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**WATER USE LICENSE APPLICATION SUMMARY REPORT:  
PORTIONS 6, 9, 11 AND 19 OF FARM 170 GAMTOOSBERG AND  
PORTIONS 3 and 4 OF FARM 172 KELLERHOOGTE**

**DRAFT REPORT**

**Prepared for Viljee Keller Trust**

**by**

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## 1. INTRODUCTION

### 1.1 Background

The Viljee Keller Trust (applicant) has signed up as a producer for the Calitzdorp Export Agri Hub, which aims to become one of the leading exporters of pomegranate fruit in the world. The first phase of the project aims to plant 200 ha of pomegranate in the Klein Karoo region by August 2021. The Export Agri Hub project has been financially supported by the Eden District Municipality and is seen as a crucial project to providing jobs and stimulating economic development in the Klein Karoo.

The applicant has signed an initial contract to contribute 10 ha to the first phase and will expand production to meet the demand of future phases. In the short-term, the applicant wishes to establish 46 hectares of pomegranates and 10 ha almonds on Portion 4 of Farm 172 Kellershoogte, in addition to the 10 ha of lucerne currently cultivated on Portions 6, 9, 11 and 19 of Farm 170 Gamtoosberg. The properties are located in quaternary catchment J35B just south of Oudtshoorn along the Kandelaars River (Figure 1). The applicant has an existing lawful use (ELU) to abstract approximately 127 500 m<sup>3</sup> from the Kandelaars River and 19 500 m<sup>3</sup> from two registered boreholes (KBH01 and KBH04). Due to numerous dams located along the course of the river and the highly irregular rainfall in the catchment area, the applicant is unable to reliably abstract their registered volume of water from the Kandelaars River of an annual basis. Any expansion of his agricultural business is therefore dependent on the availability of a reliable water source. The applicant therefore drilled two new boreholes for this purpose.

