	14	70	110	90	-1.16	9.33	4.09	
October '99	15	70	120	95	-1	9	4.00	
October '99	16	70	110	90	-1.33	9	3.84	
October '99	17	60	110	85	-1.16	8.67	3.76	
October '99	18	70	110	90	-0.16	9.5	4.67	
October '99	19	70	120	95	2	9.08	5.54	
October '99	20	70	120	95	0	9	4.50	
October '99	21	100	120	110	0	9.67	4.84	
October '99	22	70	110	90	0	9.58	4.79	
October '99	23	70	110	90	-0.5	10.16	4.83	
October '99	24	70	110	90	-0.5	10	4.75	
October '99	25	70	110	90	-0.33	10.67	5.17	
October '99	26	70	110	90	-1	10.83	4.92	

Month	Day	Turbidity (N.T.U)			Halda River Water Level (feet)			Remark
		Min.	Max.	Average	Min.	Max.	Average	
October '99	27	80	120	100	-1	10	4.50	
October '99	28	80	110	95	-0.25	10.58	5.17	
October '99	29	70	110	90	0.33	10.83	5.58	
October '99	30	70	110	90	0.67	11.58	6.13	
October '99	31	70	110	90	0.16	10.33	5.25	
November '99	1	70	110	90	-0.5	9.5	4.50	
November '99	2	70	100	85	-0.5	8.75	4.13	
November '99	3	70	100	85	-0.5	8.67	4.09	
November '99	4	60	100	80	-0.83	8.75	3.96	
November '99	5	60	100	80	-1	8.83	3.92	
November '99	6	60	100	80	-1	8.83	3.92	
November '99	7	40	100	70	-1.25	9.5	4.13	
November '99	8	40	80	60	-1.33	9.16	3.92	
November '99	9	40	90	65	-1.33	9.5	4.09	
November '99	10	40	90	65	-1.5	9.67	4.09	
November '99	11	40	80	60	-2	9.5	3.75	
November '99	12	40	80	60	-2	8.33	3.17	
November '99	13	40	60	50	-2.33	8.33	3.00	
November '99	14	40	70	55	-2	8	3.00	
November '99	15	40	70	55	-2.16	8.42	3.13	
November '99	16	40	70	55	-1.33	8.75	3.71	
November '99	17	40	70	55	-1	8.16	3.58	
November '99	18	40	70	55	-1.33	8.16	3.42	
November '99	19	40	60	50	-2	8.67	3.34	
November '99	20	40	60	50	-2.33	8.67	3.17	
