



Quarterly Water Quality Status of the Waterval River Catchment

1 July 2016 - 30 June 2017

In-stream Water Quality Guidelines

Sample Points	Sample Point Description	Ammonia	Chloride	Fluoride	M-Alkalinity	Nitrate	Phosphate	Sulphate	Chemical Oxygen Demand	Conductivity	pH	E. coli
WAW	Winkelhaakspruit @ Secunda 26°31'12.14"S 29° 4'17.79"E	5.40	38	0.43	135	2.73	1.08	48	31	48	7.99	
		12.83	43	0.28	185	2.55	3.35	55	49	71	7.72	
		7.20	74	0.40	210	1.20	2.00	40	35	76	7.70	
		9.00	60	0.33	185	0.57	1.30	52	48	65	7.20	
WAT	Kleinspruit @ Secunda 26°33'9.73"S 29° 4'58.31"E	0.46	43	0.15	142	4.47	1.61	62	31	58	7.90	
		1.44	41	0.44	118	0.75	0.20	68	23	48	7.70	
		0.84	48	0.58	150	3.60	0.19	97	31	61	7.80	
		1.10	39	0.39	165	2.10	0.21	97	28	64	7.50	
WAR	Waterval River @ Roodebank 26°37'44.10"S 29° 1'32.31"E	4.73	41	0.49	170	1.31	1.13	67	35	60	8.11	
		7.07	34	0.37	185	1.75	1.11	67	33	62	7.74	
		0.92	38	0.49	120	2.20	0.19	57	37	47	7.60	
		8.70	65	0.46	175	0.22	1.40	58	35	66	7.40	
WAE	Waterval River @ Elandslaagte 26°51'30.04"S 28°53'23.52"E	0.28	37	0.59	138	0.64	0.14	65	32	58	8.27	
		0.30	47	0.40	153	2.30	0.41	70	32	59	8.46	
		0.20	13	0.45	58	0.56	0.10	22	32	21	7.40	
		0.12	54	0.43	170	0.71	0.20	69	28	56	8.00	
WATERVAL_VAAL	WATERVAL_VAAL - Waterval near confluence with Vaal River	0.25	26	0.44	91	0.93	0.12	58	34	43	7.86	
		<0.2	45	0.27	162	1.32	<0.1	62	24	61	8.44	
		0.20	34	0.40	72	1.70	0.12	21	34	27	7.50	
		<0.092	51	0.34	150	0.37	0.20	57	28	57	8.10	
S-EVAN_W	Evander Sewage Works 26°29'32.97"S 29° 6'54.97"E	21.50	23	18.63	223	<0.1	2.85	46	106	75	7.35	1986300
		10.85	54	0.33	188	2.50	2.30	47	47	67	7.37	2427067
		21.00	99	0.26	225	4.70	2.00	58	63	72	7.50	2672200
		14.00	61	0.52	150	1.60	2.00	46	40	66	7.20	1,769,750
S-SEC_LOC	Embalenhle Sewage Works 26°33'21.66"S 29° 4'16.66"E	31.00	68	0.29	343	<0.1	7.10	79	98	113	7.44	490319
		33.74	59	0.31	373	2.70	4.67	63	144	112	7.63	1710933
		28.00	96	0.22	295	0.18	3.40	95	125	99	7.70	1185300
		38.00	62	0.34	315	0.11	4.80	68	74	100	7.40	814,600
S-SEC_SEW	Secunda Sewage Works* 26°32'21.04"S 29° 8'42.00"E	1.20	52	0.54	125	2.83	0.28	75	22	61	7.46	85
		2.30	49	0.27	117	2.57	0.16	71	34	56	7.27	1
		0.23	79	0.48	185	2.30	0.32	99	53	73	7.40	3
		1.40	60	0.46	145	2.60	0.20	72	46	64	7.40	1

\*The above colour coding is as per the Waterval River Instream Water Quality Guideline and not Water Use License conditions for any mining/ industries.