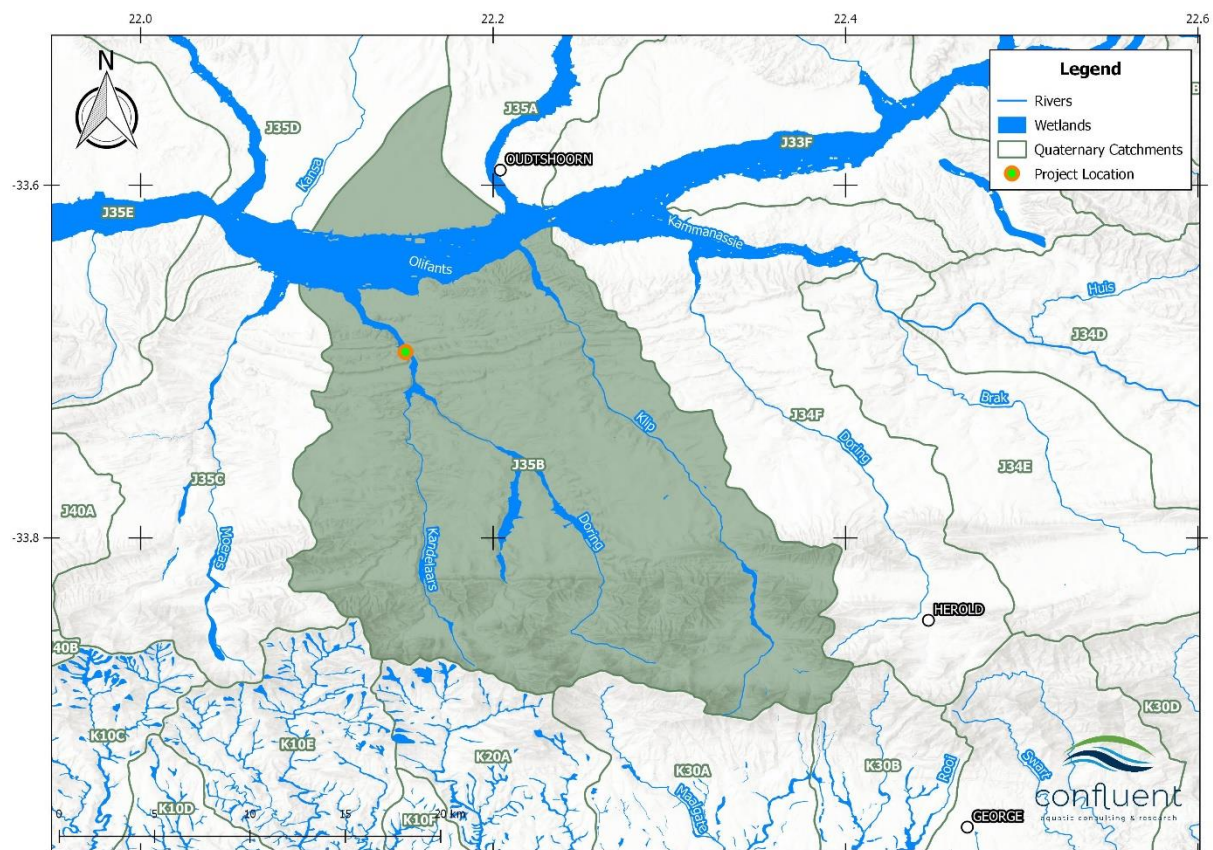


Figure 1: Map indicating location of water uses.

### 1.2 Project Description

The applicant intends to apply for water to irrigate 46 hectares of pomegranates and 10 hectares of almonds, in addition to the 10 hectares of lucerne currently irrigated on the farm. Water will be

abstracted from three boreholes, two of which are located on Portion 19 of Farm 170 (KBH02 and KBH03) and one which is located on Portion 9 of Farm 170 (KBH04). KBH04 and KBH01 (which is now dry) are existing, registered boreholes, for which the applicant has a registered water use of 19 500 m<sup>3</sup>. KBH02 and KBH03 are two new boreholes that have been drilled to provide additional water for the project. Water from all three boreholes will be used to irrigate lucerne currently cultivated on Portions 6, 9, 11 and 19 of Farm 170 and pomegranates and almonds, which will be cultivated on Portion 4 of Farm 172 Kellershoogte. Water from the boreholes will be transferred to Portion 4 of 172 by means of a pipeline which crosses a non-perennial drainage line (Figure 2).



Figure 2: Position of boreholes and pipeline for transferring water to Portion 4 of Farm 172.

A summary of authorization(s) required in terms of the National Water Act is provided in Table 1.

Table 1: Summary of Authorization(s) Required in terms of the National Water Act.

Water use(s) activities	Purpose	Volume (m <sup>3</sup> , dimension)	Property Description	Co-ordinates
<b>Section 21(a)</b>				
Taking of water from a borehole (KBH02)	Irrigation	131 772 m <sup>3</sup>	Portion 19 of Farm 170	33.69422 S 22.15152 E
Taking of water from a borehole (KBH03)	Irrigation	148 244 m <sup>3</sup>	Portion 19 of Farm 170	33.69482 S 22.15198 E
Taking of water from a borehole (KBH04)	Irrigation	37 944 m <sup>3</sup>	Portion 9 of Farm 170	33.69930 S 22.15437 E
<b>Section 21 (c)</b>				
Pipeline to Transfer Water for Irrigation	Irrigation	1125 m	Portion 3 of Farm 172	33.70240 S 22.15293 E
Non-perennial drainage line covered by agricultural field	Irrigation	350 m	Portion 4 of Farm 172	33.70883 S 22.14692 E
<b>Section 21 (i)</b>				
Pipeline to Transfer Water for Irrigation	Irrigation	1125 m	Portion 3 of Farm 172	33.70240 S 22.15293 E
KBH02 located within the regulated area of a watercourse	Irrigation	131 772 m <sup>3</sup>	Portion 19 of Farm 170	33.69422 S 22.15152 E
KBH03 located within the regulated area of a watercourse	Irrigation	148 244 m <sup>3</sup>	Portion 19 of Farm 170	33.69482 S 22.15198 E
Non-perennial drainage line covered by agricultural field	Irrigation	350 m	Portion 4 of Farm 172	33.70883 S 22.14692 E

## 2. WATER RESOURCES AND AVAILABILITY

### 2.1 Existing Water Resources

Kellershoogte has a registered water use from two boreholes (KBH01 and KBH04 in Figure 1) to the volume of 19 500 m<sup>3</sup>/y and from the Kandelaars River a volume of 127 500 m<sup>3</sup>/y. During the major recent drought, the groundwater table lowered drastically in response to abstraction and the yields of the two boreholes decreased significantly. No water was available for irrigation from the Kandelaars River for more than two years. The preliminary validation and verification (V&V) indicates that the Existing Lawful Use (ELU) is likely lower than the registered volumes (approximately 75 300 m<sup>3</sup>/annum).

