



# Scientific Aquatic Services

**Applying science to the real world**

29 Arterial Road West, Oriel, Bedfordview, 2007

Tel 011 616 7893

Fax 086 724 3132

[www.sasenvironmental.co.za](http://www.sasenvironmental.co.za)

[admin@sasenvgroup.co.za](mailto:admin@sasenvgroup.co.za)

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**Name:** Stephen van Staden

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**Ref:** SAS 217167

Royal HaskoningDHV (Pty) Ltd  
Fountain Square  
78 Kalkoen Street  
Monument Park Ext 2  
0181

Tel: 012 367 5800

Fax: 012 367 5976

Email: [Sibongile.gumbi@rhdhv.com](mailto:Sibongile.gumbi@rhdhv.com)

Attention: Ms. Sibongile Gumbi

## **RE: FRESHWATER RESOURCE VERIFICATION FOR THE PROPOSED BEZUIDENHOUT VALLEY CLINIC UPGRADE IN BEZUIDENHOUT VALLEY, JOHANNESBURG, GAUTENG**

Scientific Aquatic Services was appointed to conduct a freshwater resource verification within the vicinity of the Bezuidenhout Valley Clinic. The existing Bezuidenhout Valley Clinic is situated within the Bezuidenhout Valley residential area (Figure 1 and 2) and is surrounded by residential housing (to the north) and open space areas. A canalised section of the Jukskei River is located to the south of the clinic property within an open space area. Two alternatives for the clinic expansion activities are proposed:

- Alternative 1: Entails the decommissioning of the existing clinic, and to build a new parking area and clinic on the current site (including the extended site to the east of the clinic property). No parking area and bridge envisaged on the open space area across the canal. This is the preferred option; and
- Alternative 2: Entails retaining the existing clinic, and only extending it to the new site on to the east of the existing clinic. It also entails a new parking area and bridge across the canal.

The key objective of the assessment was to determine whether the formalised canal located to the south of the clinic property within an open space area, could be considered to be a watercourse in terms of the definition contained in Section 1 of the National Water Act (Act 36 of 1998).

Prior to the site investigation, a background study was undertaken, during which the relevant national and provincial spatial databases were consulted. The results of the desktop study are presented in Appendix A at the end of this memo.



Figure 1: Digital satellite image depicting the location of the existing Bezuidenhout Valley clinic in relation to surrounding areas.





