APPENDIX A

A.1 Water Quality Databases

Each water sample taken from the sample sites has been compared to the South African Water Quality Guidelines, to assess their respective fitness-for-use. In the following tables, all samples that do not fall within the water quality guidelines for a specific use, have been highlighted. For each set of guidelines, only those parameters for which standards have been set are indicated for means of comparison.

Please note that as the database used for this exercise was not compiled by the author, data has been omitted on the basis of unacceptable ionic balances.

PARAMETER	SO_4	pH	TDS	Na	Cl	Ca	Mg	Fe	Al	Mn
UNITS	mg/l		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
DOMESTIC	200	6-9	450	100	100	32-80	30	0.3	0.12-0.5	0.05
GOEDEHOOP	355	8	-	-	-	-	-	-	-	-
ARNOT	249	8	-	74	50	-	-	-	-	-
WOESTALLEEN	1866	8	-	100	-	33	21	-	0.1	-
KRIEL	165	9	482	113	28	22	18	0.02	0.28	0.01
KLEINKOPJE	1904	8	-	-	-	-	-	-	-	-
SYFERFONTEIN	334	8	707	208	12	23	20	0.24	0.15	0.08
MMS	1371	7	1985	41	13	-	-	0.16	0.13	0.93
MATLA	436	9	860	2	54	46	-	-	-	-
KOORNFONTEIN	352	8	-	107	36	-	33	0.88	-	0.32
GREENSIDE	1912	9	2321	73	53	36	-	-	-	-
EIKEBOOM	62	8	-	34	-	-	21	-	-	-

NOTE: '-' indicates no data available

Water from all sites, except for Eikeboom, is unsuitable for domestic use, based on the limited data available

PARAMETER	pH
UNITS	
RECREATIONAL	6.5-8.5
GOEDEHOOP	8
ARNOT	8
WOESTALLEEN	8
KRIEL	9
KLEINKOPJE	8
SYFERFONTEIN	8
MMS	7
MATLA	9
KOORNFONTEIN	8
GREENSIDE	9
EIKEBOOM	8

NOTE: '-' indicates no data available

Water from Kriel, Matla and Greenside is not suitable for recreational use, based on the limited data available.

PARAMETER	SO_4	pH	TDS	Cl	TOTAL ALKALINITY	Fe	Mn
UNITS	mg/l		mg/l	mg/l	mg/l	mg/l	mg/l
INDUSTRIAL	200	6.5-8	450	100	300	0.3	0.2
GOEDEHOOP	355	8	-	-	-	-	-
ARNOT	249	8	-	50	-	-	-
WOESTALLEEN	1866	8	-	-	21	-	-
KRIEL	165	9	482	28	18	0.02	0.01
KLEINKOPJE	1904	8	-	-	-	-	-
SYFERFONTEIN	334	8	707	12	20	0.24	0.08
MMS	1371	7	1985	13	-	0.16	0.93
MATLA	436	9	860	54	-	-	-
KOORNFONTEIN	352	8	-	36	33	0.88	0.32
GREENSIDE	1912	9	2321	53	-	-	-
EIKEBOOM	62	8	-	-	21	-	-

NOTE: '-' indicates no data available

Water from all sites is not suitable for Class 3 industrial use, based on the limited data available.

PARAMETER	SO_4	pH	TDS	Na	Cl	Fe	Al	Mn
UNITS	mg/l		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
AGRICULTURE: IRRIGATION	40	6.5-8.4	280	70	140	5	5	10
GOEDEHOOP	355	8	-	-	-	-	-	-
ARNOT	249	8	-	74	50	-	-	-
WOESTALLEEN	1866	8	-	100	-	-	0.1	-
KRIEL	165	9	482	113	28	0.02	0.28	0.01
KLEINKOPJE	1904	8	-	-	-	-	-	-
SYFERFONTEIN	334	8	707	208	12	0.24	0.15	0.08
MMS	1371	7	1985	41	13	0.16	0.13	0.93
MATLA	436	9	860	2	54	-	-	-
KOORNFONTEIN	352	8	-	107	36	0.88	-	0.32
GREENSIDE	1912	9	2321	73	53	-	-	-
EIKEBOOM	62	8	-	34	-	-	-	-