### 2.2 New/Additional Water Resources

Two deeper boreholes (KBH02 and KBH03) were drilled in the vicinity of the existing boreholes with the aim of accessing deeper aquifers that are not currently exploited by other groundwater users. The two deeper boreholes had good groundwater yields at depth with acceptable salinity and were therefore equipped to use for irrigation of fruit trees. The total sustainable yield of the three boreholes (KBH02, -3 and -4) available for pumping in the Kellershoogte area amount to a total of 422 750 m<sup>3</sup>/a.

## 3. WATER RESOURCE DEVELOPMENT PLAN

### 3.1 Water Demand Analysis

Future crop production plans and water requirements are provided in Table 2. Total irrigation requirements were estimated using the SAPWAT (version 4) irrigation model and are approximately 393 260 m<sup>3</sup>/annum.

Table 2: Estimated monthly irrigation requirements (m<sup>3</sup>) for 10 hectares of lucerne, 10 hectares of almonds and 46 hectares of pomegranates.

	Lucerne	Almonds	Pomegranates	TOTAL
<b>Water Source</b>				
	Kandelaars River & Borehole	Borehole	Borehole	
<b>Area (ha)</b>				
	10	10	46	66
<b>Irrigation Method</b>				
	Flood & Sprinkler	Drip	Drip	
<b>Irrigation Requirement (m<sup>3</sup>)</b>				
<b>January</b>	22 200	9 500	64 400	96 100
<b>February</b>	18 000	7 500	49 680	75 180
<b>March</b>	14 000	6 000	27 600	47 600
<b>April</b>	6 600	3 200	0	9 800
<b>May</b>	4 200	3 100	0	7 300
<b>June</b>	0	0	0	0
<b>July</b>	0	0	0	0
<b>August</b>	300	0	0	300
<b>September</b>	5 700	0	0	5 700
<b>October</b>	13 100	2 400	0	15 500
<b>November</b>	18 400	7 100	22 080	47 580
<b>December</b>	21 400	9 200	57 500	88 100
<b>TOTAL</b>	<b>123 900</b>	<b>48 100</b>	<b>221 260</b>	<b>393 260</b>

### 3.2 Water Source Analysis

Of the total 393 260 m<sup>3</sup> irrigation demand, 75 300 m<sup>3</sup> will be provided by the ELU from the Kandelaars River. The balance of the irrigation requirements (317 960 m<sup>3</sup>) will be supplied by combined abstraction from KBH02, -03 and 04. According to the geohydrological report, the monthly irrigation requirements can be supplied by the boreholes, provided that the total sustainable yield of the borehole (of 422 750 m<sup>3</sup>) is not exceeded on an annual basis (Table 3).

Table 3: Borehole specifications

Borehole	Depth (m)	Static Water Level (m)	Sustainable Yield (L/hr) Pumping @ 12 hrs/day	Yield/a (m <sup>3</sup> /a)
<b>KBH02</b>	310	51.4	40 000	175 200
<b>KBH03</b>	200	50.14	45 000	197 100
<b>KBH04</b>	50	7.4	11 520	50 450
<b>Total Volume (m<sup>3</sup>/year)</b>				<b>422 750</b>

### 3.3 Storage Demand Analysis

Crops will be irrigated directly from the borehole supply and no storage is therefore required.

### 3.4 Water Distribution Plan

Water will be pumped from the boreholes (located on Portions 9 and 19 of Farm 170) via a pipeline to the fields established on Portion 4 of 172. The pipeline has already been constructed and crosses one watercourse on its route to Portion 4 of 172. Trees will be irrigated by drip irrigation.