November '99	21	40	60	50	-1.67	9	3.67	
November '99	22	40	60	50	-2.33	9.33	3.50	
November '99	23	40	70	55	-2.5	9.5	3.50	
November '99	24	40	70	55	-2.5	9.16	3.33	
November '99	25	40	80	60	-2	9.08	3.54	
November '99	26	60	110	85	-2.5	8.83	3.17	
November '99	27	70	110	90	-2.5	8.33	2.92	
November '99	28	90	120	105	-2.67	9	3.17	
November '99	29	90	110	100	-2.83	8.67	2.92	
November '99	30	90	120	105	2.83	7.75	2.46	
December '99	1	60	100	80	-2.67	7.5	2.42	
December '99	2	50	100	75	-2.67	7.5	2.42	
December '99	3	60	100	80	-2.33	7.5	2.59	
December '99	4	60	100	80	-2.25	7.5	2.63	
December '99	5	60	100	80	-2	7	2.50	
December '99	6	60	110	85	-2.33	7	2.34	
December '99	7	60	100	80	-2.33	7.58	2.63	
December '99	8	60	110	85	-2.16	7.58	2.71	
December '99	9	70	110	90	-2.33	7.5	2.59	
December '99	10	70	120	95	-2	7.67	2.84	
December '99	11	100	150	125	-1.25	8.33	3.54	
December '99	12	100	150	125	-1.33	8.5	3.59	
December '99	13	100	140	120	-2	7.33	2.67	
December '99	14	100	150	125	-2	7.33	2.67	
December '99	15	100	160	130	-2.16	7	2.42	
December '99	16	90	120	105	-2.16	7	2.42	
December '99	17	80	120	100	-2	7.16	2.58	
December '99	18	90	120	105	-2.5	7.5	2.50	
December '99	19	70	100	85	-2.33	8.16	2.92	
December '99	20	70	100	85	-2.5	7.33	2.42	
December '99	21	60	90	75	-2.16	8.67	3.26	
December '99	22	60	80	70	-2.16	8	2.92	
December '99	23	70	110	90	-2	8.5	3.25	
December '99	24	80	100	90	-2	9.25	3.63	
December '99	25	70	90	80	-2	9.5	3.75	
December '99	26	70	110	90	-2	9	3.50	
December '99	27	80	110	95	-1.67	9	3.67	
December '99	28	90	120	105	-2.33	8.16	2.92	
December '99	29	80	110	95	-2.5	7.33	2.42	
December '99	30	90	120	105	-2.33	7	2.34	
