

Table F.1: Issues & mitigation measures (REV 3)

Item	Element ID	Street / Location	Existing conduit	Event ₁	Issue description	Recommended intervention	Unit	Quantity	Pr ₃	Indicative Cost (Excl VAT) 2015
1	111500-111230	Adderley	600 dia	2	Significant local flooding	Abandon existing pipe	Sum	1	1	R 30 000.00
		<i>Refer to Fig 10</i>				Construct new 900x900 BC	m	60		R 370 000.00
2	111200-111030	Kerk <i>Refer to Fig 10</i>	600 dia	2	Minor local flooding	Construct new 900mm dia SW pipe	m	260	1	R 1 070 000.00
3	111620-111700	Voortrekker	600 dia		Medium local flooding	Replace existing with 1200x900 BC	m	435	1	R 3 010 000.00
		<i>Refer to Fig 10</i>	600 dia			Replace existing with 1800x900 BC	m	140		R 1 810 000.00
			blockwork channel			Replace existing with 2000 x 1200 outlet channel	m	170		R 2 680 000.00
4	109680	Voortrekker / Barry	Grating inlet	2	Significant local flooding	Reconstruct strip drain inlets	Sum	1	1	R 60 000.00
		<i>Refer to Fig 11</i>				Regrade Kromhout street	m	100		R 530 000.00
						Construct new 600mm dia SW pipe	m	230		R 430 000.00
						Construct new 750mm dia SW pipe	m	460		R 1 310 000.00
5	111840-111850	Kerk / Industria	450 dia	2	Localised flooding of parking area and businesses opposite discharge point	Blank off culvert inlet and divert water to existing system in Kerk Str	Task complete		1	
6		Hoops River	River channel	20	Significant flooding at bridges blocked by vegetation washed down from upstream	Regular maintenance and river cleaning			1	
7	106380-107080	Johan de Jongh <i>Refer to Fig 12</i>	trapezoidal	2	Overtopping of channel	Replace existing with 1900x700x400 trapezoidal channel	m	125	2	R 420 000.00
						Replace existing with 2300x800x500 trapezoidal channel	m	465		R 1 560 000.00

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8		Johan de Jongh <i>Refer to Fig 16</i>	Open channel	5	Overtopping of channel, downstream flooding via Van Zyl and Kerk Streets	Construct formal detention storage facility (9 000 m ³) east of Johan de Jongh at Van Zyl intersection	m ³	9000	2	R 3 650 000.00
						Construct formal detention storage facility (7 000 m ³) east of Johan de Jongh on airfield	m ³	7000		R 2 840 000.00
						Enlarge existing earth drain to 4700x1500x800 unlined trapezoidal channel	m	500		R 420 000.00
						Enlarge existing earth drain to 3800x1000x700 unlined trapezoidal channel	m	140		R 120 000.00
						Enlarge existing earth drain to 3400x1000x600 unlined trapezoidal channel	m	310		R 260 000.00
9	112520-112530	Voortrekker <i>Refer to Fig 13</i>	450 dia	2	Ponding in low spots on either side of Voortrekker	Construct formal detention storage (6 000 m ³)	m ³	6000	2	R 2 430 000.00
						Construct new 375mm dia SW pipe	m	230		R 260 000.00
						Construct new unlined channel	m	230		R 120 000.00
10		Hani <i>Refer to Fig 13</i>	Open channel	2	Discharge of polluted stormwater into downstream property	Construct settling ponds and filtration beds (2000 m ³)	m ³	2000	2	R 810 000.00
11		Geelhout		2	Unable to drain cul-de-sac	Instruct body corporate of group housing scheme to construct strip drain through property	m	100	2	R 340 000.00
12		De Hoop / Johan de Jongh <i>Refer to Fig 17</i>	Side drain	2	Accumulation of runoff causing localised ponding and flooding	Construct 4600x1500x900 unlined trapezoidal cut-off drain to divert upstream water directly into Hoops River	m	620	2	R 520 000.00
						Construct 2 x 1500x600 BC	m	20		R 260 000.00
13		Truter <i>Refer to Fig 14</i>		2	Trapped low spot causing localised ponding	Construct new 525mm dia SW pipe	m	275	2	R 440 000.00

