#### INDEPENDENT EXPERT OPINION

Dr Kevin Winter

### WITH RESPECT TO

An Appeal to the Water Tribunal to uphold the suspension of the Water User License issued to the Liesbeek Leisure Property Trust (LLPT)

### **Qualifications and experience**

Dr Kevin Winter is a specialist in water resource science and management. He is senior lecturer in Environmental & Geographical Department at the University of Cape Town, and a lead researcher at the Future Water Institute at the university. He has a PhD in Water Management from UCT (2006). He is the research director at the Water Hub, Franschhoek, where he has extensive experience in nature-based processes in the treatment and reuse of water. Since 2017 he has served on the City of Cape Town's Section 80 Water Resilience committee which was established as a knowledge sharing platform during the 'Day Zero' scenario and continues to address water-related issues in the City. He has also been a member of the Friends of the Liesbeek since 1996 serving an executive committee and chaired the organisation for 6 years.

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## **Conflict of interest statement**

I confirm that I have no conflict of interest whatsoever in providing this expert report.

### INTRODUCTION

The document provides my professional opinion with respect to the issuance of a Water User License (WUL) by the Acting Provincial Head of the Western Cape for the Department of Water & Sanitation ("DWS") to Liesbeek Leisure Properties Trust (LLPT) and why the suspension on the WUL of the should not be removed as applied for by the LLPT.

I have read the Final Basic Environment Impact Assessment Report prepared by the Environmental Consultants (SRK); the Water Use License issued in 8 June 2021 by the Department of Water and Sanitation (DWS) which was signed by Ms Boniswe Hene, Acting Head of Provincial DWS; and the Record of Recommendation (ROR) issues to the LLPT dated 4 June 2021.

### **GRANTING OF LICENSE**

- 1. The DWS granted the LLPT authorisation for the use of water in terms of:
  - 1.1. section 21(c) of the NWA, for impeding or diverting the flow of water in a watercourse; and
  - 1.2. section 21(g) of the NWA, for altering the bed, banks, course or characteristics of a watercourse.

In my opinion, the suspension on WUL, which is operative as a result of an appeal against the decision to grant the WUL, should not be lifted by the Minister, as the development at the River Club and consequent water uses for which the LLPT received authorisation in terms of the WUL, will cause irreparable harm to the environment, people and Liesbeek River, for the following reasons:

# 1. FAILURE TO CONSERVE THE LAST REMAINING HISTORIC CHANNEL OF THE LIESBEEK RIVER

The Liesbeek River channel has been significantly modified since the arrival of European settlers. This began with farming activity along its banks. From the 1780s it was considerably by industrialisation and urbanisation. The earliest record of the Liesbeek channel (Figure 1) is recorded in the Historiese Atlas which shows the path of the channel in 1657 (Stockman, n.d.). The encircled section on the map is relevant because it indicates a stretch of the Liesbeek channel lying adjacent to the River Club property and is referred to as the Liesbeek wetland in the WUL. It is one of the last remaining stretches which has not been altered after it leaves Bishopscourt (property of the Anglican Church of southern Africa). Everywhere else the course has been changed. Canalisation began in 1928 and continued until 1950s with only 2 kms left of the Liesbeek river that is uncanalised.

The WUL gives the licensee the authority to fill this historic stretch and to repurpose a natural channel into a stormwater swale, effectively a 'modern' day stormwater channel. By implication the WUL has accepted Alternative 1 option as recommended by the BAR (E. Day, et.al. Report 2019; & Aurecon Report, 2019). The proposed swale is designed to be a stormwater conduit that will perform a similar function to other canalised sections of the Liesbeek. This concern is explained later.



Figure 1: Liesbeek Neersetting 1657-1660.

## 2. UNDER-ESTIMATION/-ENUMERATION OF THE DISCHARGE

The WUL is issued on the premise that the assumptions and validation of the modelling exercise results are acceptable in deciding that the flood risk can be mitigated by raising the building platform and that the effect on surrounding properties will be insignificant (reference to the Aurecon Report, 2019). The modelling focuses attention on the site. Data used as inputs are not ideas and is recognised by the Aurecon Report. For instance, the modellers did not have the hydrological data from the Liesbeek and Black River

channels since there are no function gauging stations on these rivers. Studies on the peak flow of Liesbeek and volume of the discharge are not available. Therefore, the premise on which the WUL was granted, is flawed, as there are limited available hydrological data which could have informed a decision which determines whether or not the flood risk can be mitigated adequately by raising building platforms.

In a recent study, which I supervised, Fahad Aziz (MSc UCT) used digital data and highresolution real-time sensors to measure the rate of discharge in the Liesbeek at the Durban Road, Mowbray. This site is 900 metres upstream of the canalised section that abuts the River Club property. The graph below (Figure 2) shows the rate of discharge from rainfall measured at Kirstenbosch and Observatory weather stations (SA Weather Services data). Peak flow was measured at the Durban Road bridge (Site 3) after the first 35 minutes of rainfall reaching a peak discharge of 15m3/s (15 000 l/s), i.e. when the water level was close to bank full. The total volume water in the rising and falling limb of the hydrograph is 63 230 m<sup>3</sup>. Thus, the proposal to widen the canalised section of the eastern Liesbeek can by removing the canal wall and landscaping the 'left' bank is unlikely to be a feasible option. In addition, removing sections of the canal will add frictional drag to the flow and alter the hydraulics and rate of discharge causing water to backup and result in flooding further upstream. The Observatory Road bridge will be the first obstacle that will obstruct backflow. The rehabilitation of the canalised section of the Liesbeek is not feasible.



