

# Rand Water

## Quarterly Water Quality Status of the Vaal Dam Reservoir Catchment

1 July 2018 - 30 June 2019



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	0.05	21	15	59		0.21	227	<0.44	8.3	<0.22	49
		2	0.01	12	20	55		0.38	228	<0.50	8.3	<0.25	50
		3	0.14	14	12	36		0.55	132	<0.50	7.9	<0.25	45
		4	0.52	14	13	39		0.55	145	<0.50	8.2	<0.25	37
KB	Klip River @ Barnardskop 27° 28.203'S 29° 36.032'E	1	<0.05	27	11	19		<0.19	61	<0.44	7.6	<0.2	14
		2	0.02	13	26	20		0.42	63	2.00	7.9	<0.25	91
		3	0.07	13	6	14		0.22	49	<0.5	7.5	<0.25	7
		4	0.03	11	5	13		<0.2	30	<0.50	7.3	<0.25	6
KW	Klip @ Winkelhaak 27° 14.694'S 29° 23.996'E	1											
		2	0.02	<10	15	28		<0.2	110	<0.50	7.8	<0.25	14
		3	0.09	13	12	27		0.53	106	0.60	7.7	<0.25	20
		4											
KD	Klip River @ De Langesdrift 27° 10.964'S 29° 14.097'E	1	<0.05	56	13	40		0.26	173	<0.44	8.1	<0.2	28
		2	0.01	11	14	43		0.26	198	<0.50	8.0	<0.25	19
		3	0.13	13	10	28		0.48	114	0.61	7.6	<0.25	27
		4	0.01	12	7	20		0.27	84	<0.50	7.7	<0.25	14
KSV	Spruitsonderdrift downstream of Vrede 27° 21.137'S 29° 10.281'E	1	0.58	19	39	64		0.27	260	1.52	8.2	0.46	63
		2	1.28	37	34	71		0.34	273	1.11	7.9	1.18	32
		3	0.04	31	21	49		0.40	183	0.90	7.7	0.30	24
		4	0.08	23	45	65		0.60	166	0.83	8.1	<0.25	55
VDS	Vaal River downstream of Standerton 27° 0.933'S 29° 1.488'E	1	0.11	16	19	48		0.23	175	0.51	7.9	<0.2	35
		2	0.07	28	28	44		0.47	167	<0.5	8.0	<0.25	36
		3	0.07	20	16	31		0.45	113	0.78	7.4	<0.25	29
		4	0.05	18	16	30		0.44	105	<0.50	7.8	<0.25	29
VGB	Gladdedrift Bridge @ Villiers 26° 59.521'S 28° 43.786'E	1	7.56	13	35	44		0.28	178	<0.44	8.1	2.20	38
		2	0.01	19	24	51		0.27	205	<0.50	8.2	<0.25	41
		3	0.04	25	25	42		0.48	153	<0.5	7.8	0.46	41
		4	0.05	19	15	33		0.48	107	<0.50	7.9	<0.25	31
VV	Vaal @ Villiers 27° 1.389'S 28° 35.631'E	1	0.17	13	21	44	1 193	0.25	172	<0.44	8.1	<0.2	35
		2	0.33	17	31	52	308	0.36	190	0.82	7.9	<0.25	46
		3	0.09	25	34	47	663	0.63	142	1.14	7.6	<0.25	49
		4	0.06	23	20	34	998	0.53	87	0.55	7.5	<0.25	34
VD4I	Vaal Dam 4 Integrated - Vaal River upstream of Vaal Marina 26° 55.366'S 28° 17.219'E	1	<0.05	17	9	20	1	0.21	70	<0.44	7.9	<0.2	21
		2	0.03	19	10	21	12	0.26	72	<0.5	7.9	<0.25	24
		3	0.06	19	13	25	3	0.41	87	<0.50	8.2	<0.25	27
		4	0.06	16	11	23	17	0.40	82	<0.50	8.0	<0.25	24
WF	Wilge River @ Frankfort 27° 16.311'S 28° 29.489'E	1	0.08	20	6	13	348	<0.19	47	<0.44	7.5	<0.2	13
		2	0.12	<10	5	11	283	0.22	44	0.61	7.6	<0.25	14
		3	0.05	20	4	12	312	0.21	48	<0.50	7.6	<0.25	8
		4	0.05	14	3	18	1 323	0.27	54	<0.50	7.4	<0.25	9
VD3I	Vaal Dam 3 Integrated - Wilge River downstream of Oranjeville 26° 56.208'S 28° 12.699'E	1	<0.05	15	5	16	2	<0.19	55	0.44	7.8	<0.2	11
		2	0.02	22	5	15	10	0.21	56	<0.5	8.1	<0.25	14
		3	0.05	11	4	14	3	0.27	56	<0.50	7.9	<0.25	14
		4	0.09	20	5	15	21	0.26	55	<0.50	7.9	<0.25	18
VD2I	Vaal Dam 2 Integrated - Confluence of Vaal & Wilge 26° 54.484'S 28° 11.933'E	1	<0.05	12	6	18	2	<0.19	62	<0.44	7.8	<0.2	14
		2	0.02	12	7	18	71	0.25	61	<0.5	7.8	<0.25	21
		3	0.05	12	6	17	1	0.28	62	<0.50	8.0	<0.25	16
		4	0.03	11	5	16	53	0.30	59	<0.50	7.8	<0.25	17

