

Rand Water

Quarterly Water Quality Status of the Vaal Dam Reservoir Catchment

Oct 2017 - Sept 2018



Sample Points	Sample Point Description	Quarter	Ammonia	Chemical Oxygen Demand	Chloride	Conductivity	E.coli	Fluoride	M-Alkalinity	Nitrate	pH	Phosphate	Sulphate
VSS	Sandspruit below Vaal River @ Klipplaatsdrift 27° 12.508'S 29° 26.225'E	1	<0.092	22	22	44		0.35	165	0.44	7.6	0.20	59
		2	<0.05	16	11	30		0.33	133	<0.44	7.2	<0.2	21
		3	<0.05	23	12	37		<0.19	145	<0.44	8.0	<0.2	34
		4	0.05	21	15	59		0.21	227	<0.44	8.3	<0.22	49
KB	Klip River @ Barnardskop 27° 28.203'S 29° 36.032'E	1	<0.092	21	11	22		0.19	79	0.44	7.5	0.20	6
		2	<0.05	17	6	22		<0.19	112	0.10	7.3	<0.2	17
		3	<0.05	18	8	15		<0.19	81	<0.44	7.4	<0.2	7
		4	<0.05	27	11	19		<0.19	61	<0.44	7.6	<0.2	14
KW	Klip @ Winkelhaak 27° 14.694'S 29° 23.996'E	1	<0.092	24	12	42		0.27	180	0.44	8.0	0.20	12
		2	<0.05	19	6	22		<0.19	100	<0.44	6.9	0.21	11
		3											
		4											
KD	Klip River @ De Langesdrift 27° 10.964'S 29° 14.097'E	1	<0.092	21	14	34		0.28	145	0.44	7.4	0.20	27
		2	0.27	17	7	23		0.36	85	0.54	7.3	<0.2	15
		3	<0.05	17	11	31		<0.19	140	<0.44	7.7	<0.2	19
		4	<0.05	56	13	40		0.26	173	<0.44	8.1	<0.2	28
KSV	Spruitsonderdrift downstream of Vrede 27° 21.137'S 29° 10.281'E	1	0.51	31	40	52		0.26	200	0.98	7.4	0.60	39
		2	<0.05	22	21	52		0.32	198	0.29	7.6	<0.2	33
		3	0.07	20	22	48		0.22	208	0.99	8.1	<0.2	37
		4	0.58	19	39	64		0.27	260	1.52	8.2	0.46	63
VDS	Vaal River downstream of Standerton 27° 0.933'S 29° 1.488'E	1	<0.092	26	22	35		0.27	110	0.44	7.1	0.20	32
		2	0.05	14	9	27		0.39	105	<0.1	7.7	<0.2	21
		3	<0.05	16	14	32		0.19	142	<0.44	7.8	<0.2	26
		4	0.11	16	19	48		0.23	175	0.51	7.9	<0.2	35
VGB	Gladdedrift Bridge @ Villiers 26° 59.521'S 28° 43.786'E	1	0.20	19	14	34		0.22	120	0.62	7.3	<0.2	28
		2	0.25	24	12	23		0.22	101	0.53	7.2	<0.2	19
		3	0.07	15	13	29		<0.19	94	<0.44	7.7	<0.2	25
		4	7.56	13	35	44		0.28	178	<0.44	8.1	2.20	38
VV	Vaal @ Villiers 27° 1.389'S 28° 35.631'E	1	0.38	24	27	34	355	0.25	120	0.74	7.2	<0.2	34
		2	<0.2	22	9	29	980	0.38	78	0.88	7.6	0.11	26
		3	0.08	18	15	36	1 388	0.20	115	<0.44	7.8	<0.1	27
		4	0.17	13	21	44	1 193	0.25	172	<0.44	8.1	<0.2	35
VD4I	Vaal Dam 4 Integrated - Vaal River upstream of Vaal Marina 26° 55.366'S 28° 17.219'E	1	<0.092	16	<10	26	4	0.23	77	0.44	7.7	0.20	17
		2	<0.05	20	15	28	2	0.26	375	<0.44	7.7	<0.2	30
		3	<0.05	27	10	29	2	0.20	75	<0.44	7.7	0.10	19
		4	<0.05	17	9	20	1	0.21	70	<0.44	7.9	<0.2	21
WF	Wilge River @ Frankfort 27° 16.311'S 28° 29.489'E	1	0.14	20	<10	13	7 120	0.19	50	0.44	7.0	<0.2	6
		2	<0.2	18	3	16	727	0.22	78	4.30	7.5	0.10	16
		3	0.07	26	4	18	306	<0.19	58	<0.44	7.5	<0.2	8
		4	0.08	20	6	13	348	<0.19	47	<0.44	7.5	<0.2	13
VD3I	Vaal Dam 3 Integrated - Wilge River downstream of Oranjeville 26° 56.208'S 28° 12.699'E	1	<0.092	13	12	17	2	0.19	61	0.44	7.4	0.20	11
		2	<0.05	15	4	15	0	<0.19	365	<0.44	7.4	<0.2	9
		3	<0.05	25	5	18	3	<0.19	59	<0.44	7.6	<0.2	11
		4	<0.05	15	5	16	2	<0.19	55	0.44	7.8	<0.2	11
VD2I	Vaal Dam 2 Integrated - Confluence of Vaal & Wilge 26° 54.484'S 28° 11.933'E	1	<0.092	14	<10	22	3	0.19	58	0.44	7.3	0.20	13
		2	<0.05	11	7	18	0	<0.19	335	<0.44	7.6	<0.2	14
		3	<0.05	20	7	19	14	<0.19	65	<0.44	7.7	<0.2	16
		4	<0.05	12	6	18	2	<0.19	62	<0.44	7.8	<0.2	14



