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## Contents

<i>No.</i>		<i>Gazette No.</i>	<i>Page No.</i>
<b>GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS</b>			
<b>Water Affairs, Department of/Waterwese, Departement van</b>			
1420	National Water Act (36/1998): Notice on proposal to construct the Berg River – Voelvie Augmentation Scheme ...	42818	4

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**GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS**

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**DEPARTMENT OF WATER AFFAIRS****NO. 1420****01 NOVEMBER 2019**

NOTICE ON PROPOSAL TO CONSTRUCT THE BERG RIVER – VOELVLEI AUGMENTATION SCHEME IN TERMS OF SECTION 110 OF THE NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998)

The Minister of Water and Sanitation, hereafter referred to as the Minister, intends constructing a government waterworks as contained in the Schedule hereto.

In terms of Section 110(1) of the National Water Act, 1998 (Act No. 36 of 1998), before constructing a government waterworks, the Minister must undertake environmental impact assessment relating to the proposed waterworks. Environmental impact assessment for the proposed Berg River – Voelvlei Augmentation Scheme (BRVAS) was undertaken and authorisation was granted in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) which superseded the Environment Conservation Act, 1989 (Act No. 73 of 1989). Interested parties are invited to submit written comments on the proposed government waterworks by 29 February 2020. Comments must be submitted to the Director-General, Department of Water and Sanitation, Private Bag X313, Pretoria; Fax: 012 336 6863 and marked for the attention of Mr Menard Mugumo, Chief Engineer: Options Analysis.

SCHEDULE TO THE PROPOSED BERG RIVER – VOELVLEI DAM GOVERNMENT WATERWORKS AND SUMMARY OF THE ENVIRONMENTAL IMPACT ASSESSMENT

**A. BERG RIVER – VOELVLEI AUGMENTATION SCHEME****1) INTRODUCTION**

The Western Cape Water Supply System (WCWSS) serves the City of Cape Town, surrounding urban centres and irrigators along the Berg, Eerste and Sonderend Rivers. It consists of infrastructure components owned and operated by both the Department of Water and Sanitation and the City of Cape Town. The Water Reconciliation Strategy for the Western Cape Water Supply System projects a supply deficit by 2019/20 and recommends timeous augmentation of the system to avert a severe shortfall. The Reconciliation Strategy investigated a range of bulk water supply interventions that could serve towards meeting the growing water requirements that will need to be supplied from the WCWSS. These interventions include large-scale sea water desalination, water re-use, developing the Table Mountain Group Aquifer, further surface water developments, and implementing more water conservation and water demand management measures.

Detailed feasibility investigations into potential for further surface water developments have identified the Berg River – Voelvlei Augmentation Scheme (BRVAS) as the best surface water intervention to meet the shortfall in the short term.

A locality map of the proposed scheme is attached.

## 2) DESCRIPTION OF THE SCHEME

The BRVAS scheme involves abstraction of winter water from the Berg River to increase the yield in the existing Voelvlei Dam by 23 million cubic metres per annum once the downstream ecological water requirements have been met. A Category D Reserve has been allowed for in the operation of the scheme.

The Berg River Estuary Reserve requires a flow ranging between 0.6 m<sup>3</sup>/s and 0.9 m<sup>3</sup>/s. In the absence of flow gauging at the estuary, present day inflow was estimated to be 0.3 m<sup>3</sup>/s based on gauged flow below Misverstand Dam and downstream irrigation abstractions. In order to meet the Reserve requirement for the estuary additional flow ranging between 0.3 m<sup>3</sup>/s and 0.6 m<sup>3</sup>/s must be released from Voelvlei Dam during summer. A conservative supplementary release amounting to 0.5 m<sup>3</sup>/s has been allowed for in the operation of the system.

The scheme consists of a low level weir and pump station located on the Berg River at the Lorelei site, and a pipeline 6.3 km long will deliver diverted water into the dam. The pipeline is planned for reverse operation during summer so that releases can be made from the dam to supply downstream users, including meeting ecological requirements of the estuary. A 4 m<sup>3</sup>/s pump station with a stepped-pump operating rule has been selected.