Figure 2: Hydrograph from study site: Durban Road bridge, Mowbray (F. Aziz 2019)

### 3. STORMWATER DRAINAGE: MANAGEMENT DIVESTED TO PRIVATE PROPERTY OWNER

It is not clear why activity 21 (f) "discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit" was not included or if it were applied for, why it was not included in the water use licence. Consideration of the City's stormwater drainage network is absent from the EIA and specialist reports which pertains to surrounding properties. There is provision in the WUL for a stormwater management plan, but it is assumed that this refers to the site and not the City's stormwater management plan:

2.5 A Storm Water Management Plan must be updated and drawn up on A 1 paper and submitted to the Provincial Head for written approval within 3 months of licence being issued. Clean water dirty water must be separated.

The map below (Figure 3) shows the City's stormwater network (purple lines). It discharges into the western Liesbeek stretch at 7 outlet pipelines (ranging from 225 cm to 1.2m in diameter). This stormwater drains an urban area of approximately 1 km<sup>2</sup> (runoff from areas further upslope are not included). The DWS erred in issuing a WUL license without clearly understanding how the City's stormwater will be managed. At this stage it is only assumed that stormwater will enter the proposed swales. DWS either overlooked the stormwater or assumed that the proposed swale would include stormwater from the surrounding urban area. If this is the case, then the WUL should not have been issued. Given the volume of stormwater (Table 1) and quality of runoff, the stormwater plan should have informed the WUL rather than after the fact. Unless DWS is aware of other plans, there is no provision for a new stormwater pipeline to connect to the current discharge points in the absence of the historic Liesbeek channel.



Figure 4: Stormwater network and immediate drainage area

Rainfall for selected events in 2019 (F. Aziz study) shows the expected volume of water from annual rainfall and three short rainfall events. For perspective, this equates to one 5th of storage capacity of the Molteno Dam, Cape Town.

Rainfall	Area km²	Calculated volume discharge in m <sup>3</sup>
600 mm / annum	0.988227	592 9362
22.4mm (19/05/19)	0.988227	22 136.3
44.4mm (04/06/19)	0.988227	43 877.3
17.8mm (19/06/19)	0.988227	17 590.4

Table 1: Annual rainfall (grey) and selection of rainfall events (2019) (blue) from Observatory weather station data (SA Weather Services)

The WUL should have identified the opportunity to improve water quality in the Liesbeek channel and the potential to improve the support habitat for Western Leopard Toads, Kingfishers and wildfowl rather than fill in this historic stretch of the river. The proposal recommends a series of underground biofilters and surface water ponds based largely on models from the Georgia Stormwater Management Manual, USA. The proposed swales are untried and untested in their application to Cape Town's stormwater with elevated level of nutrients, bacteria, hydrocarbons and solid litter.

It is noted that item 9.5 of WUL makes provision for a final stormwater management plan and construction drawings to be approved by the City of Cape Town prior to construction. However, the DWS should have recognised the building footprint will encroach on the Liesbeek channel.

## 4. FAILURE TO CONSIDER AN INTEGRATED CATCHMENT MANAGEMENT APPROACH

The failure of Environmental Impact Assessments and the brief to consultants is that they focus on an environmental evaluation of site-specific issues and immediate adjoining land use. In most cases these limitations are acceptable, but in this case, the site is connected to a catchment where flow of water and quality are dependent on what happens upstream. DWS has issued the WUL without due consideration of other developments are being planned in other parts that will impact on the rate of the discharge and time lag to reach peak flow. The Protea Village land restitution claim is one of larger housing developments that will impact on seepage and surface water flow in the upper catchments. The development spans an area of 78 000 m<sup>2</sup> (Figure 4). If 60% of the area is covered by building

resulting in hardening of surface and runoff then an annual rainfall average of 1200 mm result in an extra annual discharge into the Liesbeek of 56 160 m<sup>3</sup>. Where will the water go? The WUL does not evaluate the risk of developments, such as the Protea Village, further upstream. During this past week (5 – 9 July), for example, the Liesbeek River was observed at near-bank for stages (see photograph below).



Figure 4: Anticipated plan for the Protea Village land restitution project (upper Liesbeek).



(a) Canal at near bank full stage adjacent to the River Club: Thursday 8 July at 16h45. (b) Close to topping the canal: Friday 9 July 09h04.

These images illustrate that the capacity of the river to carry additional runoff from the catchment is limited. Changing the hydraulic capacity through the proposed interventions could result in flooding further upstream. The WUL should have considered interventions further upstream. For example, recommending the unblocking of the pipeline between the Liesbeek River and western channel of the Liesbeek will increase the capacity of the river to deal with floodwaters; harvesting and excavating parts of the Valkenburg wetland (a mere 500 m) upstream of the River Club, would reduce the potential of flooding with the offtake

of peak flow. The issuance of the WUL license without reference to the impacts of developments in catchment is unacceptable. DWS fails to recognise the opportunity of integrating the River Club development with the Liesbeek catchment.

## 5. WATER USER LICENSE IGNORES ALTERNATIVE OPTIONS

The WUL only considers Alternative 1 as recommended by EIA. It fails to make a direct reference to Alternative 2 as an option, or a 'no-go' in which DWS recognises value of floodplain that would favourably support the City of Cape Town's water strategy in developing a water resilient (2030) and a water sensitive city by 2040.

## REFERENCES

Aziz, F. 2020 An analysis of discharge and water quality of an urban river and implications for stormwater harvesting. MSc Unpublished, University of Cape Town. https://open.uct.ac.za/bitstream/handle/11427/32582/thesis\_sci\_2020\_aziz%20fahad.pdf?sequenc e=1

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Signed:

Date: 03/08/2021