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**W. G. Krige *Pr.Sci.Nat. (Aquatic Science)***  
**Flood Line Modelling and Bridge Backwater Computation**  
**Experience, 2012 to 2019**

Mr Krige has been involved in the determination of flood lines for over 1½ decade. Below is a list of some of the projects he has been involved in since 2012:

- June 2019                      100-year flood lines fro the Muenda River in the Niassa Province of Moçambique in the town of Cuamba. The flood lines are for a solar Power station on the banks of this river.
- May 2019                      50 and 100-year flood lines for an unnamed stream in close proximity to the Avon Gas Turbine Power Station in KZN. This project formed part of an EIA study for a new gas pipeline to this power station. The flood lines were required at a point where the pipeline will cross over this stream.
- May 2019                      1 to 20-year flood line and hydrological modelling of the Holfontein Stream as well as bridge backwater calculations of two bridges at, and in close proximity to its confluence with the Blesbokspruit. This also included the modelling of flood discharge for the extremely short return interval storms of 0.1 to 1 years. This project was required for a gold mine that will be dewatering an old mine shaft for exploration purposes.
- March 2019                    50- and 100-year flood lines for the Middelvlispruit and Kocksoordspruit at a gold mining site in the Randfontein area, Gauteng. This work formed part of an EIA study, the hydrological work also done by Mr Krige
- January 2019                Development of the High Flood Level (HFL) of the Inyaka Dam in the Mariete River near Bushbuckridge, Mpumalanga Province. The flood modelling also included the modelling of the 100-year flood lines for an unnamed stream, a tributary of the Mariete River, the confluence of which is in the Inyaka Dam. The purpose of this project was to determine the safe distance between the Maviljan Sewage Treatment Plant on the banks of the Inyaka Dam and the dam.
- August 2018                50- and 100-year flood lines for the Cowles Stream at its confluence with the Blesbokspruit as part of a water balance of the Cowles and Blesbokspruit Streams for a gold mine's



water use licence for the discharge of an additional volume of underground water into this stream. A project for Gold One Africa Limited

- August 2018 Development of the 100-year High Flood Level of the Zuurbekom Pan on Portion 37 of the farm Zuurbekom 297 IQ, for the development of an industrial area around the pan in Westonaria Local Municipality for Township Realtors, (Pty) Ltd
- July 2018 100-year flood lines for an unnamed stream at the proposed development of the Protea Industrial Park West on the farm Zuurbekom 297 IQ, City of Johannesburg Metropolitan Municipality and Westonaria Local Municipality for Township Realtors, (Pty) Ltd
- July 2018 50- and 100-year flood lines for the Rietspruit at Holdings 108 RE, 108/1 and 108/2 Raslow Agricultural Holdings, City of Tshwane Metropolitan Municipality Gauteng, for Peter Bond & Associates Consulting Engineers (Pty) Ltd
- May 2018 50- and 100-year flood lines for the Molempse Stream and Molati River and the routing of a River Diversion in the Molempse Stream at the Stibium Mining, Molati Operations, Gravelotte, Limpopo Province for Stibium Mining (Pty) Ltd
- May 2018 50- and 100-year flood lines at Portion 379 of the farm Tiegerpoort 371 JR for the subdivision of this land, City of Tshwane Metropolitan Municipality, Gauteng Province for Royal Anthem Investments 124 (Pty) Ltd
- April 2018 High Flood Level of the Mooifontein Pan in Ekurhuleni for the proposed housing development on the banks of this perennial pan for GKM Environmental Services, Ekurhuleni Metropolitan Municipality, Gauteng Province
- April 2018 50 and 100-year flood lines for the farm Roodepan, as well as the high flood lever for the Kamfers Dam in Kimberley for a proposed housing project in the Sol Plaatje Local Municipal area, Northern Cape Province for Alleyroads Consulting Engineers
- February 2018 50- and 100-year flood lines for an unnamed stream on the farm, Grootfontein near Dunnottar, Ekurhuleni Metropolitan



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Municipality for a planned housing project for Alleyroads  
Consulting Engineers