Sample Points	Sample Point Description	Quarter	Ammonia	Chemical Oxygen Demand	Chloride	Conductivity	E.coli	Fluoride	M-Alkalinity	Nitrate	pH	Phosphate	Sulphate
VD1I	Vaal Dam 1 Integrated @ RW Intake 26° 53.075'S 28° 7.329'E	1	<0.092	12	13	15	3	0.19	54	0.44	7.5	0.20	51
		2	<0.092	12	13	15	3	0.19	54	0.44	7.5	0.20	51
		3	<0.05	21	11	25	11	<0.19	76	<0.44	7.8	1.10	104
		4	<0.05	12	7	20	2	<0.19	66	<0.44	7.8	<0.2	16
KLIPR_VDAM	Klip River inflow to Vaal Dam 27° 7.735'S 28° 17.028'E	1	0.15	28	<10	29		0.19	100	0.44	7.2	<0.2	10
		2	<0.2	37	5	23		0.38	62	0.79	7.3	<0.1	18
		3	0.05	31	9	21		<0.19	80	<0.44	7.4	<0.2	12
		4	0.01	19	10	21		<0.19	76	<0.44	7.7	<0.2	14

Key

VD1I	Vaal Dam 1 Integrated @ RW Intake 26° 53.075'S 28° 7.329'E	1	0.05	- 1 Oct to 31 Dec 2017
		2	<0.092	- 1 Jan to 31 Mar 2018
		3	<0.092	- 1 Apr to 30 Jun 2018
		4	<0.05	- 1 Jul to 31 Sept 2018

Water Quality Guidelines

	- Ideal
	- Acceptable
	- Tolerable
	- Unacceptable

Sewage Works Compliance (where applicable) to General Standard (GN 1191 Oct 1999)