NOTE: '-' indicates no data available

Water from all sites is unsuitable for irrigation, based on the limited data available

PARAMETER	SO_4	TDS	Na	Cl	Ca	Mg	Fe	Al	Mn
UNITS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
AGRICULTURE: LIVESTOCK WATERING	**1000**	**1000**	**2000**	**3000**	**1000**	**500**	**10**	**5**	**10**
GOEDEHOOP	355	-	-	-	-	-	-	-	-
ARNOT	249	-	74	50	-	-	-	-	-
WOESTALLEEN	1866	-	100	-	33	21	-	0.1	-
KRIEL	165	482	113	28	22	18	0.02	0.28	0.01
KLEINKOPJE	1904	-	-	-	-	-	-	-	-
SYFERFONTEIN	334	707	208	12	23	20	0.24	0.15	0.08
MMS	1371	1985	41	13	-	-	0.16	0.13	0.93
MATLA	436	860	2	54	46	-	-	-	-
KOORNFONTEIN	352	-	107	36	-	33	0.88	-	0.32
GREENSIDE	1912	2321	73	53	36	-	-	-	-
EIKEBOOM	62	-	34	-	-	21	-	-	-

NOTE: '-' indicates no data available

Water from Woestalleen, Kleinkopje, Middelburg (MMS) and Greenside is unsuitable for livestock watering, based on the limited data available

PARAMETER	pH	TDS	Cl	Fe	Al	Mn
UNITS		mg/l	mg/l	mg/l	mg/l	mg/l
AQUACULTURE	6.5-9	2000	600	0.01	0.01	0.1
GOEDEHOOP	8	-	-	-	-	-
ARNOT	8	-	50	-	-	-
WOESTALLEEN	8	-	-	-	0.1	-
KRIEL	9	482	28	0.02	0.28	0.01
KLEINKOPJE	8	-	-	-	-	-
SYFERFONTEIN	8	707	12	0.24	0.15	0.08
MMS	7	1985	13	0.16	0.13	0.93
MATLA	9	860	54	-	-	-
KOORNFONTEIN	8	-	36	0.88	-	0.32
GREENSIDE	9	2321	53	-	-	-
EIKEBOOM	8	-	-	-	-	-

NOTE: '-' indicates no data available

Only the water from Goedehoop, Arnot, Kleinkopje, Matla and Eikeboom, is suitable for aquaculture, based on the limited data available

PARAMETER	Cl	Al
UNITS	mg/l	mg/l
AQUATIC ECOSYSTEMS	200	5-10
GOEDEHOOP	-	-
ARNOT	50	-
WOESTALLEEN	-	0.1
KRIEL	28	0.28
KLEINKOPJE	-	-
SYFERFONTEIN	12	0.15
MMS	13	0.13
MATLA	54	-
KOORNFONTEIN	36	-
GREENSIDE	53	-
EIKEBOOM	-	-

NOTE: '-' indicates no data available

Water from all sites is suitable for aquatic ecosystems, based on the limited data available

A.2 South African Water Quality Guidelines

A.2.1 Domestic use: Volume 1

	ELEMENT	VALUE	UNITS	MEASUREMENT
1	ALGAE			
	Chlorophyll *a*	1-15	*µg/l chl a*	Algal cell/colony counts
	Blue-green algae	50-1400	*cells/ml*	Algal cell/colony counts
	Microsystins	0.8-1	*µg/l*	Algal cell/colony counts
2	ALUMINIUM	0.15-0.5	*mg/l*	Dissolved Al concentration I.e. Al which passes through a 0.45 µm membrane filter.
3	AMMONIA	1.0-2.0	*mg/l N*	Free ammonia nitrogen concentration I.e. sum of NH3 and NH4 nitrogen concentrations.
4	ARSENIC	10-200	*µg/l*	Atomic absorption spectrometry (AAS) with hydride generation. Various forms of arsenic are converted to As(V) and then reduced to As(III).
5	ASBESTOS	$1x10^{7}$	*fibres/l*	Total asbestos fibre counts/l.
6	ATRAZINE	2-20	*µg/l*	Total extractable atrazine concentration
7	CADMIUM	10-20	*µg/l*	Total cadmium concentrations
8	CALCIUM	32-80	*mg (Ca)/l*	Dissolved calcium concentration
9	CHLORIDE	100	*mg / l*	Dissolved chloride concentration
10	CHROMIUM (VI)	0.05	*mg / l*	Diphenyl carbazide spectrophotometry
11	COLOUR		dominant wavelength, luminance (%), purity (%), colour	Pt-Co colour units or spectrophotometric methods
12	COPPER	1.00	*mg / l*	Total copper concentration
13	CORROSION	positive = scale-forming tendency		Langlier index = (actual pH of water) - (hypothetical pH of water if it were in eq. With solid CaCO3)
		<6.5 = scale-forming >6.5 = corrosive		Ryznar index (RI) = 2x(saturation pH) - (actual pH)
		>0.1		Corrosion ratio: >0.1 = progressive corrosion I.e. aggressive waters
		10.00		Aggressiveness index: >10 = aggressive waters