December '99	31	80	120	100	-2.42	6.75	2.17	
January '00	1	80	120	100	-2.33	6.83	2.25	
January '00	2	80	120	100	-2.16	5.5	1.67	
January '00	3	80	120	100	-2	8	3.00	
January '00	4	80	120	100	-2.5	7.42	2.46	
January '00	5	70	100	85	-2.33	7.33	2.50	
January '00	6	60	90	75	-2.33	7.42	2.55	
January '00	7	60	90	75	-2.42	7	2.29	
January '00	8	60	80	70	-2.16	7	2.42	
January '00	9	60	80	70	-2	7.5	2.75	
January '00	10	60	80	70	-2.16	7.42	2.63	
January '00	11	60	80	70	-2.5	6.83	2.17	
January '00	12	50	80	65	-2.33	7.16	2.42	
January '00	13	50	70	60	-2.5	7.33	2.42	
January '00	14	40	70	55	-2.5	7.33	2.42	
January '00	15	40	60	50	-2.5	7	2.25	
January '00	16	40	60	50	-2.5	7.42	2.46	
January '00	17	40	60	50	-2.67	7.33	2.33	
January '00	18	40	60	50	-2.5	7.83	2.67	
January '00	19	40	60	50	-2.5	6.16	1.83	
January '00	20	40	60	50	-2	7.5	2.75	
January '00	21	40	50	45	-2	8	3.00	
January '00	22	40	60	50	-2.16	8	2.92	
January '00	23	40	60	50	-2	8	3.00	
January '00	24	50	100	75	-1.5	8	3.25	
January '00	25	60	100	80	-2	7.75	2.88	

Month	Day	Turbidity (N.T.U)			Halda River Water Level (feet)			Remark
		Min.	Max.	Average	Min.	Max.	Average	
January '00	26	50	90	70	-2.5	7.33	2.42	
January '00	27	60	100	80	-2.16	7.33	2.59	
January '00	28	60	90	75	-2.25	6.5	2.13	
January '00	29	60	80	70	-2	6.5	2.25	
January '00	30	60	70	65	-1.83	6.5	2.34	
January '00	31	50	70	60	-2	6.67	2.34	
February '00	1	40	70	55	-1.83	5.5	1.84	
February '00	2	50	70	60	-2.33	6	1.84	
February '00	3	40	60	50	-2	7	2.50	
February '00	4	30	50	40	-1.75	7.5	2.88	
February '00	5	30	50	40	-2	7.5	2.75	
February '00	6	30	40	35	-2.16	7.5	2.67	
February '00	7	30	40	35	-1.83	7.75	2.96	