- December 2017 10- and 20-year flood lines for the Muldersdrift se Loop at Featherbrooke Estate for the evaluation of remediation work planned at the estate for Anderson Vogt Consulting Engineers
- November 2017 50- and 100-year flood lines for the Olienhoutspoortspruit, Johannesburg North for the years, 2009, 2012 and 2015 and modelling of the impact of development within the riparian zone of the stream on the properties on the opposite side of the stream, City of Johannesburg, Gauteng Province for Concrete Laser Flooring (Pty) Ltd
- November 2017 50- and 100-year flood lines for the Kaalspruit at Erf 3581, Clayville X33, Ekurhuleni, Gauteng Province for Peter Bond & Associates
- October 2017 50- and 100-year flood lines for the Naauwpoortspruit and the Olifants River, including the high flood level of the Witbank Dam, at the Naauwpoort Wastewater Treatment Works, Witbank, Mpumalanga Province for Tharollo ea Metsi Consulting Engineers
- October 2017 50- and 100-year flood lines for an unnamed stream at Ferrobank Wastewater Treatment Works, Witbank, Mpumalanga Province for Tharollo ea Metsi Consulting Engineers
- June 2017 100-year flood lines and Flood Modelling for silt traps and culverts for an unnamed Stream at Camden Power Station new ash dump, Mpumalanga Province
- June 2017 100-year flood lines for an unnamed stream at Withok Estate Agricultural Holdings
- April 2017 100-year flood lines for 43 river crossings of a pipeline from the Klipvoor Dam on the Pienaars River to a distribution point in Mookopong, three of which are rivers with very large catchments (Nyl River, Pienaars/Moretele River and Marierietsa River) for Magalies Water and the Dept of Water and Sanitation. This project also includes many bridge and culvert backwater computations



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March 2017	100-year flood lines for the Musonoie River at Kolwezi in the Democratic Republic of the Congo for the construction of a new tailings dam and pipeline crossing over the river for Gecamines Ltd
March 2017	100-year flood lines for the Rietspruit near Hennenman for the proposed new Venterburg Gold Mine, a project for Gold One Africa Limited
February 2017	50- and 100-year Flood Lines for the Klip River at the Fun Valley Holiday Resort, the site for the SA Football Association's new training centre, Johannesburg, Gauteng Province
December 2016	100-year flood lines for the Jan Smuts Spruit near Sherwood Gardens, Brakpan Ekurhuleni Metropolitan Municipality for Gold One Africa Limited Gedex project
November 2016	100-year Flood Lines for a small tributary of the Rietspruit at Dalpark, Ekurhuleni, Gauteng Province
November 2016	100-year flood lines for the Olienhoutspoortspruit, a tributary of the Jukskei River, Johannesburg, Gauteng Province
November 2016	100-year flood lines and bridge backwater computations for a tributary (referred to as the Bryanston Stream) at Niven Rd Bridge, Douglasdale Ex 6 Johannesburg, Gauteng Province
September 2016	100-year flood lines for two small streams on the farm Nietgedacht 535 JQ, Johannesburg, Gauteng Province
August 2016	50- and 100-year flood lines for the Muldersdrift se Loop at Featherbrooke Estate, Mogale City, Gauteng Province
May 2016	Revision of 2-, 5-, 10-, 20-, 50- and 100-year flood lines at the River Club, Cape Town Western Cape Province
May 2016	50- and 100-year flood lines for the Shakwaneng River and two of its tributaries (the Mookeng and Ironstone Streams) on the farms Geluk 512 Ks and Ironstone 847 KS, for the Geluk Platinum Mine, Sekhukhune, Limpopo Province
May 2016	Bridge backwater computations for a bridge over the Harts River downstream from the Spitskop Dam, Northern Cape Province



