RAND WATER

Quarterly Water Quality Status of the Vaal Dam Reservoir Catchment

1 January 2017 - 31 december 2017

Sample Points	Sample Point Description	Ammonia	Chloride	Fluoride	M-Alkalinity	Nitrate	Phosphate	Sulphate	Chemical Oxygen Demand	Conductivity	pH	*E. coli*
VSS	Sandspruit below Vaal River @ Kliplaatsdrift 27°12'30.82"S 29°26'12.83"E	0.20	11	0.23	69	0.21	0.10	24	24	22	7.40	
		<0.092	14	0.18	115	0.10	0.20	28	27	32	8.00	
		0.05	14	0.32	235	0.28	<0.2	47	20	56	8.35	
		<0.092	22	0.35	165	0.44	0.20	59	22	44	7.60	
KB	Klip River @ Barnardskop 27°28'12.33"S 29°36'1.76"E	0.2	<10	0.20	45	0.10	0.10	12	27	15	7.00	
		<0.092	<10	0.18	70	0.10	0.20	10	28	20	7.40	
		<0.05	8	0.27	62	1.10	<0.2	10	12	20	8.03	
		<0.092	11	0.19	79	0.44	0.20	6	21	22	7.50	
KW	Klip @ Winkelhaak 27°14'41.55"S 29°23'59.91"E	0.2	<10	0.22	39	0.10	0.10	7	12	12	7.20	
		<0.092	12	0.27	180	0.44	0.20	12	24	42	8.00	
KD	Klip River @ De Langesdrift 27°10'57.77"S 29°14'5.54"E	0.2	<10	0.16	42	0.10	0.10	9	27	59	6.60	
		<0.092	10	0.17	115	0.10	0.20	17	22	28	7.80	
		<0.05	12	0.28	193	0.10	<0.2	26	20	42	7.93	
		<0.092	14	0.28	145	0.44	0.20	27	21	34	7.40	
KSV	Spruitsonderdrift downstream of Vrede 27°21'8.15"S 29°10'16.87"E	0.20	18	0.24	105	0.48	0.10	25	32	75	7.10	
		<0.092	30	0.26	180	1.30	0.28	34	33	48	7.90	
		0.06	39	0.31	247	1.03	0.58	45	29	62	8.83	
		0.51	40	0.26	200	0.98	0.6	39	31	52	7.40	
VDS	Vaal River downstream of Standerton 27° 0'55.97"S 29° 1'29.30"E	0.2	11	0.23	75	0.17	0.10	21	23	23	7.40	
		<0.092	13	0.22	130	0.36	0.20	22	23	34	7.80	
		0.25	17	0.30	170	0.81	<0.2	32	17	44	7.87	
		<0.092	22	0.27	110	0.44	0.20	32	26	35	7.10	
VGB	Gladdedrift Bridge @ Villiers 26°59'31.24"S 28°43'47.18"E	0.34	11	0.38	72	0.15	0.1	37	24	22	7.50	
		<0.092	12	0.21	140	0.07	0.32	25	18	36	7.90	
		0.16	19	0.32	163	0.29	<0.2	35	16	45	8.27	
		0.2	14	0.22	120	0.62	<0.2	28	19	34	7.30	
VV	Vaal @ Villiers 27° 1'20.13"S 28°36'0.32"E	0.31	12	0.30	68	0.67	0.1	26	27	24	7.30	1370
		<0.092	19	0.23	115	0.08	0.18	30	28	33	7.90	31
		0.165	23	0.30	164	0.53	<0.2	36	18	44	7.42	26
		0.38	27	0.25	120	0.74	<0.2	34	24	34	7.20	355
VD4I	Vaal Dam 4 Integrated - Vaal River upstream of Vaal Marina 26°53'27.99"S 28°15'0.16"E	0.2	12	0.28	55	0.67	0.10	30	23	18	7.80	205
		<0.092	<10	0.19	49	0.11	0.20	16	25	15	6.70	1
		<0.05	8	0.34	60	0.32	19.33	<0.2	22	19	7.74	1
		<0.092	<10	0.23	77	0.44	0.20	17	16	26	7.70	4
WF	Wilge River @ Frankfort 27°16'18.00"S 28°29'28.41"E	0.20	<10	0.18	53	0.17	0.10	8	14	16	7.40	550
		<0.092	<10	0.11	55	0.22	0.18	6	12	14	7.50	145
		<0.05	6	<0.19	52	0.80	<0.2	9	15	18	7.55	803
		0.14	<10	0.19	50	0.44	<0.2	6	20	13	7.00	7,120
VD3I	Vaal Dam 3 Integrated - Wilge River downstream of Oranjeville 26°59'1.64"S 28°13'25.08"E	0.2	11	0.25	42	0.51	0.1	25	12	12	7.90	38