February '00	8	30	40	35	-2	7.83	2.92	
February '00	9	30	40	35	-2.83	8.16	2.67	
February '00	10	30	40	35	-2.08	8	2.96	
February '00	11	25	40	33	-2.83	8	2.59	
February '00	12	25	40	33	-2.33	7.5	2.59	
February '00	13	35	50	43	-2.33	7	2.34	
February '00	14	35	45	40	-2.42	7	2.29	
February '00	15	25	40	33	-2.42	6.67	2.13	
February '00	16	30	40	35	-2.33	7.67	2.67	
February '00	17	25	35	30	-2.16	6.5	2.17	
February '00	18	25	35	30	-2	8	3.00	
February '00	19	25	35	30	-2.16	7.5	2.67	
February '00	20	25	45	35	-2.33	8	2.84	
February '00	21	20	40	30	-2	8	3.00	
February '00	22	30	45	38	-2.33	7.83	2.75	
February '00	23	30	45	38	-2.33	7.83	2.75	
February '00	24	30	45	38	-2.5	7.67	2.59	
February '00	25	25	40	33	-2.33	7.5	2.59	
February '00	26	25	40	33	-2.33	6.5	2.09	
February '00	27	25	35	30	-2.58	7	2.21	
February '00	28	25	40	33	-2.25	6.16	1.96	
February '00	29	20	35	28	-2	6.25	2.13	
March '00	1	25	40	33	-2	6.5	2.25	
March '00	2	30	45	38	-1.16	6.67	2.76	
March '00	3	30	40	35	-1.58	7.5	2.96	
March '00	4	25	40	33	-1.67	7.5	2.92	
March '00	5	30	40	35	-2	8.25	3.13	
March '00	6	25	40	33	-1.58	8.5	3.46	
March '00	7	30	40	35	-2	8.67	3.34	
March '00	8	30	45	38	-1.33	8.83	3.75	
March '00	9	30	45	38	-2	9	3.50	
March '00	10	30	45	38	-1.67	9	3.67	
March '00	11	30	45	38	-1.5	8.83	3.67	
March '00	12	30	45	38	-2.25	8.5	3.13	
March '00	13	38	50	44	-1.33	8.58	3.63	
March '00	14	35	50	43	-1.67	8	3.17	
March '00	15	40	60	50	-2.33	8	2.84	
March '00	16	70	110	90	-1.5	7	2.75	
March '00	17	120	180	150	-1.33	7.16	2.92	
March '00	18	210	280	245	-1.83	8.67	3.42	
March '00	19	220	300	260	-1.83	9.16	3.67	
March '00	20	180	250	215	-1.25	9	3.88	