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April 2016	50-year flood lines for an unnamed tributary of the Jukskei River at Mogase View, Johannesburg, Gauteng Province
February 2016	50- and 100-year flood lines for the Elands River at the Bakubung Platinum Mine, Rustenburg area Northwest Province
January 2016	50- and 100-year flood lines of the Moshaweng River for the Assmang Black Rock Manganese Mine at Segonyane Local Municipality, Northwest Province
December 2015	50 and 100-year flood lines for the Lucunga and M'Bridge Rivers and several of their tributaries in the Zaire Province, Angola
November 2015	100-year flood lines for the Jukskei River at Beverley Ext 1, Johannesburg, Gauteng Province
October 2015	100-year flood lines for an unnamed stream at Carlswald AH, Johannesburg, Gauteng Province
July 2015	50- and 100-year flood lines for the Holfonteinspruit ant Gold One International Holfontein Gold Mine, Ekurhuleni, Gauteng Province
July 2015	10- and 20-year flood lines for an unnamed streams and bridge backwater computations for a new bridge at the Canyon Springs Colliery, on the farm Roodekoppies 167 JR Mpumalanga Province
August 2015	50- and 100-year flood lines for the Jukskei and Klein Jukskei Rivers at the farm Nietgedacht 535 JQ, Johannesburg, Gauteng Province
May 2015	100-year flood lines for an unnamed stream on the farm Alandale 10 IR for the Carstenhof Life Healthcare Clinic, Johannesburg, Gauteng Province
March 2015	100-year flood lines for the Sandspruit at Strathavon, Johannesburg, Gauteng Province
March 2015	50 and 100-year flood lines for the Geelklipspruit, Witbankspruit and Palmietspruit tributary at the Eskom



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	Majuba Power Station on the farms Roodekopjes 67 HS and Witkoppies 81 HS, Mpumalanga Province. The Palmietspruit project included a bridge backwater computation
January 2015	2-, 5-, 10-, 20-, 50- and 100-years flood lines for the Black and Liesbeek Rivers at the River Club, Cape Town, Western Cape Province. This project included the backwater computations for one bridge
October 2014	50- and 100-year flood lines for the Jukskei River and one of its tributaries at the site of the Nokuthula Special School, Corlett Gardens, Johannesburg, Gauteng Province
October 2014	Modelling of flow lines for a specific discharge of the Harts River at the farm, Machorogan 106 and Spitskop 91, Northern Cape Province
October 2014	50- and 100-year flood lines for the Sandspruit at Zandspruit Ext 10, Johannesburg, Gauteng Province
September 2014	100-year flood lines for the Rietspruit and 2 of its tributaries for a proposed new Eskom Feeder line on the farms Hartbeestfontein 312 IQ and Fonteine 313 IQ, Johannesburg, Gauteng Province
August 2014	100-year flood lines for the unnamed streams at the Temane Gas Plant of SASOL in the Inhambane Province, Moçambique
August 2014	100-year flood lines for the Blesbokspruit on the farm Bultfontein 192 IR, Ekurhuleni, Gauteng Province
July 2014	100-year flood lines for the Govuro River near the Temane Gas Plant of SASOL Inhambane Province, Moçambique
May 2014	100-year flood lines for the Diepsloot and two of its unnamed tributaries at Diepsloot, Johannesburg, Gauteng Province
May 2014	100-year flood lines for an unnamed stream at the farm Alkmaar 3434, Mkuze, Kwazulu-Natal Province
April 2014	100-year flood lines of the Klipspruit and two of its tributaries at Mshenguville, Soweto, Johannesburg, Gauteng Province



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April 2014	100-year flood lines for the Stretford Stream, Orange Farm, Johannesburg, Gauteng Province
April 2014	50- and 100-year flood lines for the Olifants River at the farm, Zeekoegat 421 KS, at the Samancor Jagdlust Chrome Mine, Mpumalanga Province
March 2014	100-year flood lines for the Rietspruit at the Eskom Astra Substation on the farm Doornkuil 369 IQ, Johannesburg, Gauteng Province
February 2014	100-year flood lines for the Jukskei River and a tributary of the Jukskei River at the Woodmead Drive Bridge, Barbeque Downs, Johannesburg, Gauteng Province. This project also included the Bridge backwater computations for the bridge over the Jukskei River
January 2014	100-year flood lines for the small streams at the Mandela Township, Bushbuckridge, Mpumalanga Province
December 2013	50- and 100-year flood lines for the Vaalbankspruit and two of its tributaries at the T-Projects Colliery, Mpumalanga Province
November 2013	100-year flood lines for the Tweekuilenspruit at the Cape Biogas plant, Tweekuylen 589 Malmesbury Western Cape Province
October 2013	100-year flood lines for the Magalies River at Lovers Rock Resort, Magaliesburg, Mogale City, Gauteng Province
August 2013	100-year flood lines for the Blaauwbankspruit and two of its tributaries near Magaliesburg, Mogale City, Gauteng Province
August 2013	100-year flood lines for the Bloubankspruit on the farm Vlakdrift, Mogale City, Gauteng Province
August 2013	100-year flood lines for the streams at the proposed solar farm on the Farm Naauw Poort 1, Northern Cape Province
July 2013	50- and 100-year flood lines for the Crocodile River and Bierspruit at the Anglo Platinum Amandelbult Platinum Mine, Northwest Province