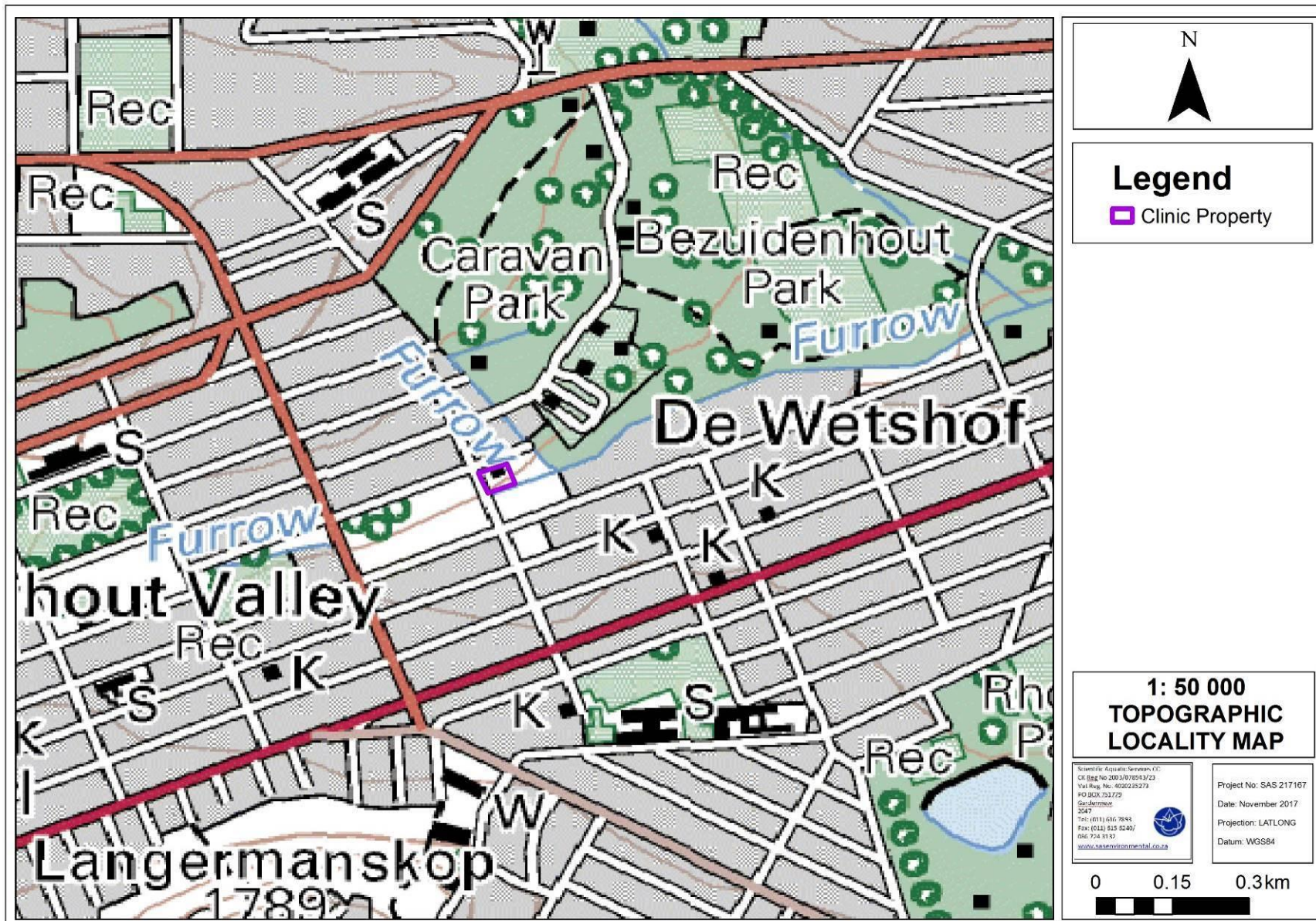


Figure 2: The location of the existing Bezuidenhout Valley clinic on a 1:50 000 topographical map in relation to the surrounding area.



Following the site visit the surrounding area of the Bezuidenhout Valley Clinic undertaken in November 2017, the following key observations were made:

1. Appendix B presents the drainage of the larger area conceptually overlaid on a digital satellite image. The following key points are highlighted:
  - a. The area surrounding the existing clinic saw widespread development which is already evident in aerial photography taken in the early 1960's (Figure 3). This indicates that even at this point in history the drainage of this area was formally canalised as part of the stormwater management of the area;
  - b. The canal forms part of the Jukskei River, which has for the largest upstream portion been constructed as a straight linear structure, where it joins the natural watercourse approximately 1km east of the existing clinic (Appendix B). The width of the canal is on average 7m wide and the depth is in the order of 3 to 4m;
  - c. Downgradient to the south-west of the clinic property, the system daylights into the open canal (Figure 4) which is located to the south of the clinic property within an open space area (Figure 5);



**Figure 3: Historical imagery (circa 1962), indicating the extensive residential development surrounding the Bezuidenhout Valley Clinic property (red square), the canalised portion of the Jukskei River (orange line) joining to the natural watercourse (blue line). The green line indicates an underground portion of the canal which daylights at the south-western corner of the clinic property.**





**Figure 4:** Left: The area west of 6<sup>th</sup> Street where the canal is underground (blue line), before it daylights to the east of 6<sup>th</sup> Street. Right: The canal daylights east of 6<sup>th</sup> Street, south to the clinic property (located to the right in this photograph).