March '00	21	110	180	145	-1.67	9.25	3.79	
March '00	22	100	140	120	-1.5	9.16	3.83	
March '00	23	100	140	120	-1.83	9	3.59	
March '00	24	100	130	115	-1.83	8.67	3.42	
March '00	25	110	140	125	-1.67	8.83	3.58	
March '00	26	100	130	115	-1.67	8	3.17	
March '00	27	80	120	100	-1.33	7.67	3.17	
March '00	28	70	110	90	-1.67	7	2.67	
March '00	29	60	90	75	-1.67	6.67	2.50	
March '00	30	50	80	65	0	7.5	3.75	
March '00	31	40	70	55	-0.67	7.25	3.29	
April '00	1	30	50	40	-1.75	7.67	2.96	
April '00	2	30	50	40	-1.75	8.58	3.42	
April '00	3	30	50	40	-1.58	8.75	3.59	
April '00	4	30	60	45	-1.58	9.83	4.13	
April '00	5	30	50	40	-1.42	9.5	4.04	
April '00	6	30	50	40	-1.67	10	4.17	
April '00	7	30	50	40	-1.58	10.16	4.29	
April '00	8	30	60	45	-2	10	4.00	
April '00	9	30	60	45	-2	9.5	3.75	
April '00	10	30	60	45	-1.83	8.75	3.46	
April '00	11	30	60	45	-1.5	9	3.75	
April '00	12	30	60	45	-1.5	8.25	3.38	
April '00	13	40	64	52	-1.67	8	3.17	
April '00	14	48	60	54	-1.5	8.33	3.42	
April '00	15	28	60	44	-1.67	8.33	3.33	
April '00	16	30	60	45	-1.5	8.16	3.33	
April '00	17	36	60	48	-1.33	8.5	3.59	
April '00	18	36	60	48	-1.5	9.33	3.92	
April '00	19	39	58	49	-1.33	9.5	4.09	
April '00	20	35	60	48	-1.67	9.5	3.92	
April '00	21	35	55	45	-1.25	9.25	4.00	
April '00	22	30	58	44	-1.25	9	3.88	
April '00	23	30	55	43	-1.25	9	3.88	
April '00	24	40	65	53	-1.25	9	3.88	
April '00	25	50	70	60	-1	8.5	3.75	
								Turbidity
								Yearly MAX
								Yearly AVE
								830

Month	Day	Turbidity (N.T.U)			Halda River Water Level (feet)			Remark	
		Min.	Max.	Average	Min.	Max.	Average		
April '00	26	58	120	89	-1.83	7.5	2.84	Yearly MIN	20