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1 July 2018 - 30 June 2019



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	<0.05	12	7	20	2	<0.19	66	<0.44	7.8	<0.2	16
		2	0.85	12	8	18	4	0.24	62	<0.50	7.8	0.29	22
		3	0.56	13	7	18	4	0.28	62	<0.50	7.9	<0.25	22
		4	0.04	11	7	20	8	0.30	61	0.63	7.8	<0.25	17
KLIPR_VDAM	Klip River inflow to Vaal Dam 27° 7.735'S 28° 17.028'E	1	0.01	19	10	21		<0.19	76	<0.44	7.7	<0.2	14
		2	0.04	27	18	27		0.43	94	0.90	7.7	<0.25	68
		3	0.19	69	10	20		0.48	69	1.10	7.4	<0.25	22
		4	0.35	34	13	61		0.50	76	0.58	7.4	0.31	25

### Key

VD1I	Vaal Dam 1 Integrated @ RW Intake 26° 53.075'S 28° 7.329'E	1	<0.05	- 1 Jul to 30 Sept 2018
		2	0.85	- 1 Oct to 31 Dec 2018
		3	0.56	- 1 Jan to 31 Mar 2019
		4	0.04	- 1 Apr to 30 Jun 2019

### 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	24.00	93	64	77	1 105 333	0.28	171	1.20	7.4	3.43	50
		2	20.05	125	85	89	978 733	0.51	300	<0.5	7.2	2.80	46
		3	20.33	70	57	78	1 035 400	0.73	283	<0.5	7.3	2.90	40
		4	14.02	153	64	80	1 643 000	0.88	162	<0.5	7.3	1.68	49
S-DENEYSVILLE	Final Effluent of Deneysville WWTW 26° 53.103'S 28° 6.692'E	1	0.00	0	0	0	0	0.00	0	0.00	0.0	0.00	0
		2	2.00	56	33	43	30 760	0.71	78	10.00	7.2	1.50	14
		3	0.82	25	20	28	6 513	0.53	56	4.85	7.2	1.40	26
		4	0.22	12	8	20	2	0.25	60	<0.5	7.4	<0.25	13
S-FRANKF_NAMAHA	Final Effluent of Frankfort Namahadi 27° 15.691'S 28° 29.503'E	1	13.00	31	41	56	581	<0.19	135	4.50	7.4	2.80	38
		2	9.50	51	69	64	129	0.47	140	8.73	7.8	3.28	46
		3	4.25	30	42	51	17	0.70	113	12.00	7.4	3.30	43
		4	5.98	27	40	56	61	0.98	132	8.98	7.3	2.20	48
S-FRANKF_OXLP	Final Effluent of Frankfort Oxidation Ponds 27° 17.453'S 28° 29.276'E	1	9.18	64	51	63	28	0.23	209	<0.44	8.3	2.42	32
		2	7.95	95	47	63	176	0.48	162	5.93	7.3	2.95	33
		3	1.20	100	38	44	104	0.55	152	0.59	8.9	1.19	27
		4	1.90	185	42	52	1 664	0.65	153	2.60	7.7	2.34	44
S-ORANJEVILLE	Final Effluent of Oranjeville WWTW 26° 58.804'S 28° 12.597'E	1	19.00	47	39	55	455 960	<0.19	134	15.00	7.4	4.10	24
		2	10.70	68	37	49	5 648 672	0.30	103	11.25	6.8	3.07	31
		3	6.60	56	37	50	2 257 245	0.71	127	6.83	7.2	2.57	28