**Figure 5:** The formalised canal, located within an open space area, south of the clinic property (red arrow).

2. No natural vegetation associated with wetlands or riparian zones of watercourses was present alongside the concrete canal. The open space area (south of the canal) has been shaped and is dominated by Kikuyu grass (*Pennisetum clandestinum*), and alien grass species. On the western side of the canal (east of the clinic property) a vegetable garden has been established, whilst the remaining area is dominated by alien invasive species and terrestrial vegetation;
3. It can be summarised that a natural watercourse has been historically (prior to the 1960's) formally canalised in order to accommodate stormwater generated from the upgradient (Johannesburg) and surrounding urban setting of the Bezuidenhout Valley Clinic. Even though this canal joins into a natural watercourse, the canal is for the larger part considered a stormwater canal, receiving runoff from the surrounding and upgradient impermeable surfaces and hence cannot be defined as a natural watercourse.

As contained in the definitions in Section 1 of the National Water Act (NWA) (Act 36 of 1998), a watercourse can be defined as follows:

“Watercourse” means:

- a) A river or a spring;
  - b) A natural depression;
  - c) A wetland, lake or dam into which, or from which, water flows; and
  - d) Any collection of water which the Minister may by notice in the Gazette declare to be a watercourse
- and a reference to a watercourse includes, where relevant, its bed bank

The term “riparian habitat” as defined in the definition of a watercourse (item a above) includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent areas (NWA, 1998); and

The term “wetland” as defined in the definition of a watercourse (item c above) means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or land is periodically covered with shallow water and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil (NWA, 1998).



It is the conclusion of the freshwater ecologist that the open canal south of the clinic property receives stormwater from the underground network directly to the west of the clinic property and overland runoff surrounding areas and conveys water to the downstream natural watercourse in the low lying areas in the landscape.

The system was developed to convey urban stormwater to the nearest natural watercourse and does not conform to the definition of a watercourse. It also does not conform to the definition of a wetland or watercourse as defined above.

Taking the above observations into account, the canal constructed by the local authority many years ago can, in our opinion, not be defined as watercourse as defined in the National Water Act or the National Environmental Management Act (Act 107 of 1998) and in no way can be considered a natural feature. The proposed development thus poses no quantum of risk to any watercourse. Due care should however be taken in the release of the stormwater from the canal to protect the concrete canal and downstream natural resources from erosion, sedimentation and incision and to protect downstream water resource function and ecoservice provision, and limit the degradation of the water quality thereof. Thus, from an enviro-legal viewpoint, the proposed expansion activities, whether Alternative A or B is considered, would not pose any constraints in terms of environmental authorisation.

We trust we have interpreted your requirements correctly. Please do not hesitate to contact us if there are aspects of this document that you would like to discuss further.

Yours Faithfully,

**Digital Documentation Not Signed for Security Purposes**

Stephen van Staden



## REFERENCES

**Department of Water Affairs and Forestry (DWAF).** 2008. Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, prepared by M. Rountree, A. L. Batchelor, J. MacKenzie and D. Hoare. Report no. X. Stream Flow Reduction Activities, Department of Water Affairs and Forestry, Pretoria, South Africa.

**National Environmental Management Act (NEMA)** 107 of 1998

**National Water Act** 36 of 1998

**NFEPA:** Driver, A., Nel, J.L., Snaddon, K., Murray, K., Roux, D.J., Hill, L., Swartz, E.R., Manuel, J. and Funke, N. 2011. Implementation Manual for Freshwater Ecosystem Priority Areas. Water Research Commission. Report No. 1801/1/11. Online available: <http://bgis.sanbi.org/nfepa/project.asp>