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June 2013	100-year flood lines for the Crocodile River at the site for the Mamba cement factory on the farm Krokodilkraal 545 KQ, Limpopo Province
May 2013	100-year flood lines for the Klein Letaba River and the KaSiyandhani Stream at the Eskom Bendstore Substation Giyani, Limpopo Province. This project included the bridge backwater computations of the bridge over the Klein Letaba River
April 2013	100-year flood lines for the Elandspruit at the Yoctolux Colliery, Witbank, Mpumalanga Province
April 2013	50- and 100-year flood lines for the Crocodile River at the Samancor Scheiding Chrome Mine on the farm Scheiding 407 KS, Limpopo Province
April 2013	100-year flood lines for the Kaalfonteinspruit at Tembisa, Ekurhuleni, Gauteng Province
March 2013	100-year flood lines for the Klein Jukskei River at Chartwell North Estate, Johannesburg, Gauteng Province
January 2013	50- and 100-year flood lines for 5 streams traversing the Harmony Gold Kusasaletu Gold mine freehold area, Carletonville, Northwest Province
October 2012	100-year flood lines for the Sabie River and its tributary, the Nwaswitshakana Stream, Skukuza Kruger National Park, Mpumalanga Province
September 2012	50- and 100-year flood lines for the Naauwpoortspruit at the Greenside Colliery, Witbank, Mpumalanga Province
September 2012	50 and 100-year flood lines for an unnamed stream, a tributary of the Gotwane River at the proposed Canyon Springs Colliery, on the farm Roodekoppies 187 JR, Mpumalanga Province
September 2012	50 and 100-year flood lines for the Komati River and a tributary, the Mgobode River at the KaNgwane South Anthracite Mine, Sibange, Mpumalanga Province





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October 2012	100-year flood lines for the Roodeplaatspruit on the farm Roodeplaat 293 JR, downstream from the Roodeplaat Dam, Tshwane, Gauteng Province
August 2012	100-year flood lines for the Eerste River on the farm, Meerlust 1081, Stellenbosch, Western Cape Province
July 2012	50 and 100-year flood lines for the Nyl River at the proposed Volspruit Platinum Mine on the farm Volspruit 326 Kr, Mokopane, Limpopo Province. This study also included the backwater computation of the bridge where the N1 passes over the Nyl River
July 2012	50-year flood lines for the Senotwane Stream, Matebeleng, Limpopo Province
July 2012	50- and 100-year flood lines for the Blesbokspruit and the Cowles Stream at Gold One New Kleinfontein Gold Mine, Ekurhuleni, Gauteng Province
April 2012	100-year flood lines for the Nhenhe River, Cacata, Cabinda Province, Angola
April 2012	100-year flood lines for the Nzachi River, Chicoco, Cabinda Province, Angola
April 2012	100-year flood lines for the Nzachi River, Chivovo, Cabinda Province, Angola
March 2012	100-year flood lines for the Ncambedlana Stream, Mthatha, Eastern Cape Province
February 2012	100-year flood lines for the Bloubankspruit on the farm Danielsrust 518 IQ, Mogale City, Gauteng Province
February 2012	100-year flood lines for the Mambane River and eight other streams, all tributaries of the Komati River, for the Kangwane Anthracite mine on the farms Walda 476 JU, Joyce 477 JU, Monson 478 JU and Wanhoop 485 JU, Mpumalanga Province
January 2012	100-year flood lines for the Hartbeeslaagtespruit on the farm Hartbeestlaagte 325 JS, Witbank, Mpumalanga Province
January 2012	50- and 100-year flood lines for the Vaal River and an unnamed tributary of the Vaal River immediately downstream



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from the Bloemhof Dam on the farm Klipfontein 334 HQ at  
Bloemhof, Free State Province

January 2012

100-year flood lines for the Seepabane River on the farm  
Mattanau 398 LR, Limpopo Province