April '00	27	100	280	190	-0.5	8.33	3.92		
April '00	28	260	350	305	1.16	7.83	4.50	MAX Ave	173
April '00	29	220	300	260	-0.5	8.5	4.00	AVE Ave	145
April '00	30	120	240	180	0	9.33	4.67	MIN Ave	116
May '00	1	150	260	205	-1	9.5	4.25		
May '00	2	250	390	320	-0.5	9.5	4.50	MAX Ave in 2 years	189
May '00	3	250	420	335	-0.58	10.58	5.00	AVE Ave in 2 years	159
May '00	4	170	380	275	-0.5	11	5.25	MIN Ave in 2 years	130
May '00	5	150	260	205	0	11	5.50		
May '00	6	120	180	150	-0.5	11	5.25	days(<100)	173
May '00	7	60	160	110	-1	10.67	4.84	Oct14-Apr26(<100)	165
May '00	8	60	110	85	-0.5	10.67	5.09		95%
May '00	9	50	100	75	-0.67	10	4.67	Oct14-Apr26(Ave)	70
May '00	10	50	110	80	-0.5	9	4.25	Oct14-Apr26(<80)	118
May '00	11	50	100	75	-1	8.5	3.75		68%
May '00	12	40	100	70	-1.33	8.16	3.42	Oct14-Apr26(<60)	90
May '00	13	40	90	65	-0.16	8.83	4.34		52%
May '00	14	40	80	60	-0.83	9.33	4.25		
May '00	15	40	80	60	-0.67	9.5	4.42		
May '00	16	40	80	60	-0.33	10.33	5.00		
May '00	17	40	80	60	0.33	10.83	5.58		
May '00	18	70	150	110	0	11	5.50		
May '00	19	100	260	180	0	11	5.50		
May '00	20	460	580	520	1	10.83	5.92		
May '00	21	510	620	565	0	10.5	5.25		
May '00	22	150	520	335	-0.5	10.5	5.00		
May '00	23	150	310	230	0	10.16	5.08		
May '00	24	240	400	320	2.67	10.58	6.63		
May '00	25	350	460	405	2.25	10.5	6.38		
May '00	26	500	750	625	2.33	10.83	6.58		
May '00	27	500	700	600	2	9	5.50		
May '00	28	450	640	545	1.25	8.83	5.04		
May '00	29	450	600	525	1.33	9.67	5.50		
May '00	30	460	580	520	2	10.5	6.25		
May '00	31	450	600	525	1	10.83	5.92		
June '00	1	300	450	375	0.5	11	5.75		
June '00	2	280	440	360	-0.33	11	5.34		
June '00	3	280	420	350	0	11	5.50		