## APPENDIX A: Background Data

**Table A: A summary of the background information applicable to the existing clinic property and surrounding area**

Aquatic ecoregion and sub-regions in which the proposed development is located		Detail of the clinic property in terms of the National Freshwater Ecosystem Priority Area (NFEPA) (2011) database	
Ecoregion	Highveld	FEPACODE	The clinic property is located within a subWMA considered to be an upstream management catchment, and anthropogenic activities in these areas must be carefully controlled in order to prevent downstream degradation of FEPAS and Fish support areas (FEPACODE = 4.)
Catchment	Limpopo		
Quaternary Catchment	A21C		
WMA	Crocodile (West) and Marico	NFEPA Wetlands	According to the NFEPA Database, no wetlands are located within the clinic property nor within the close surrounding area.
subWMA	Upper Crocodile		
Dominant characteristics of the Highveld Ecoregion Level 2 (11.01) (Kleynhans <i>et al.</i> , 2007)		Wetland Vegetation Type	Mesic Highveld Grassland Group 3 (Critically Endangered)
Dominant primary terrain morphology	Plains; Low Relief	NFEPA Rivers (Figure A1)	The Jukskei River is situated approximately 500m south of the clinic property and is indicated by NFEPA to be in a largely modified (Class D) ecological condition.
Dominant primary vegetation types	Rocky Highveld Grassland		
	Mixed Bushveld	Detail of the clinic property in terms of the Gauteng Conservation Plan (C-Plan V3.3, 2011) (Figure A1 & A2)	
Altitude (m a.m.s.l)	1300-1900	Critical Biodiversity Area (CBA)	No CBA is located within close proximity to the clinic property. A CBA is located approximately 6.2km north west of the clinic property. A CBA is an area considered important for the survival of threatened species and includes valuable ecosystems such as wetlands, untransformed vegetation and ridges.
MAP (mm)	500 to 700		
Coefficient of Variation (% of MAP)	20 to 34		
Rainfall concentration index	55 to 64	Ecological Support Area (ESA) (Figure A2)	The clinic property as well as the area south thereof, is considered to be part of an ESA. An ESA provides connectivity and important ecological processes between CBAs and is therefore important in terms of habitat conservation
Rainfall seasonality	Early to mid summer		
Mean annual temp. (°C)	14 to 18		
Winter temperature (July)	0 – 20 °C		
Summer temperature (Feb)	12 – 30 °C		
Median annual simulated runoff (mm)	20 to 60		
Ecological Status of the most proximal sub-quaternary reach (DWS, 2014)			
Sub-quaternary reach	A21C-01269		
Proximity to clinic property	Approximately 6,7 km north east of the clinic property	River (Figure A3)	A perennial river has been indicated by the C-Plan to be located south of the clinic property, corresponding with the locality of the Jukskei River.
Assessed by expert?	Yes	Urban Area	The clinic property is located within the Urban Edge according to the C-Plan V3 (2011). Although the Urban Area was rescinded as a policy document in the Gauteng Spatial Development Framework (2011), it nevertheless remains a useful indicator of where concentration [of development] should occur.
PES Category Median	E		
Mean Ecological Importance (EI) Class	Low		
Mean Ecological Sensitivity (ES) Class	Moderate	Detail of the clinic property in terms of the City of Johannesburg Wetland Database (CoJ, 2014)	
Stream Order	1		
Default Ecological Class (based on median PES and highest EI or ES mean)	Moderate (Class C)		The COJ wetland dataset indicates wetland areas in the same vicinity as the river buffer indicated by the GDARD C-Plan. As with the GDARD C-Plan, as discussed above, this area was extensively investigated during the site assessment.





Figure A1: The locality of the Jukskei River south of the clinic property, as identified by the NFEPA (2009) database.







Figure A2: The Critical Biodiversity associated with the clinic and surrounding area, according to the Gauteng C-Plan (2013).







Figure A3: The River Buffer associated with the clinic and surrounding area, according to the Gauteng C-Plan (2011).