Sample Points	Sample Point Description	Quarter	Ammonia	Chemical Oxygen Demand	Chloride	Conductivity	Faecal coliforms	Fluoride	M-Alkalinity	Nitrate	pH	Phosphate	Sulphate	
S-ST_NEW	Standerton Sewage Works 26° 58.453'S 28° 12.260'E	1	21.00	63	54	69	1 019 367	0.38	193	<0.44	7.1	2.63	48	
		2	27.67	112	50	78	1 753 833	0.51	273	<0.44	7.1	3.47	29	
		3	13.60	102	69	84	938 967	0.26	228	2.60	7.2	1.84	54	
		4	24.00	93	64	77	1 105 333	0.28	171	1.20	7.4	3.43	50	
S-DENEYSVILLE	Final Effluent of Deneysville WWTW 26° 53.103'S 28° 6.692'E	1												
		2	4.05	48	35	49	4 408	0.28	104	6.53	6.9	3.10	40	
		3												
		4												
S-FRANKF_NAMAHA	Final Effluent of Frankfort Namahadi 27° 15.691'S 28° 29.503'E	1	9.20	62	82	54	550	0.19	160	3.40	7.1	4.20	28	
		2	9.20	39	36	44	87	0.24	138	4.98	7.7	3.75	35	
		3	8.23	42	51	61	250	<0.19	158	3.97	7.6	3.30	54	
		4	13.00	31	41	56	581	<0.19	135	4.50	7.4	2.80	38	
S-FRANKF_OXLP	Final Effluent of Frankfort Oxidation Ponds 27° 17.453'S 28° 29.276'E	1	6.70	86	42	57	3 660	0.26	185	0.44	7.1	2.70	35	
		2	<0.2	56	43	54	2 324	0.28	143	0.79	8.6	1.27	28	
		3	<0.2	44	47	44	100	<0.19	150	<0.44	9.4	0.76	25	
		4	9.18	64	51	63	28	0.23	209	<0.44	8.3	2.42	32	
S-ORANJEVILLE	Final Effluent of Oranjeville WWTW 26° 58.804'S 28° 12.597'E	1	12.00	43	33	50	39 860	0.19	130	6.80	6.9	3.20	26	
		2	9.53	30	28	49	1 012 691	0.41	120	6.71	7.2	2.60	27	
		3	13.52	31	35	159	778 203	<0.19	112	13.64	7.1	3.15	26	
		4	19.00	47	39	55	455 960	<0.19	134	15.00	7.4	4.10	24	
S-VAAL_MARINA	Final Effluent of Vaal Marina WWTW 26° 53.324'S 28° 12.838'E	1	0.15	20	38	50	660	0.19	88	24.00	7.0	3.20	38	
		2	1.07	20	55	59	13 614	0.30	121	8.52	7.3	3.75	38	
		3	0.57	15	44	57	798	<0.19	107	15.60	7.7	2.62	42	
		4	0.30	21	48	60	20	<0.19	76	24.20	7.7	3.12	44	
S-VILLIERS	Final Effluent of Villiers WWTW 27° 1.908'S 28° 35.366'E	1	18.00	140	100	100	354 260	0.31	285	0.44	7.0	2.20	60	
		2	20.00	109	83	82	499 539	0.48	199	0.49	7.3	2.95	43	
		3	17.40	127	70	87	780 067	0.22	227	0.77	7.3	1.23	60	
		4	26.33	192	75	101	1 802 480	0.28	337	1.10	7.5	2.50	46	

Key

S-VAAL_MARINA	Final Effluent of Vaal Marina WWTW 26° 53.324'S 28° 12.838'E	1	0.15	- 1 Oct to 31 Dec 2017
		2	1.07	- 1 Jan to 31 Mar 2018
		3	0.57	- 1 Apr to 30 Jun 2018
		4	0.30	- 1 Jul to 31 Sept 2018

Water Quality Guidelines

	- Acceptable
	- Unacceptable

In-stream Water Quality for the Vaal Dam Catchment

Variables	Measured as	Ideal Catchment Background	Acceptable Management Target	Tolerable Interim Target	Unacceptable
Physical					
Conductivity	mS/m	< 10	10 - 30	30 - 45	> 45
pH	pH units	6.5 - 8.5			< 6.5; > 8.5
Organic					
Chemical Oxygen Demand (COD)	mg/l	< 10	10 - 15	15 - 20	> 20
Macro Elements					
Ammonia (NH ₄)	mg/l	< 0.2	0.2 - 0.5	0.5 - 1.0	> 1.0
Chloride (Cl)	mg/l	< 25	25 - 50	50 - 75	> 75
Fluoride (F)	mg/l	< 0.05	0.05 - 0.20	0.20 - 0.40	> 0.40
Alkalinity	CaCO ₃ mg/l	< 40	40 - 75	75 - 120	> 120
Nitrate (NO ₃)	mg/l	< 0.1	0.1 - 0.2	0.2 - 0.3	> 0.3
Phosphate (PO ₄)	mg/l	< 0.05	0.05 - 0.25	0.25 - 0.50	> 0.50
Sulphate (SO ₄)	mg/l	< 20	20 - 45	45 - 70	> 70
Bacteriological					
<i>E.coli</i>	counts/100ml	< 10	10 - 60	60 - 120	> 120
<i>Faecal coliforms</i>	counts/100ml		< 126	126 - 1000	> 1000

Sewage Works Compliance to General Standard (GN 1191 Oct 1999)

Variables	Measured as	Acceptable Management Target	Unacceptable
Physical			
Conductivity	mS/m	< 150	>= 150
pH	pH units	5.5 - 9.5	< 5.5; > 9.5
Organic			
Chemical Oxygen Demand (COD)*	mg/l	< 75	>= 75
Macro Elements			
Ammonia (NH ₄)	mg/l	< 3	>= 3
Fluoride (F)	mg/l	< 1	>= 1
Nitrate (NO ₃)	mg/l	< 15	>= 15
Phosphate (PO ₄)	mg/l	< 10	>= 10
Bacteriological			
<i>Faecal coliforms</i>	counts/100ml	< 1,000	>= 1,000

*After removal of algae

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