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14	109100-110200	Paul Kruger	450x750 BC	2	Minor localised flooding near Voortrekker Str	Regular maintenance			2		
15	Leiwater system	Paul Kruger	BC, varies	2	Running at capacity	Regular maintenance			2		
16	Leiwater system	Reitz	BC, varies	2	Running at capacity	Regular maintenance			2		
17	110760-111150	Reitz / Voortrekker	375 dia	2	Running at capacity	Regular maintenance			2		
18	108410-109100	Paul Kruger	450x600 BC	5	Minor local flooding at Kerk Str	Regular maintenance			2		
19	109100-110200	Paul Kruger	450x750 BC	5	Minor local flooding	Regular maintenance			2		
20	Leiwater system	Reitz	BC, varies	5	Minor flooding	Regular maintenance			2		
21	112520-112530	Voortrekker	450 dia	5	Minor flooding	Regular maintenance			2		
22	107120-107130	Malherbe <i>Refer to Fig 14</i>	600 dia	2	Local flooding of trapped low spot	Regular maintenance			2		
23	111020-111200	Denne	375 dia	2	Minor local flooding	Replace existing with 450mm dia	m	95	3	R	150 000.00
		<i>Refer to Fig 10</i>	600 dia			Replace existing with 750mm dia	m	235		R	750 000.00
24	101340-100910	Heuwel	300 dia	2	Minor local flooding	Replace existing with 450mm dia	m	200	3	R	320 000.00
25	110680-110690	Jakaranda	300 dia	2	Minor local flooding	Replace existing with 375mm dia	m	30	3	R	60 000.00
26	102950-103290	Paddy	300 dia	2	Minor local flooding	Replace existing with 375mm dia	m	120	3	R	180 000.00
			300 dia	2	Minor local flooding	Replace existing with 450mm dia	m	200	3	R	320 000.00
			300 dia	2	Minor local flooding	Replace existing with 525mm dia	m	160	3	R	310 000.00
27	Leiwater system	Paul Kruger	BC, varies	5	Minor to medium flooding	Replace existing with 450x450 BC	m	710	3	R	3 200 000.00
		<i>Refer to Fig 15</i>	300 dia			Replace existing with 375mm dia	m	230		R	330 000.00
28		Masakhane <i>Refer to Fig 13</i>		2	Difficulty draining area adjacent to railway line	Construct 525 mm dia culvert under railway line	m	30	3	R	150 000.00
29	109060-108780	Kerk	PVC inlet	2	Local flooding of parking area	Replace PVC pipes with conventional kerb inlets	Sum	1	3	R	170 000.00
30	109270-109280	Voortrekker	900x2400 BC	5	Outfall culvert at capacity	Regular maintenance			3		
31	109650-109870	Voortrekker	900x1500 BC	5	Running at capacity	Regular maintenance			3		
32	110770-110780	Voortrekker	300 dia	5	Minor to medium flooding	Regular maintenance			3		
33		Refer to Fig 4 (SWMP Update 2015)	Street	2	Significant local flooding	Construct raised earth berm across entrances to the erven (160m long x 100mm high)	m	160	1	R	100 000.00

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34		Refer to Fig 4 (SWMP Update 2015)		2	Significant local flooding downstream	Construct earth stormwater cutoff drain (900m long x 1m high x 1m wide trapezoidal channel; side slope 1:2)	m	900	1	R 700 000.00
35		Refer to Fig 4 (SWMP Update 2015)	Street	2	Significant local flooding	Construct surfaced "speedbump" and berm (30m long x 150mm high)	m	30	1	R 30 000.00
36		Refer to Fig 4 (SWMP Update 2015)	Street	2	Significant local flooding	Construct detention storage pond (2500 m ³)	m ³	2500	3	R 950 000.00
37		Refer to Fig 4 (SWMP Update 2015)	Headwall	2	Potential blockage and upstream flooding	Regular maintenance			1	
38		Refer to Fig 4 (SWMP Update 2015)		2	Water quality concerns and reducing peak outflow to pre-development levels	Construct detention storage pond (4000 m ³)	m ³	4000	3	R 1 530 000.00
39		Refer to Fig 4 (SWMP Update 2015)		2	Water quality concerns for the runoff entering the irrigation channel	Construct treatment intervention to treat the outflow into the existing irrigation channel (silt trap, bioswale, etc)	Sum	1	3	Cost will depend on extent of intervention / method of mitigation used
40		Refer to Fig 4 (SWMP Update 2015)	Open channel	2	Potential blockage and upstream flooding	Regular maintenance			1	

1. The issues have been tabulated only for storm event in which they first appear. All issues recur with greater severity during higher-order events

2. These indicative costs are intended to give an idea of the scale of the project construction cost and exclude professional fees. Detailed estimates will require preliminary design

3. Priority level, where **1** = urgent, **2** = requiring attention in the short term and **3** = requires consideration in medium to longer term