## 4. WATER DEMAND MANAGEMENT

Management of water demand will be maximised by implementing drip irrigation for almonds and pomegranates. This is an efficient use of water. In addition, the following water demand management interventions are recommended:

- Flow volumes abstracted from each borehole must be measured and recorded at the end of each month.

## 5. WATER RESOURCE PROTECTION

The following recommendations regarding the monitoring of the WULA boreholes should be considered:

- Groundwater levels should be measured on a monthly basis to verify the results of the sustainable yield estimations. In doing so, timely adjustments can be made to the pumping rate and/or duration of a borehole that shows signs of an unacceptable decline in water level and its imminent failure (if any).
- The flow meters with which the boreholes have been equipped must be read at monthly intervals.
- The above data should be captured into an electronic database for easy access, interpretation and review.

## 6. APPENDICES

### 6.1 Section 27 (a) - Existing Lawful Use

There are two existing Registration Certificates, issued under NWA, 1998 (Act no. 36 of 1998) to use water on Gamtoosberg Farm T62604/1995. See Table 4 below.

Table 4: Water uses registered for Gamtoosberg Farm under the previous title deed (T62604/1995).

Property	Registration Certificate number	Water use	Source	Volume m <sup>3</sup>
Gamtoosberg T62604/1995	22046162	21a (Taking water from a water resource)	Kandelaars River	22 500
			Borehole	19 500
Gamtoosberg T62604/1995	22075380	21a (Taking water from a water resource)	Kandelaars River	105 000
<b>Total:</b>				<b>147 000</b>

A preliminary Validation and Verification (V&V) for the above registered water uses indicates that the ELU is likely lower than the registered volumes at approximately 75 300 m<sup>3</sup>/annum.



## **6.2 Section 27 (b) - The Need to Redress the Results of Past Racial and Gender Discrimination**

The project is expected to create a total of 150 work opportunities. All spaces will be taken up by Historically Disadvantaged Individuals (HDIs) from the rural areas surrounding Calitzdorp and Oudtshoorn (Eden District Municipality) which will therefore create a reduction in the unemployment figures for the local economy.

## **6.3 Section 27 (c) - Efficient and Beneficial Use of Water in the Public Interest**

The Export Agri Hub has been financially supported by the Eden District Municipality as it is seen as a crucial project to providing jobs and stimulating economic development in the area.

Water will be used to irrigate pomegranate and almond orchards. Drip-irrigation and sprayers will be used for the pomegranates as it is the most efficient and effective watering methods for these orchards. The water drip will be specifically concentrated in designated areas to minimise excess use or wastage of the water resource. Previously flood irrigation was used on 10 ha of lucerne at a rate of 12 250m<sup>3</sup>/ha, whereas the new method of irrigation requires 5 000m<sup>3</sup>/ha for the pomegranates.

Water supplied to the orchards will be calculated and monitored on an on-going basis to make sure use is within the registered rights. The production boreholes are equipped with flow meters, so that the abstraction volumes can be measured and abstraction volumes be supplied if need be.

## **6.4 Section 27 (d) - Socio-Economic Impact**

Agriculture as a sector is becoming increasingly important on a global, national and local level. With the world population having grown rapidly in the last century, the concept of food security is becoming an ever-increasing concern for governments across the globe. The agricultural sector is also seen as a critical employer with larger scale farming operations not only creating many jobs in rural communities, but also being a catalyst in creating downstream business and employment opportunities within the agri-processing and manufacturing sectors.

Socio-economic impacts are expected to be positive and include the following:

- The expected yearly income/contribution to the economy that will be generated by the pomegranate orchards through job creation and income is estimated at R14 000 000. R12 000 000 would be from foreign currency associated with exports.
- The landowner is part of the Calitzdorp Export Agri Hub, which aims to become one of the leading exporters of pomegranate fruit in the world. The landowner signed a contract to contribute 10 ha of pomegranate fruit (of the planned 200 ha of pomegranate orchards) in the Klein Karoo region. The Export Agri Hub has been financially supported by the Eden District Municipality as it is seen as a crucial project to providing jobs and stimulating economic development in the area.