14	**DISSOLVED ORGANIC CARBON**	5	*mg C / l*	DOC = persulphate-ultraviolet oxidation; TOC = combustion-infrared; COD = dichromate sulphuric acid digestion; BOD = five-day water sample
15	**FLUORIDE**	1	*mg / l*	Dissolved fluoride concentration
16	**INDICATOR ORGANISMS**			
	E. coli			Faecal coliforms which test indole-positive at 44.5C and generally consists only of E.coli which is definitely of faecal origin.
	Enterococci			Bacteria which produce typical reddish colonies on m-Enterococcus agar after 48hrs incubation at 35C. Faecal streptococci (sub-group) of proven faecal origin.
	Somatic coliphages			Indicate faecal pollution.
	F-RNA coliphages			Highly specific indicators of faecal pollution.
	Heterotrophic bacteria	100	*(number of colonies) / ml*	Heterotrophic plate counts: pour plates, spread plates and membrane filtration methods.
	Total coliforms	5	*counts / 100ml water*	Membrane filtration, pour plates and multiple tube fermentation techniques. **Note: some bacteria classified as coliforms are NOT of faecal origin!** All bacteria which produce colonies with a metallic sheen within 24hrs of incubation at 35C on m-Endo agar. Indicates general sanitary quality of water.
	Faecal coliforms	0	*counts / 100ml water*	All bacteria which produce typical blue colonies on m-FC agar within 24hrs of incubation at 44.5C. Indicates faecal pollution of wastewater, raw water supplies and recreational water bodies. Membrane filtration, pour plates and multiple tube fermentation techniques.
	Coliphages	10	*counts / 100ml water*	Bacterial viruses which infect and replicate in E. coli. Indicators of faecal pollution and may indicate the presence of pathogenic viruses.
	Enteric viruses	1	*TCID50/10 l*	Cool 100 l water samples to 4-10C immediately. Adsorption-eluption techniques.

	Protozoan parasites	>1	*(cysts or oocysts / 10 l)*	Fluorescent-conjugated antibody staining. No standard monitoring practices, concentration procedures or detection methods. *Giardia lambia* and *Cryptosporidium parvum* infect humans.
17	**IRON**	0.3	*mg / l*	Total iron concentration, which requires acidification prior to filtration before AAS analysis.
18	**LEAD**	10	*µg/l*	Total lead concentration, measured using dithizone or AAS.
19	**MAGNESIUM**	30	*mg / l as Mg*	AAS using a phosphate interference inhibitor and an ionisation suppressant
20	**MANGANESE**	0.05	*mg / l*	Total Mn measured using AAS with an air-acetylene flame.
21	**MERCURY**	1	*µg / l*	Total mercury concentrations (both dissolved and particulate forms must be measured).
22	**NITRATE**	6	*mg / l N*	Concentration of nitrate plus nitrite nitrogen, determined by cadmium reduction followed by diazotisation.
23	**ODOUR**	1	*TON*	Threshold odour number (TON) I.e. greatest dilution of a sample with odour-free water that yields a final water with an odour which is just detectable by a panel of judges under carefully controlled test conditions.
24	**pH**	6.0-9.0	*pH units*	Measured electrometrically using a calibrated pH meter and temperature should always be recorded.
25	**PHENOLS**	1	*µg / l*	Total concentration of phenols.
26	**POTASSIUM**	50	*mg / l*	Dissolved potassium concentration.
27	**RADIOACTIVITY (Gross alpha activity)**	0.5	*Bq / l*	Radioactive nuclides are measured by the detection of emissions from alpha and beta particles or gamma rays. They are presented as disintegrations per second.
	Uranium	0.89	*Bq / l*	U238
	Thorium	0.228	*Bq / l*	Th232
	Radium	>0.42	*Bq / l*	Rd226
	Radon	11	*Bq / l*	Rd222
	Gross Beta activity	1.38	*Bq / l*	Gross Beta activity
	Radium	0.42	*Bq / l*	Rd228
28	**SELENIUM**	20	*µg / l*	Total selenium concentration
29	**SETTLEABLE MATTER**	Qualitative		Settleable solids concentration determined by the volumetric and/or gravimetric method. Responsible for erosion, corrosion etc.
30	**SODIUM**	100	*mg / l*	Dissolved sodium concentration