		4	9.00	27	34	46	202 723	0.84	86	11.72	7.2	4.72	27
S-VAAL_MARINA	Final Effluent of Vaal Marina WWTW 26° 53.324'S 28° 12.838'E	1	0.30	21	48	60	20	<0.19	76	24.20	7.7	3.12	44
		2	1.83	27	46	60	3 003	0.42	111	18.10	7.5	2.75	43
		3	7.94	39	57	69	154 021	0.92	215	2.56	7.7	4.36	41
		4	5.15	20	52	56	205	0.96	99	12.00	7.5	2.90	56
S-VILLIERS	Final Effluent of Villiers WWTW 27° 1.908'S 28° 35.366'E	1	26.33	192	75	101	1 802 480	0.28	337	1.10	7.5	2.50	46
		2	19.74	286	103	115	1 848 360	0.58	365	<0.5	7.4	0.45	82
		3	9.55	209	109	113	469 300	0.84	328	0.78	7.4	3.42	79
		4	14.80	132	91	89	1 543	1.31	169	1.55	7.4	2.74	79

**Key**

S-VAAL_MARINA	Final Effluent of Vaal Marina WWTW 26° 53.324'S 28° 12.838'E	1	0.30	- 1 Jul to 30 Sept 2018
		2	1.83	- 1 Oct to 31 Dec 2018
		3	7.94	- 1 Jan to 31 Mar 2019
		4	5.15	- 1 Apr to 30 Jun 2019

**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
<b>Physical</b>					
Conductivity	mS/m	< 10	10 - 30	30 - 45	> 45
pH	pH units	6.5 - 8.5			< 6.5; > 8.5
<b>Organic</b>					
Chemical Oxygen Demand (COD)	mg/l	< 10	10 - 15	15 - 20	> 20
<b>Macro Elements</b>					
Ammonia (NH <sub>4</sub> )	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 <sub>3</sub> mg/l	< 40	40 - 75	75 - 120	> 120
Nitrate (NO <sub>3</sub> )	mg/l	< 0.1	0.1 - 0.2	0.2 - 0.3	> 0.3
Phosphate (PO <sub>4</sub> )	mg/l	< 0.05	0.05 - 0.25	0.25 - 0.50	> 0.50
Sulphate (SO <sub>4</sub> )	mg/l	< 20	20 - 45	45 - 70	> 70
<b>Bacteriological</b>					
<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
<b>Physical</b>			
Conductivity	mS/m	< 150	>= 150
pH	pH units	5.5 - 9.5	< 5.5; > 9.5
<b>Organic</b>			
Chemical Oxygen Demand (COD)*	mg/l	< 75	>= 75
<b>Macro Elements</b>			
Ammonia (NH <sub>4</sub> )	mg/l	< 3	>= 3
Fluoride (F)	mg/l	< 1	>= 1
Nitrate (NO <sub>3</sub> )	mg/l	< 15	>= 15
Phosphate (PO <sub>4</sub> )	mg/l	< 10	>= 10
<b>Bacteriological</b>			
<i>Faecal coliforms</i>	counts/100ml	< 1,000	>= 1,000

\*After removal of algae

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 status report and forum  
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