## **6.5 Section 27 (e) Relevant Catchment Management Strategies**

Portions 3 and 4 of Farm 172 Kellershoogte Portion 19 of the Farm Gamtoosberg fall within the Breede-Gouritz Catchment Management Agency (BGCMA). The vision of the BGCMA Catchment Management Strategy is captured by:

*“Healthy water resources, for all, forever”*,

This can be reflected by the following mission statements:

- Healthy water resources: Ensure sustainability of our rivers, groundwater, wetlands and estuaries to maintain functional catchments and clean and healthy water for the environment, people and the economy, through effective policy and regulation,
- For all, forever: Allocate and use our water resources equitably, efficiently and responsibly to maintain existing desired activities, support new development, ensure social justice and reduce inefficient activities, adaptive to changing climate and development pressures,
- Collectively take responsibility to nurture and steward our catchments using the principles of ubuntu, through knowledge sharing, cooperation and implementation of innovative ideas within all communities, and by building strong flexible institutions supported by engaged stakeholders.

The water use license application process has been implemented to ensure that water use activities are authorised in a manner that achieves these broad mission statements, particularly the mission of ensuring healthy water resources and allocating water for all forever. Application of this license and the implementation of associated licensing conditions such that the Reserve and Resource Quality Objectives are met is linked directly to Strategic Area 1 of the management strategy:

**Protecting for People and Nature:** focussing primarily on management of streamflow, water quality, habitat and riparian zones related to riverine, wetland, estuarine and groundwater resources, to maintain important ecosystem goods and services and biodiversity.

Application of a water use license also fulfils Strategic Area 2 of the management strategy:

**Sharing for Equity and Development:** focussing primarily on management of water use from surface and groundwater resources through the operation of infrastructure, in order to provide water for productive and social purposes within and outside of the WMA.

## 6.6 Section 27 (f) - The Likely Effect of the Water Use on the Water Resource and other Water Users

Laying the pipeline required that the bed and banks of the KH1 non-perennial stream were excavated along the section where the pipe crosses the river. The pipeline did however follow the alignment of an existing farm road that crosses KH1 at this point. In this respect, disturbance to the bed and banks was minimised as the pipeline fell entirely within the existing footprint of the road.

Establishment of agricultural fields on Portion 4 of Farm 172 covered a portion of a non-perennial drainage line (KH2). Given the non-perennial and highly intermittent flow characteristics of the drainage line it is not important with respect to hosting a diverse aquatic assemblage. The main function of this watercourse is to supply flows to downstream areas as opposed to hosting instream aquatic fauna and flora. Loss of a portion this drainage line did not however result in a significant alteration to the ecological function of the watercourse as it had already been disconnected from the broader hydrological network prior to the establishment of the agricultural fields via a furrow that intercepted all flows originating from the northerly draining watercourse. The intensity of the impact is therefore not considered to be very high based on the condition of the watercourse prior to the activity. Nevertheless, the channel will be re-established to run along its former alignment.

With respect to the boreholes, if the recommended sustainable yields per borehole are not exceeded, the proposed groundwater abstraction is expected to neither have any significant immediate effects on groundwater availability of nearby groundwater users, nor would it have lasting adverse impacts on the

groundwater system or base flows in the Kandelaars River. The pumping tests have shown that after extensive pumping:

- The Kellershoogte boreholes have very little water level impact on each other.
- Nearly no interaction (water level response) could be measured between the shallow and the deeper aquifers in the Kellershoogte boreholes.
- There was even very little (a few centimetres) interaction between the two deep boreholes during the pump testing in the deep aquifer.
- No water level response was measured in the nearest neighbouring user borehole.
- There is no shallow (primary or secondary) aquifer present in the study area;
- There is no alluvial aquifer present around the Kandelaars River in the study area.
- There is no base flow interaction between the groundwater and the Kandelaars River in the project area – the river acts as a losing stream and groundwater abstraction has no influence on the hydrology or fresh water ecology of the river.
- At the end of an extreme drought the estimated sustainable yields of the two deep boreholes were less than 20% of the yield calculated after good rainfall occurred and the aquifer was adequately recharged.