		<0.092	<10	0.16	43	0.15	0.21	8	16	12	7.40	1
		<0.05	<10	0.40	49	0.27	13.17	<0.2	17	14	7.78	98
		<0.092	12	0.19	61	0.44	0.20	11	13	17	7.40	2
VD2I	Vaal Dam 2 Integrated - Confluence of Vaal & Wilge 26°53'48.81"S 28°11'9.92"E	0.2	<10	0.33	48	0.97	0.1	84	13	15	7.60	44
		<0.092	<10	0.18	47	0.25	0.20	10	14	14	7.50	1
		<0.05	6	0.30	50	0.33	<0.2	14	15	15	7.63	2
		<0.092	<10	0.19	58	0.44	0.20	13	14	22	7.30	3
VD1I	Vaal Dam 1 Integrated @ RW intake 26°53'0.26"S 28° 7'14.35"E	0.20	21	0.23	50	0.80	0.10	29	10	15	7.70	12
		<0.092	<10	0.19	55	0.30	0.20	17	12	17	7.70	13
		0.05	7	0.38	52	0.57	<0.2	16	12	17	7.67	65
		<0.092	13	0.19	54	0.44	0.20	51	12	16	7.50	3
C-KLIPR_VDAM	Klip River inflow to VaalDam 27°07'43.93"S 28° 17'01.47"E	0.20	26	0.24	62	1.60	0.10	24	26	18	7.30	
		0.12	<10	0.16	82	0.18	0.15	12	26	23	7.20	
		14.07	7	0.45	83	0.24	3.20	14	26	23	7.28	
		0.15	<10	0.19	100	0.44	<0.2	10	28	29	7.20	
S-ST_NEW	Standerton Sewage Works 26°58'24.60"S 29°13'52.87"E	18.00	65	0.58	180	6.10	1.80	74	46	61	7.20	864530
		19.00	52	0.33	250	1.70	2.90	58	18	81	7.10	595,730
		20.00	49	0.34	215	0.21	2.55	54	97	73	7.07	583265
		21.00	54	0.38	193	<0.44	2.63	48	63	69	7.06	1019367
S-DENEYSVILLE	Final Effluent of Deneysville WWTW 26°53'06.29"S 28°06'42.35"E	6.80	38	0.18	125	3.60	2.60	52	36	52	8.10	4170
		14.50	62	0.33	130	8.60	4.00	44	33	53	7.20	19826
S-FRANKF_NAMAHA	Final Effluent of Frankfort Namadi 27°15'41.58"S 28°29'29.22"E	6.80	53	0.16	165	0.93	4.20	59	39	58	7.80	180
		3.40	32	0.31	120	0.82	4.60	28	28	53	7.50	285
		2.45	30	0.21	72	8.75	3.10	36	34	47	7.24	41
		9.20	82	0.19	160	3.40	4.20	28	62	54	7.10	550
S-FRANKF_OXI_P	Final Effluent of Frankfort Oxidation Ponds 27°17'27.44"S 28°29'16.83"E											
		6.80	41	0.38	230	<0.44	36.00	3	58	64	7.44	33
		6.70	42	0.26	185	0.44	2.70	35	86	57	7.10	3,660
S-ORANJEVILLE	Final Effluent of Oranjeville WWTW 26°58'47.06"S 28°12'35.72"E	7.40	49	0.18	125	7.60	3.40	45	46	56	7.70	110480
		21.00	36	0.37	205	0.18	3.70	18	48	60	7.20	2,253,520
		28.80	38	0.38	236	5.71	4.10	29	78	71	7.19	2507338
		12.00	33	0.19	130	6.80	3.20	26	43	50	6.90	39,860
S-VAAL_MARINA	Final Effluent of Vaal Marina WWTW 26°53'19.35"S 28°12'50.50"E	0.29	51	0.21	185	5.50	1.40	49	18	69	7.60	860
		0.32	47	0.16	160	12.00	2.20	45	22	62	7.50	9
		<0.05	41	0.45	67	21.34	3.18	45	15	56	7.27	801
		0.15	38	0.19	88	24.00	3.20	38	20	50	7.00	660
S-VILLIERS	Final Effluent of Villiers WWTW 27°01'54.43"S 28°35'21.89"E	19.00	94	0.24	175	0.30	0.36	52	82	67	7.20	196300
		18.00	60	0.33	295	0.23	2.80	31	64	87	7.20	283,120
		25.17	74	0.35	324	2.96	2.95	49	128	101	7.43	188205
		18.00	100	0.31	285	0.44	2.20	60	140	100	7.00	354,260