APPENDIX B

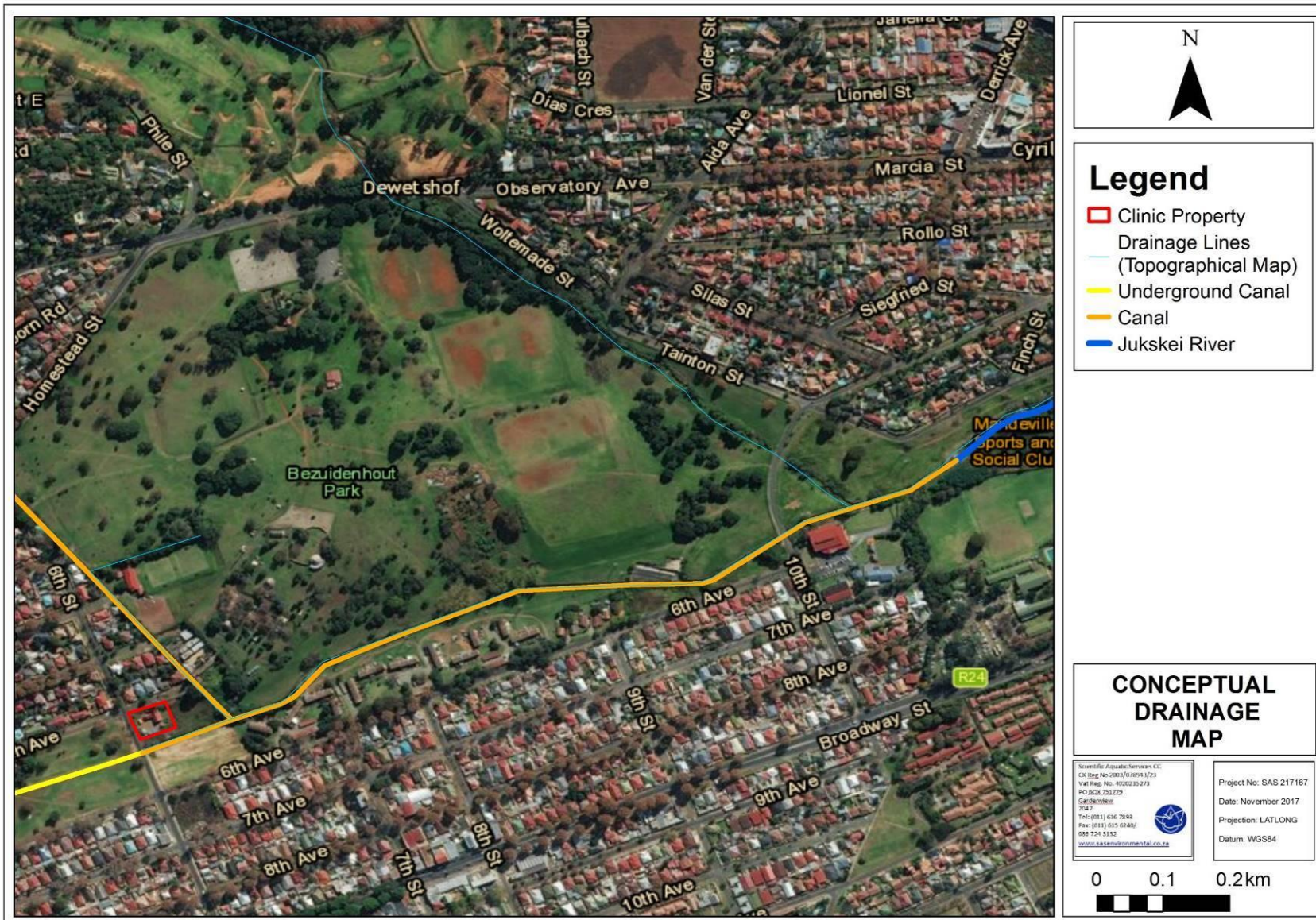


Figure B1: Conceptual illustration of the upstream canalised portion of the Jukskei River, where it ultimately joins the natural watercourse, approximately 1km from the clinic property.