Based on the DWS classification, the total sustainable yield (i.e. the applied-for volume) can be classified as Category C or large scale with respect to the property size and far exceeds the annual recharge on the property surface area. The applied-for use is, however, still supported on the basis that:

- Unexploited groundwater will be used instead of over-stressed surface water resources in the area;
- The abstraction will mainly occur from deeper aquifers that are not currently used by any nearby user;
- Extensive testing showed that other groundwater users will not be significantly affected; and
- The applied-for groundwater use represents a mere 1.4% of the exploitable groundwater potential in the catchment.

## **6.7 Section 27 (g) – The Class and Resource Quality Objectives of the Water Resource**

The classification of water resources and development of Resource Quality Objectives (RQO) for the Breede-Gouritz Catchment Management Area was finalised in 2018. Portion 19/170, 3/172 and 4/172 falls within quaternary catchment J35B, which falls within the D7 Coastal Integrated Unit of Analysis (IUA). The Water Resource Class for this IUA is III, indicating sustainable minimal protection and high utilisation. Quaternary J35B catchment does not fall within a priority resource unit, therefore no specific RQO has been set for this catchment area. The closest biophysical node is located in the Olifants River, downstream of its confluence with the Kandelaars River. The Target Ecological Category (TEC) for this Resource Unit (RU) has been set as an E, meaning it has been seriously modified, which indicates a highly impacted river with a low level of protection for high utilisation for socio-economic development. None of the water uses included in this application will have any detrimental effect on the TEC of the RU.

Catchment J35B is located in a priority groundwater RU. RQOs for this RU are provided in Table 5. Given the type of agricultural activities that will occur on site and based on the depth of the boreholes, and assuming that the sustainable yield of the borehole will not be exceeded, it is unlikely that these RQOs will be exceeded.

Table 5: Resource Quality Objectives for J35B

Component	Indicator	RQO Narrative	RQO Numeric
Quantity	Water level decline stabilises under consideration of aquifer response time.	Groundwater use should be sustainable for all users and the environment	n/a
Quality	<i>E. coli</i>	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	0 counts/100 mL
Quality	Total coliforms	Groundwater should be fit for domestic use after treatment; and groundwater quality shall not show a deteriorating trend from natural background	<10 counts/100 mL
Quality	Nutrients	NO <sub>3</sub> (as N)	<11.0 mg/L
Quality	Salts	EC	<589 mS/m

## 6.8 Section 27 (h) - Investments Already made and to be made by the Water User in Respect of the Water Use

Significant investment has already been made in the acquisition of the property and various environmental authorisation and planning development processes (in excess of R 1 500 000).

## 6.9 Section 27 (i) – The Strategic Importance of the Water Use to be Authorised

According to the 2018-2022 Integrated Development Plan for the Eden District Municipality, agriculture, forestry and fishing sector contributes to Eden’s economy in terms of employment and providing inputs that are used within the manufacturing sector.

One of the main national outcomes associated with the Key Performance Area (KPA) of Local Economic Development is:

*“Vibrant, equitable, sustainable rural communities contributing food towards security for all”*

with the goals being to:

*“End poverty in all its forms everywhere”* and

*“End hunger, achieve food security and improve nutrition and promote agriculture”*

The Export Agri Hub project has been financially supported by the Eden District Municipality and is seen as a crucial project to providing jobs and stimulating economic development in the Klein Karoo. In this respect, the water use can be regarded as of strategic importance with respect to meeting the KPAs and development goals for the Eden District Municipality.

### **6.10 Section 27 (j) – The Quality of Water in the Water Resource which may be Required for the Reserve.**

The quality of the water in the catchment will not be detrimentally affected as there will not be a great impact on the surface water, as boreholes (deeper than 100m) will be abstracted from for irrigation purposes. The reserve should not be affected by reduced water quality, due to deep borehole water that will be used for irrigation. It is important to stress that extensive agriculture and irrigation activities already occur upstream of the property. Downstream water quality impacts should therefore be compared against existing upstream impacts.

### **6.11 Section 27 (k) – The Probable Duration of any Undertaking for which the Water Use is to be Authorised**

The duration of the water use is permanent.

## **7. APPENDICES**

### **Appendix 1: Freshwater Study**

### **Appendix 2: Geohydrological Study**