31	**SULPHATE**	200	*mg / l*	Dissolved sulphate concentration
32	**TRIHALO-METHANES**	100	*µg / l*	Total THM concentration
33	**TDS**	450	*mg / l*	TDS concentration and/or EC (mS/m)
34	**TOTAL HARDNESS**	100	*mg CaCO3 / l*	Calculated from Ca and Mg concentrations
35	**TURBIDITY**	5	*NTU*	Turbidity should be measured in nephelometric turbidity units on the day of sample collection.
36	**VANADIUM**	0.1	*mg / l*	Total vanadium concentration.
37	**ZINC**	3	*mg / l*	Total zinc concentration

A.2.2 Recreational use: Volume 2

	ELEMENT	VALUE	UNITS	MEASUREMENT
1	ALGAE	15	*µg/l chl a*	Measurement of the chlorophyll *a* concentration
2	CHEMICAL IRRITANTS	Qualitative		Depends on chemical type.
3	CLARITY	3	*Secchi disc depth, metres*	Secchi disk visibility in metres
4	FLOATING MATTER & REFUSE	Qualitative		Presence, amount and type determined qualitatively
5	INDICATOR ORGANISMS	Qualitative	*counts*	Depends on organism
	Faecal Coliforms	130	*counts/ 100 ml*	
	E. coli	130	*counts/ 100 ml*	
	Enterococci: Faecal Streptococci	30	*counts/ 100 ml*	
	Coliphages	20	*counts/ 100 ml*	
	Enteric viruses	1	*$TCID_{50}$/10l*	
	Schistosoma / Bilharzia	Qualitative		
6	NUISANCE PLANTS	Qualitative		
7	ODOUR	Qualitative		
8	pH	6.5-8.5	*pH units*	Measured electrometrically using a pH meter

A.2.3 Industrial use: Volume 3

		CATEGORY				
	ELEMENT	1	2	3	4	MEASUREMENT
1	ALKALINITY	50	120	300	1 200	Total alkalinity concentration
2	C.O.D.	10	15	30	75	Oxygen equivalent of the oxidisable matter in a sample following oxidation with a strong chemical oxidant
3	CHLORIDE	20	40	100	500	Dissolved chloride concentration
4	IRON	0.1	0.2	0.3	10	Total iron concentration, which requires acidification prior to filtration before AAS analysis.
5	MANGANESE	0.05	0.1	0.2	10	Total Mn measured using AAS with an air-acetylene flame.
6	pH	7 - 8	6.5 - 8	6.5 - 8	5 - 10	Measured electrometrically using a calibrated pH meter and temperature should always be recorded.
7	SILICA	5	10	20	##	Dissolved silica concentration
8	SULPHATE	30	80	200	##	Dissolved sulphate concentration
9	SUSPENDED SOLIDS	3	5	5	25	Measured as the mass of material retained on a glass fibre filter after drying at 103 - 105C
10	TDS	100	200	450	##	TDS concentration and/or EC (mS/m)
11	TOTAL HARDNESS	50	100	250	1 000	Calculated from Ca and Mg concentrations