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

Sample Points	Sample Point Description	Ammonia	Fluoride	Nitrate	Phosphate	Chemical Oxygen Demand	Conductivity	pH	E. coli			
S-EVAN_W	Evander Sewage Works 26°29'32.97"S 29° 6'54.97"E	21.50	23	18.63	223	<0.1	2.85	46	106	75	7.35	1986300
		10.85	54	0.33	188	2.50	2.30	47	47	67	7.37	2427067
		21.00	99	0.26	225	4.70	2.00	58	63	72	7.50	2672200
		14.00	61	0.52	150	1.60	2.00	46	40	66	7.20	1,769,750
S-SEC_LOC	Embalenhle Sewage Works 26°33'21.66"S 29° 4'16.66"E	31.00	68	0.29	343	<0.1	7.10	79	98	113	7.44	490319
		33.74	59	0.31	373	2.70	4.67	63	144	112	7.63	1710933
		28.00	96	0.22	295	0.18	3.40	95	125	99	7.70	1185300
		38.00	62	0.34	315	0.11	4.80	68	74	100	7.40	814,600

\* Applicable Water Quality Standards for final effluent discharge from Secunda Sewage Works (as per DWA licence)

S-SEC_SEW	Secunda Sewage Works* 26°32'21.04"S 29° 8'42.00"E	1.20	52	0.54	125	2.83	0.28	75	22	61	7.46	85
		2.30	49	0.27	117	2.57	0.16	71	34	56	7.27	1
		0.23	79	0.48	185	2.30	0.32	99	53	73	7.40	3
		1.40	60	0.46	145	2.60	0.20	72	46	64	7.40	1

**Key**

<b>WAB</b>	Bossiespruit @ Secunda	0.59	-	1 July 16 - 30 Sept 16
		0.12	-	1 Oct 16 - 31 Dec 16
		2.1	-	1 Jan 17 - 31 Mar 17
		0.28	-	1 Apr 17- 30 Jun 17

**Water Quality Guidelines**

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

**In-stream Water Quality Guidelines for the Waterval 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	0.2 - 0.4	> 0.4
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>					
Faecal coliforms	counts/100ml	<10	10 - 60	60 - 120	> 120

**\* Applicable Water Quality Standards for final effluent discharge from Secunda Sewage Works (as per DWA licence)**

Variable	Limit
pH	5.5 - 9.5
Electrical Conductivity	≤70 mS/m
Chemical Oxygen Demand	≤75 mg/l
Ammonia as N	≤6 mg/l
Nitrate / Nitrite as Nitrogen	≤15 mg/l
Orthophosphate as P	≤10 mg/l
Fluoride	≤1 mg/l
Faecal coliform units (FCU)	0 per 100ml