June '00	4	300	450	375	0	11.67	5.84		
June '00	5	280	430	355	0.33	12	6.17		
June '00	6	300	420	360	1.5	12.16	6.83		
June '00	7	300	420	360	0	11.5	5.75		
June '00	8	300	450	375	1	10.16	5.58		
June '00	9	290	420	355	0.67	10	5.34		
June '00	10	300	420	360	1	9	5.00		
June '00	11	300	400	350	0	9.67	4.84		
June '00	12	320	400	360	1	10.5	5.75		
June '00	13	340	420	380	1	10.75	5.88		
June '00	14	340	430	385	1	10.67	5.84		
June '00	15	320	410	365	0.16	10.5	5.33		
June '00	16	340	420	380	0.33	11	5.67		
June '00	17	320	430	375	0.33	11.25	5.79		
June '00	18	330	420	375	0.83	11.5	6.17		
June '00	19	340	450	395	0	11.16	5.58		
June '00	20	340	460	400	1	11.42	6.21		
June '00	21	400	550	475	1.33	11.25	6.29		
June '00	22	340	460	400	0.5	10.83	5.67		
June '00	23	300	420	360	0.67	10	5.34		
June '00	24	400	550	475	1	10.5	5.75		
June '00	25	450	600	525	2.67	10.5	6.59		
June '00	26	290	380	335	1.33	10.42	5.88		
June '00	27	250	300	275	0.5	10	5.25		
June '00	28	200	280	240	0.67	10.67	5.67		
June '00	29	180	240	210	0.67	11.25	5.96		
June '00	30	160	220	190	0.5	11.5	6.00		
July '00	1	170	220	195	0.42	11.67	6.05		
July '00	2	160	210	185	0.5	11.67	6.09		
July '00	3	150	200	175	0	11.67	5.84		
July '00	4	150	200	175	0	12	6.00		
July '00	5	150	210	180	0	11.5	5.75		
July '00	6	150	200	175	0	11.33	5.67		
July '00	7	150	200	175	0	11	5.50		
July '00	8	140	200	170	0.5	10.33	5.42		
July '00	9	150	210	180	0.33	10.67	5.50		
July '00	10	140	210	175	0.5	10	5.25		
July '00	11	140	200	170	0	9.5	4.75		
July '00	12	120	200	160	1	11	6.00		
July '00	13	120	190	155	0.67	11	5.84		
July '00	14	120	180	150	0.83	11.33	6.08		
July '00	15	140	200	170	0.67	11.33	6.00		