A.2.4 Agricultural use - Irrigation: Volume 4

	ELEMENT	VALUE	UNITS	MEASUREMENT
1	ALUMINIUM	5	*mg / l*	Dissolved Al concentration
2	ARSENIC	0.1	*mg / l*	Total As concentration
3	BERYLLIUM	0.1	*mg / l*	Total beryllium concentration
4	BORON	0.5	*mg / l*	Total dissolved boron concentration.
5	CADMIUM	0.05	*mg / l*	Total cadmium concentration
6	CHLORIDE	140	*mg / l*	Dissolved chloride concentration
7	CHROMIUM (VI)	1	*mg / l*	Total chromium concentration
8	COBALT	5	*mg / l*	Total cobalt concentration
9	COLIFORMS (Faecal)	10 000	*counts / 100ml water*	All bacteria which produce typical blue colonies on M-FC agar within 24hrs of incubation at 44.5C.
	E. coli	1	*E. coli counts / 100ml water*	
10	COPPER	5	*mg / l*	Total copper concentration
11	FLUORIDE	15	*mg / l*	Dissolved fluoride concentration
12	IRON (crop yield)	5	*mg / l*	Total iron concentration
	IRON (equipment)	0.2	*mg / l*	Total iron concentration
13	LEAD	0.2	*mg / l*	Total lead concentration
14	LITHIUM	2.5	*mg / l*	Measured by flame emission photometry
15	MANGANESE (crop yield)	10	*mg / l*	Total manganese
	MANGANESE (equipment)	0.1	*mg / l*	Total manganese
16	MOLYBDENUM	0.05	*mg / l*	Total molybdenum concentrations
17	NICKEL	0.2	*mg / l*	Total nickel concentration
18	NITROGEN (inorganic)	5	*mg / l*	Concentration of inorganic nitrogen in water determined by adding concentrations of ammonia, nitrite and nitrate.
	NITROGEN (equipment)	0.5	*mg / l*	As above.
19	pH	6.5-8.4	pH units	Measured electrometrically using a pH meter

20	**SCALING / CORROSION**	-0.2 - +0.2	*Langlier Index Range*	Langlier Index
		>12	*AI*	Aggressiveness Index
		<6.5	*Ryznar index*	Scale-forming
		>6.5	*Ryznar index*	Corrosive
21	**SELENIUM**	0.05	*µg / l*	Total selenium concentration
22	**SODIUM ADSORPTION RATIO**	2	*SAR Range*	SAR=[sodium] / ([calcium] + [magnesium]) *0.5
23	**SODIUM**	70	*mg / l*	Dissolved sodium concentration
24	**SUSPENDED SOLIDS**	50	*mg / l*	Suspended solids are measured as the mass of material retained on a glass fibre filter after drying at 103-105C.
25	**TOTAL DISSOLVED SOLIDS**	40	*mS/m*	The TDS concentration can be measured as: an estimate based on the EC value; the dry weight of the salts after evaporation of a known volume of filtered water; and the sum of the concentrations of the constituent cations and anions.
26	**URANIUM**	0.1	*mg / l*	Can be chemically measured as mg / l or radiologically measured as Bq / l.
27	**VANADIUM**	1	*mg / l*	Total vanadium concentration
28	**ZINC**	5	*mg / l*	Total zinc concentration

A.2.5 Agricultural use - Livestock watering: Volume 5

	ELEMENT	VALUE	UNITS	MEASUREMENT
1	ALGAE	<6 colonies of blue-green algae / 0.5 ml	*cells / ml*	Blue-green cells are measured in the top meter of water
2	ALUMINIUM	5	*mg/l*	Dissolved Al concentration I.e. Al which passes through a 0.45 µm membrane filter.
3	ARSENIC	1	*mg/l*	Atomic absorption spectrometry (AAS) with hydride generation. Various forms of arsenic are converted to As(V) and then reduced to As(III).
4	BORON	5	*mg/l*	Total dissolved boron concentration
5	CADMIUM	0.01	*mg/l*	Total cadmium concentrations
6	CALCIUM	1 000	*mg/l*	Dissolved calcium concentration
7	CHLORIDE	3 000	*mg / l*	Dissolved chloride concentration
8	CHROMIUM (VI)	1	*mg / l*	Total chromium concentration
9	COBALT	1.00	*mg / l*	Total cobalt concentration
10	COPPER	1.00	*mg / l*	Total copper concentration
11	FLUORIDE	2	*mg / l*	Dissolved fluoride concentration
12	IRON	10	*mg / l*	Total iron concentration, which requires acidification prior to filtration before AAS analysis.
13	LEAD	0.2	*mg / l*	Total lead concentration, measured using dithizone or AAS.
14	MAGNESIUM	500	*mg / l*	Total magnesium concentration
15	MANGANESE	10	*mg / l*	Total Mn measured using AAS with an air-acetylene flame.
16	MERCURY	1	*µg / l*	Total mercury concentrations (both dissolved and particulate forms must be measured).
17	MOLYBDENUM	0.01	*mg / l*	Total molybdenum concentrations
18	NICKEL	5	*mg / l*	Total nickel concentration
19	NITRATE / NITRITE	200	*mg / l*	Concentration of nitrate plus nitrite nitrogen, determined by cadmium reduction followed by diazotisation.
20	PATHOGENS	1000	*counts / 100ml water*	Faecal coliforms are used as indicator bacteria to test for the possible presence of pathogens.
21	PESTICIDES	0.1 (wide range)	*µg / l*	Concentration determined by chromatographic methods
22	SELENIUM	50	*µg / l*	Total selenium concentration