**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>			
Faecal coliforms	counts/100ml	<1000	≥1000

\*\* After removal of algae

Sample Points	Sample Point Description	Ammonia	Chloride	Fluoride	M-Alkalinity	Nitrate	Phosphate	Sulphate	Chemical Oxygen Demand	Conductivity	pH	E. coli
WAW	Winkelhaakspruit @ Secunda 26°31'12.14"S 29° 4'17.79"E	5.40	38	0.43	134.6666667	2.7	1.08	48	31	48.33333333	7.986666667	
		12.83	43	0.28	185	2.6	3.35	55	49	71.33333333	7.72	
		7.20	74	0.40	210	1.2	2.00	40	35	76	7.7	
		9.00	60	0.33	185	0.6	1.30	52	48	65	7.2	
WAT	Trichardspruit @ Secunda 26°33'9.73"S 29° 4'58.31"E	0.46	43	0.15	141.6666667	4.5	1.61	62	31	57.66666667	7.9	
		1.44	41	0.44	118.3333333	0.8	0.20	68	23	48	7.7	
		0.84	48	0.58	150	3.6	0.19	97	31	61	7.8	
		1.10	39	0.39	165	2.1	0.21	97	28	64	7.5	
WAR	Waterval River @ Roodebank 26°37'44.10"S 29° 1'32.31"E	4.73	41	0.49	170	1.3	1.13	67	35	59.66666667	8.11	
		7.07	34	0.37	185	1.8	1.11	67	33	62	7.74	
		0.92	38	0.49	120	2.2	0.19	57	37	47	7.6	
		8.70	65	0.46	175	0.2	1.40	58	35	66	7.4	
WAE	Waterval River @ Elandslaagte 26°51'30.04"S 28°53'23.52"E	0.28	37	0.59	138.3333333	0.6	0.14	65	32	57.66666667	8.27	
		0.30	47	0.40	153.3333333	2.3	0.41	70	32	59	8.463333333	
		0.20	13	0.45	58	0.6	0.10	22	32	21	7.4	
		0.12	54	0.43	170	0.7	0.20	69	28	56	8	
WATERVAL_VAAL	WATERVAL_VAAL - Waterval near confluence with Vaal River	0.25	26	0.44	91.33333333	0.9	0.12	58	34	43.33333333	7.863333333	
		<0.2	45	0.27	161.6666667	1.3	<0.1	62	24	61	8.44	
		0.20	34	0.40	72	1.7	0.12	21	34	27	7.5	
		<0.092	51	0.34	150	0.4	0.20	57	28	57	8.1	
S-EVAN_W	Evander Sewage Works 26°29'32.97"S 29° 6'54.97"E	21.50	23	18.63	222.5	<0.1	2.85	46	106	74.5	7.35	1,986,300
		10.85	54	0.33	188.3333333	2.5	2.30	47	47	66.66666667	7.373333333	2,427,067
		21.00	99	0.26	225	4.7	2.00	58	63	72	7.5	2,672,200
		14.00	61	0.52	150	1.6	2.00	46	40	66	7.2	1,769,750
S-SEC_LOC	Embalenhle Sewage Works 26°33'21.66"S 29° 4'16.66"E	31.00	68	0.29	342.5	<0.1	7.10	79	98	112.5	7.435	490,319
		33.74	59	0.31	373.3333333	2.7	4.67	63	144	111.6666667	7.626666667	1,710,933
		28.00	96	0.22	295	0.2	3.40	95	125	99	7.7	1,185,300
		38.00	62	0.34	315	0.1	4.80	68	74	100	7.4	814,600
S-SEC_SEW	Secunda Sewage Works* 26°32'21.04"S 29° 8'42.00"E	1.20	52	0.54	125	2.8	0.28	75	22	61	7.46	85
		2.30	49	0.27	116.6666667	2.6	0.16	71	34	56	7.273333333	1
		0.23	79	0.48	185	2.3	0.32	99	53	73	7.4	3
		1.40	60	0.46	145	2.6	0.20	72	46	64	7.4	1
<b>Sewage Works Compliance (where applicable) to General Standard (GN 1191 Oct 1999)</b>												
S-EVAN_W	Evander Sewage Works 26°29'32.97"S 29° 6'54.97"E	21.50	23	18.63	222.5	<0.1	2.85	46	106	74.5	7.35	1,986,300
		10.85	54	0.33	188.3333333	2.5	2.30	47	47	66.66666667	7.373333333	2,427,067
		21.00	99	0.26	225	4.7	2.00	58	63	72	7.5	2,672,200
		14.00	61	0.52	150	1.6	2.00	46	40	66	7.2	1,769,750
S-SEC_LOC	Embalenhle Sewage Works 26°33'21.66"S 29° 4'16.66"E	31.00	68	0.29	342.5	<0.1	7.10	79	98	112.5	7.435	490,319
		33.74	59	0.31	373.3333333	2.7	4.67	63	144	111.6666667	7.626666667	1,710,933
		28.00	96	0.22	295	0.2	3.40	95	125	99	7.7	1,185,300
		38.00	62	0.34	315	0.1	4.80	68	74	100	7.4	814,600
<b>Applicable Water Quality Standards for final effluent discharge from Secunda Sewage Works (as per DWA licence)</b>												
S-SEC_SEW	Secunda Sewage Works* 26°32'21.04"S 29° 8'42.00"E	1.20	52	0.54	125	2.8	0.28	75	22	61	7.46	85
		2.30	49	0.27	116.6666667	2.6	0.16	71	34	56	7.273333333	1
		0.23	79	0.48	185	2.3	0.32	99	53	73	7.4	3
		1.40	60	0.46	145	2.6	0.20	72	46	64	7.4	1