July '00	16	140	220	180	0.33	11.5	5.92		
July '00	17	150	220	185	0.83	11.83	6.33		
July '00	18	180	450	315	3	12.5	7.75		
July '00	19	450	600	525	0.5	12.83	6.67		
July '00	20	480	600	540	2.5	12.83	7.67		
July '00	21	400	500	450	2	12.5	7.25		
July '00	22	500	400	450	2	11.33	6.67		
July '00	23	150	200	175	1.33	10.5	5.92		
July '00	24	140	220	180	1.33	10.5	5.92		
July '00	25	170	250	210	0.5	10.5	5.50		

Month	Day	Turbidity (N.T.U)			Halda River Water Level (feet)			Remark
		Min.	Max.	Average	Min.	Max.	Average	
July '00	26	250	320	285	0.5	10.33	5.42	
July '00	27	240	300	270	0.33	10.83	5.58	
July '00	28	220	280	250	0.33	10.67	5.50	
July '00	29	200	280	240	0.33	11.16	5.75	
July '00	30	150	200	175	0	11.33	5.67	
July '00	31				0	12.42	6.21	
Total Date	822 days		Average	173				(1 May 1998 to 30 July 2000)
Average		130	189	159				in 2 years (1 May 1998 to 31 April 2000)
Total	731 days			293 days				Days at more than Average turbidity (159) to 30 July 2000
				40 %				
				499				Days at more than 100NTU of turbidity to 30 July 2000
				68 %				
Note : Hatch portion means daily average turbidity is more than the average turbidity (173).								

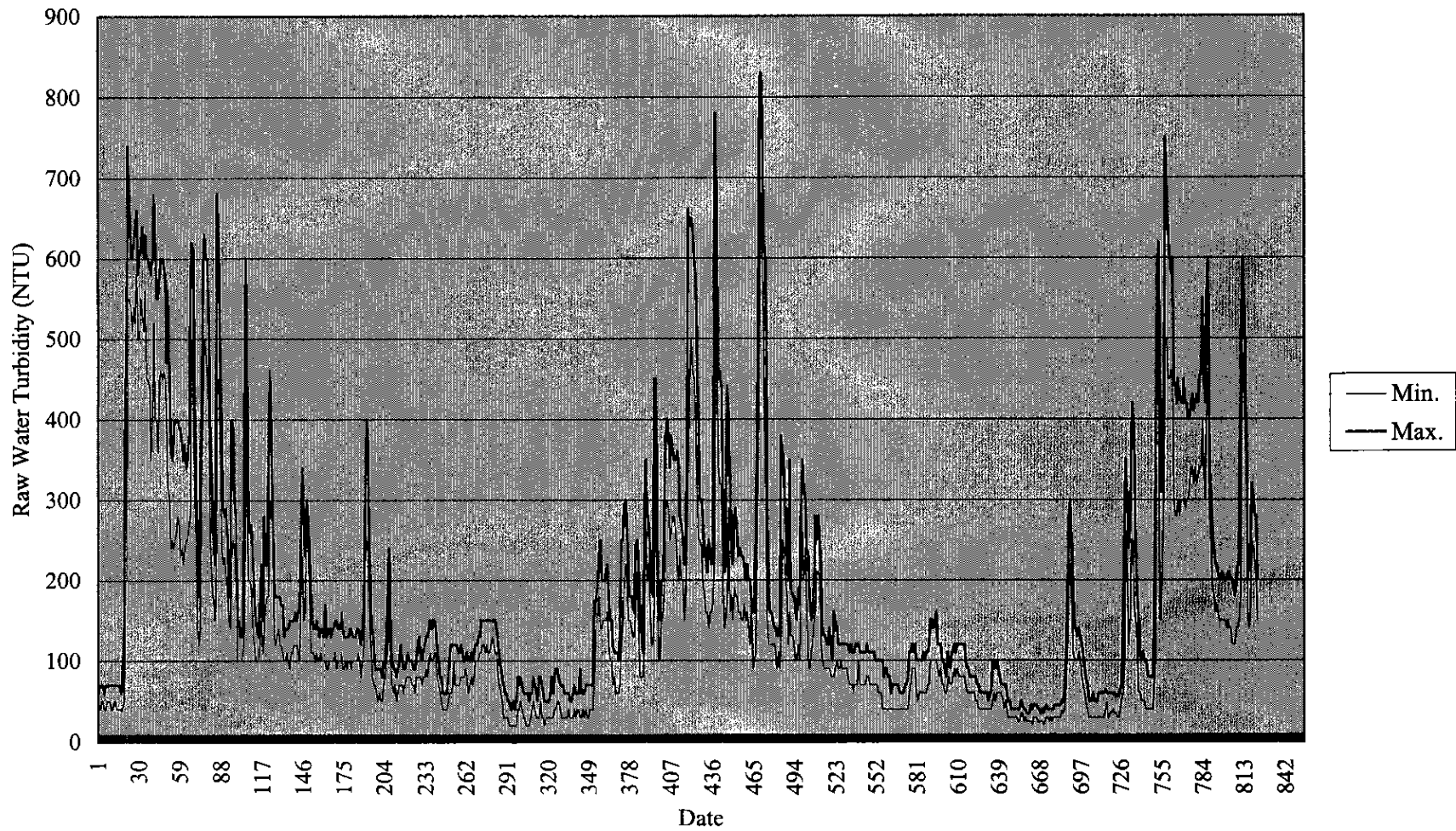


Figure 4.1-1-1 Raw Water Maximum and Minimum Daily Turbidity (1 May 1998 to 30 July 2000)

4.1-1-13

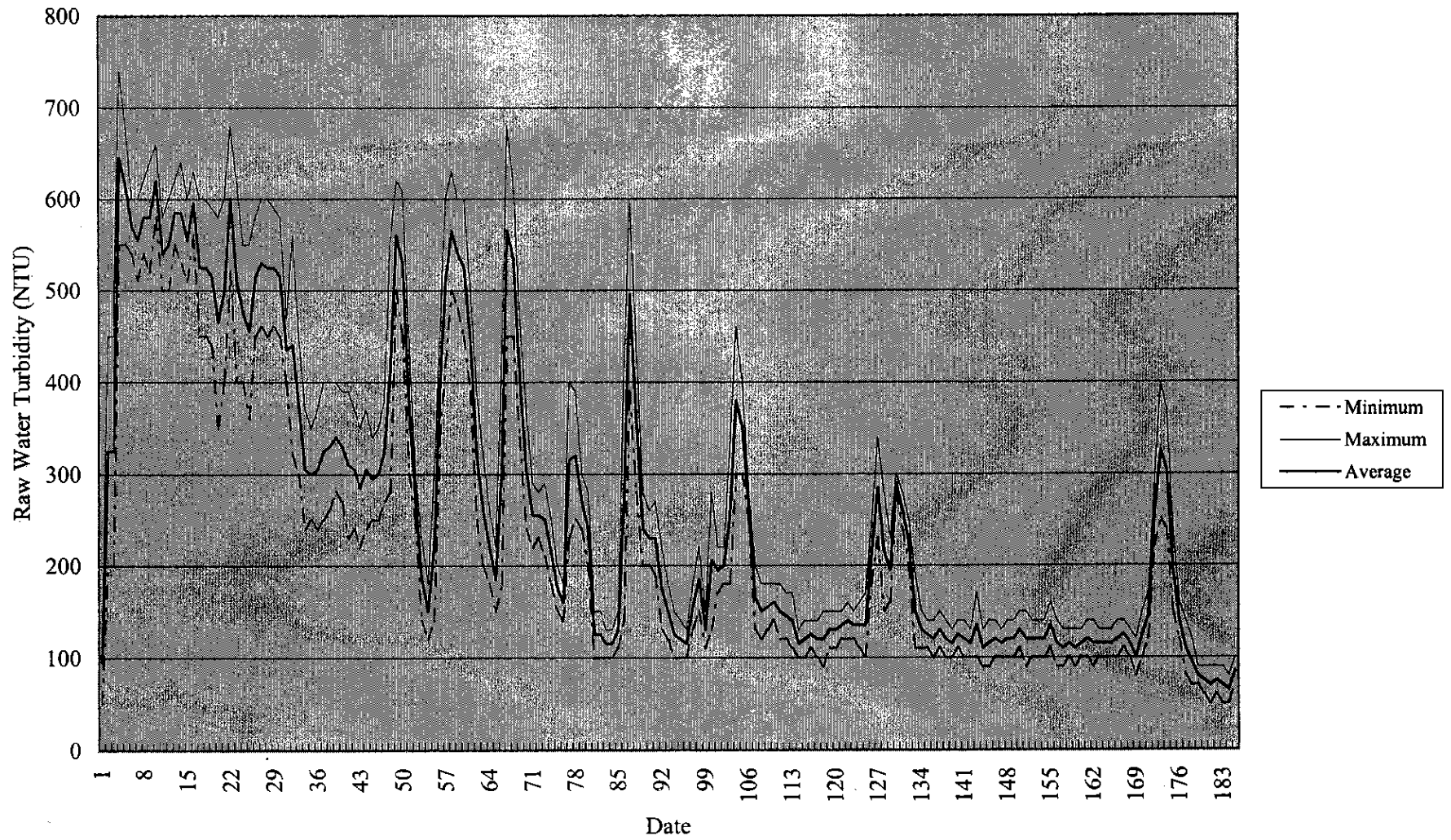


Figure 4.1-1-2 Raw Water Turbidity (15 May to 15 November 1998)

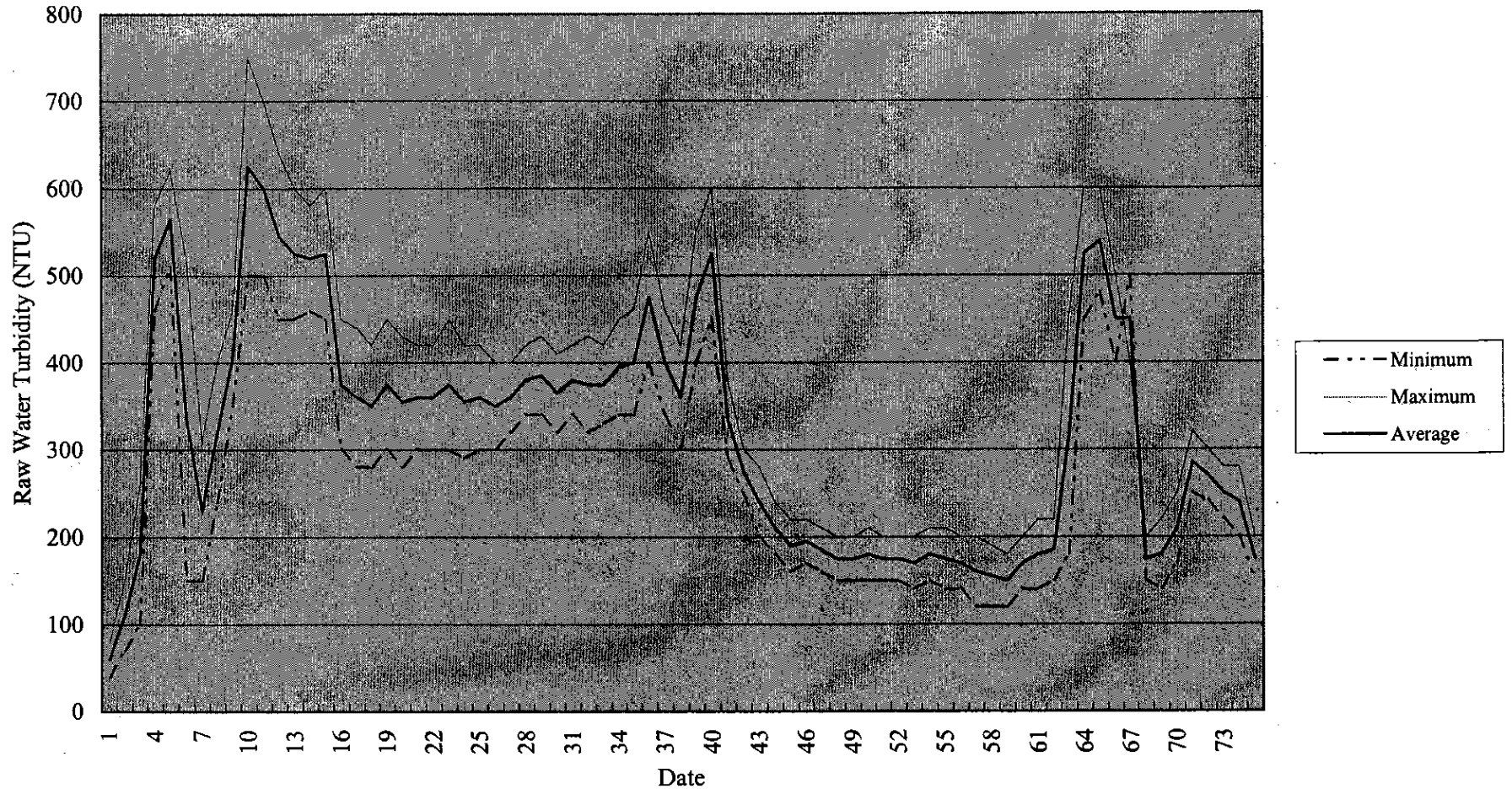


Figure 4.1-1-3 Average Raw Water Turbidity (15 May to 30 July 2000)

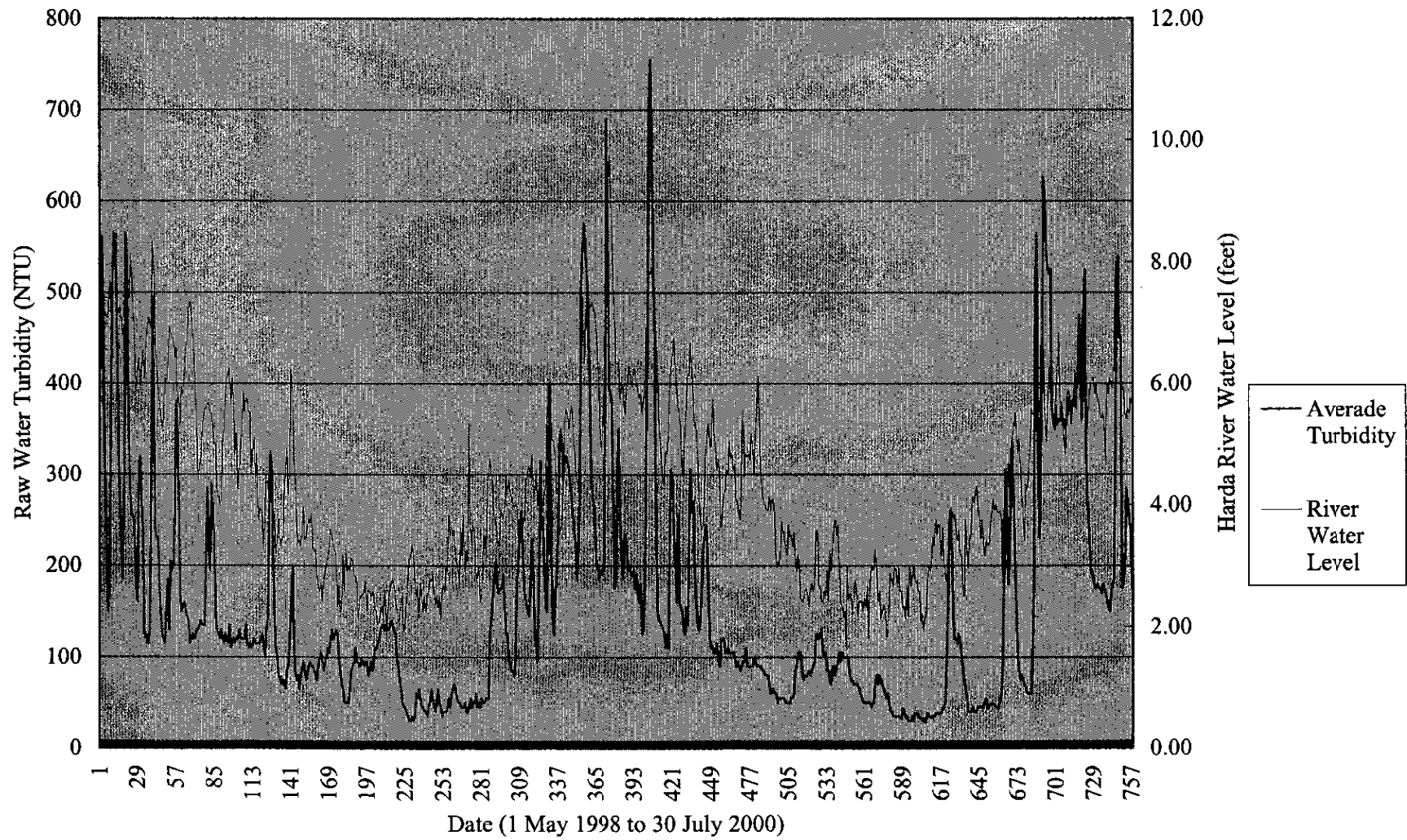


Figure 4.1-1-4 Turbidity and Water Level at Intake Point of Harda River