23	SODIUM	2000	*mg / l*	Dissolved sodium concentration
24	SULPHATE	1000	*mg / l*	Dissolved sulphate concentration
25	TDS	1000	*mg / l*	TDS concentration and/or EC (mS/m)
26	VANADIUM	1	*mg / l*	Total vanadium concentration.
27	ZINC	20	*mg / l*	Total zinc concentration

A.2.6 Agricultural use - Aquaculture: Volume 6

	ELEMENT	VALUE	UNITS	MEASUREMENT
1	ALGAE	Qualitative		Blooms of single-celled algae are estimated from the concentration of chlorophyll *a*
2	ALKALINITY	20 - 100	*mg CaCO3/l*	Measured by titration of the water sample with a strong acid (usually HCl), of known concentration to an end point pH of between 8 - 10.
3	ALUMINIUM	0.03	*mg Al^{3+}/l*	Dissolved Al concentration I.e. Al which passes through a 0.45 µm membrane filter.
4	AMMONIA	0.025 or 0.3	*mg NH_3/l*	Based on the un-ionised ammonia fraction. Values given for cold-water and warm-water fish respectively.
5	ARSENIC	0.05	*mg/l*	Atomic absorption spectrometry (AAS) with hydride generation. Various forms of arsenic are converted to As(V) and then reduced to As(III).
6	BACTERIA			Bacterial diagnosis: fish surface is disinfected, samples taken from blood and kidney, streaked and incubated for 24 - 48 hours at 28C. Isolated types of bacteria can then be characterised.
	E. coli	10 *E. coli /g of fish flesh*	*counts/ 100ml water*	Counted from cultures on agar plates
7	CADMIUM	0.2	*µg/l*	Soluble cadmium concentration. (Value given depends on water hardness values)
8	CARBON DIOXIDE	12	*mg/l*	Concentrations of individual dissolved gases expressed in mg/l, ml/l or as a %saturation or partial pressure
9	CHLORIDE	600	*mg / l*	Dissolved chloride concentration. (Value given is a tentative guideline).
10	CHLORINE	1	*µg HOCL/l*	Total chlorine concentration
11	CHROMIUM (VI)	20	*µg/l*	Necessary to assume all chromium present is chromium VI
12	COPPER	0.01	*mg / l*	Total copper concentration
13	CYANIDE	0.02	*mg/l*	Acid distillation followed by colorimetry.
14	DISSOLVED OXYGEN	5 - 9	*mg / l*	Use Winkler method to give DO concentration