Sewage Works Compliance (where applicable) to General Standard (GN 1191 Oct 1999)													
Sample Points	Sample Point Description	Ammonia	Chloride	Fluoride	M-Alkalinity	Nitrate	Phosphate		Chemical Oxygen Demand	Conductivity	pH	*E. coli*
S-ST_NEW	Standerton Sewage Works 26°58'24.60"S 29°13'52.87"E	18.00	65	0.58	180	6.1	1.80	74	46	61	7.20	664530
		19.00	52	0.33	250	1.7	2.90	58	18	81	7.10	595,730
		20.00	49	0.34	215	0.2	2.55	54	97	73	7.07	583265
		21.00	54	0.38	193	<0.44	2.63	48	63	69	7.06	1019367
S-DENEYSVILLE	Final Effluent of Deneysville WWTW 26°53'06.29"S 28°06'42.35"E	6.80	38	0.18	125	3.6	2.60	52	36	52	8.10	4170
		14.50	62	0.33	130	8.6	4.00	44	33	53	7.20	19826
S-FRANKF_NAMAHA	Final Effluent of Frankfort Namadi 27°15'41.58"S 28°29'29.22"E	6.80	53	0.16	165	0.9	4.20	59	39	58	7.80	180
		3.40	32	0.31	120	0.8	4.60	28	28	53	7.50	285
		2.45	30	0.21	72	8.8	3.10	36	34	47	7.24	41
		9.20	82	0.19	160	3.4	4.20	28	62	54	7.10	550
S-FRANKF_OXI_P	Final Effluent of Frankfort Oxidation Ponds 27°17'27.44"S 28°29'16.83"E											
		6.80	41	0.38	230	<0.44	36.00	3	58	64	7.44	33
		6.70	42	0.26	185	0.4	2.70	35	86	57	7.10	3,660
S-ORANJEVILLE	Final Effluent of Oranjeville WWTW 26°58'47.06"S 28°12'35.72"E	7.40	49	0.18	125	7.6	3.40	45	46	56	7.70	110480
		21.00	36	0.37	205	0.2	3.70	18	48	60	7.20	2,253,520
		28.80	38	0.38	236	5.7	4.10	29	78	71	7.19	2507338
		12.00	33	0.19	130	6.8	3.20	26	43	50	6.90	39,860
S-VAAL_MARINA	Final Effluent of Vaal Marina WWTW 26°53'19.35"S 28°12'50.50"E	0.29	51	0.21	185	5.5	1.40	49	18	69	7.60	860
		0.32	47	0.16	160	12.0	2.20	45	22	62	7.50	9
		<0.05	41	0.45	67	21.3	3.18	45	15	56	7.27	801
		0.15	38	0.19	88	24.0	3.20	38	20	50	7.00	660
S-VILLIERS	Final Effluent of Villiers WWTW 27°01'54.43"S 28°35'21.89"E	19.00	94	0.24	175	0.3	0.36	52	82	67	7.20	196300
		18.00	60	0.33	295	0.2	2.80	31	64	87	7.20	283,120
		25.17	74	0.35	324	3.0	2.95	49	128	101	7.43	188205
		18.00	100	0.31	285	0.4	2.20	60	140	100	7.00	354,260

Key

VD1I	Vaal Dam 1 Integrated @ RW intake	0.12	-	1 Jan 17 - 31 Mar 17
		0.12	-	1 Apr 17- 30 Jun 17
		0.12	-	1 July 17 - 30 Sept 17
		0.12	-	1 Oct 2017 - 31 Dec 2017

Water Quality Guidelines

	-	Ideal
	-	Acceptable
	-	Tolerable
	-	Unacceptable
	-	No sample or result available

In-stream Water Quality Guidelines 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
Chloride (Cl)	mg/l	< 25	25 - 50	50 - 75	> 75
Fluoride (F)	mg/l	< 0.05	0.05 - 0.20	0.2 - 0.4	> 0.4
Alkalinity	CaCO3 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	> 0.5
Sulphate (SO_4)	mg/l	< 20	20 - 45	45 - 70	> 70
Bacteriological					
Faecal coliforms	counts/100ml	< 10	10 - 60	60 - 120	> 120

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			
Faecal coliforms	counts/100ml	<1000	>=1000

** After removal of algae