15	**HERBICIDES**	0.1 - 3	*mg/kg*	Wet weight. (Values have a wide range depending on particular herbicide. Value for Benomyl has been given as it is lowest).
16	**IRON**	0.01	*mg / l*	Soluble iron concentration
17	**LEAD**	0.01	*mg Pb/l*	Total lead concentration
18	**MANGANESE**	0.1	*mg / l*	Total manganese
19	**MERCURY**	1	*µg Hg / l*	Total mercury concentrations (both dissolved and particulate forms must be measured).
20	**NITRATE**	300	*mg NO_3^- N/ l*	Concentration of nitrate-nitrogen
16	**NITRITE**	0.05	*mg NO_2^- N/ l*	Concentration of nitrate-nitrogen
17	**NUISANCE PLANTS**	<10%		Estimate of the proportion of the water body covered.
18	**PARASITES**			Microscopic examination of gills, skin and internal organs of the fish.
19	**PCBs**	Qualitative		Measured by gas chromatography after solvent extraction.
20	**PESTICIDES**	0.05	*mg wet weight / kg*	Wet weight. (Value given is the smallest value and depends on particular pesticide).
21	**pH**	6.5-9	*pH units*	
22	**PHENOLS**	1	*mg / l*	Total concentration of phenols.
23	**PHOSPHOROUS**	0.1	*mg/l*	Soluble orthophosphate concentration
24	**SELENIUM**	0.3	*mg Se(VI)/l*	Total selenium concentration
25	**SULPHIDE**	0.001	*mg H_2S/l*	Un-ionised hydrogen sulphide
26	**TEMPERATURE**	12/25/28	*°C*	Degrees Celsius. (Values given are those for cold -, intermediate- and warm-water species respectively).
27	**TOTAL DISSOVED GASES**	100	*%TGP*	Saturation level i.e. % Total Gas Pressure
28	**TDS**	2	*g/l*	TDS concentration and/or EC (mS/m)
29	**TOTAL HARDNESS**	20-100	*mg $CaCO_3$ / l*	Calculated from Ca and Mg concentrations

30	**TOTAL SUSPENDED MATTER**	20 000	*mg/l*	Measured by weighing the residue collected on a 0.2-0.5 µm filter from a known volume evaporated to dryness at a temperature below 70C.
26	**VIRUSES**	Qualitative		Serum neutralisation
27	**ZINC**	0.03	*mg / l*	Soluble zinc concentrations. (Dependent on water hardness).

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	ELEMENT	VALUE	UNITS	MEASUREMENT
1	ALUMINIUM	5 (pH<6) - 10 (pH>6.5	µg / l	Acid-soluble aluminium concentration
2	AMMONIA	7	µg N / l	Total ammonia concentration I.e. sum of ammonia and ammonium concentrations
3	ARSENIC	10	µg / l	Dissolved arsenic
4	ATRAZINE	10	µg / l	Gas chromatography after solvent extraction and clarification
5	CADMIUM	0.25	µg / l	Total cadmium concentration I.e. dissolved + particulate forms
6	CHLORINE	0.2	µg Cl_2 / l	Total residual chlorine concentration
7	CHROMIUM	7-12	µg / l	Dissolved concentration of chromium III and chromium VI
8	COPPER	0.8	µg / l	Dissolved copper
9	CYANIDE	1	µg / l	Free cyanide concentration
10	DISSOLVED OXYGEN	80% - 100% of saturation		The lowest instantaneous concentration recorded in a 24-hour period.
11	ENDOSULFAN	0.01	µg / l	Gas chromatography after solvent extraction and clarification
12	FLUORIDE	750	µg / l	Dissolved fluoride concentration
13	IRON (crop yield)	<10% variation from backgroun d dissolved Fe concentra-tion	µg / l	Dissolved iron concentrations
14	LEAD	0.5	µg / l	Dissolved lead concentration
17	NITROGEN (inorganic)	0.5	mg / l	Concentration of inorganic nitrogen in water determined by adding concentrations of ammonia, nitrite and nitrate.
18	pH	<5% variation from backgroun d pH values	pH units	Calculated from the mean hydrogen ion concentration
19	PHENOL	30	µg / l	Gas chromatography
20	PHOSPHORUS (inorganic)	5-25	µg / l	Orthophosphates, total inorganic phosphate or total dissolved phosphorous
21	SELENIUM	2	µg / l	Dissolved selenium concentration

22	**TEMPERATURE**	<2°C variation from background average daily water temperature	°C	Celsius value recorded over 24hr period
24	**TOTAL DISSOLVED SOLIDS**	<15% variation from normal cycles of water body	*mS/m*	The TDS concentration can be measured as: an estimate based on the EC value; the dry weight of the salts after evaporation of a known volume of filtered water; and the sum of the concentrations of the constituent cations and anions.
25	**TOTAL SUSPENDED SOLIDS**	<10% increase relative to background TSS concentra-tions	*mg / l*	Measured gravimetrically
26	**ZINC**	5	*mg / l*	Total zinc concentration