The Voelvlei Dam is strategically positioned within the Western Cape Water Supply System. While other users obtain their water requirements from various nodes in the system, the West Coast District Municipality obtain the bulk of their supply from the Voelvlei Dam. A bigger Voelvlei yield thus provides greater operational flexibility. This unique feature makes augmenting the WCWSS via the BRVAS scheme more beneficial compared to the other surface water development options.

Water quality in the Berg River poses a significant challenge with regard to current and future water use opportunities, and any abstraction from the river must be carefully considered in terms of the intended water use. Three critical water quality characteristics were analysed.

- Flood samples were taken to investigate changes in water quality during high flow events;
- Impact of nutrient movement from the Berg River on algal growth in the Voelvlei Dam was modelled; and
- Dispersion and mixing behaviour of the reservoir as a result of water transfer was studied and the discharge point of diverted water optimally positioned.

In the presence of an appropriate operating rule to guide the timing of winter abstractions there are no red flags associated with water quality to prohibit implementation of the BRVAS.

Visual inspection of the site revealed evidence of rock on the left bank at the weir site and core drilling on the right bank confirmed that the abstraction weir and pump station could be partly located directly on bedrock that provides good founding conditions. Geotechnical conditions at the weir site are considered generally favourable, especially if an adequate length of spillway can be provided in the general area of the rock exposures on the western side of the river channel.

Trial pits dug along the proposed rising main alignment revealed the presence of materials suitable for machine excavation with a possible need for importation of selected bedding material for pipe laying. Preliminary design of the rising main is based on the recommended use of glass-fibre reinforced polyester (GRP) pipes, but final material selection should be based on careful consideration of cost and operational convenience.

Table 1: Technical details of the rising main and pump station

Design Parameter	Parameter Specification	
	4 m <sup>3</sup> /s Design Flow	6 m <sup>3</sup> /s Design Flow
Rising Main Length	6 300 m	6 300 m
Rising Main Size	1 700 mm diameter	1 900 mm diameter
Rising Main Static Pressure	28.0 m	28.0 m
Friction Losses	7.8 m	9.5 m
Inlet Static Pressure	1.8 m	1.8 m
Pump Duty	34.0 m	35.7 m

The 4 m<sup>3</sup>/s pump was selected on the basis of yield and economics considerations. This pump size is able to deliver 23 million m<sup>3</sup> of water compared to 20 million m<sup>3</sup> possible with a 6 m<sup>3</sup>/s pump. The southern discharge point between the water treatment works of the City of Cape Town and that of the West Coast District Municipality is preferable from a water quality (blending and settlement) perspective. Competent bedrock at the site also provides suitable founding conditions.

### 3) FUNDING REQUIREMENTS

The cost to construct the BRVAS scheme has been estimated to be R550 million with escalation of 6.5% per annum up to end of construction in 2021. This cost includes a contingency allowance of 10%, design and supervision fees as well as VAT. The cost is made up of the following cost elements:

Materials and labour	R284.80 million
Professional fees	R 21.90 million
Servitudes & Compensation	R 5.75 million
Escalation (6.5%)	R237.55 million
<b>TOTAL CAPITAL COST</b>	<b>R550 million</b>

A common measure for assessing economic efficiency of developing water resources in South Africa is the unit reference value (URV), which expresses the unit cost of water. The URV for the new yield added by the BRVAS scheme is estimated at R1.52/m<sup>3</sup> at 8% per annum discount rate. This URV compares favourably with similar water resource development projects recently completed in the country.

Apart from the favourable URV, the scheme also has an added advantage in that it is the only scheme among the many potential schemes investigated that has a short lead time to water delivery, bringing an early relief to the system from the worsening crisis.

Section 111 of the National Water Act, 1998 (Act No. 36 of 1998) empowers the Minister of Water and Sanitation to finance the acquisition or alteration of an existing government waterworks with funds appropriated by Parliament or obtained from any other source. Although pockets of poverty do exist within the demographical composition of the area, the general socio-economic profile of the Cape Town Metropolitan lends support to off-budget funding. The funding model to be adopted requires approval of the National Treasury.

#### **4) OPERATIONAL REQUIREMENTS**

The BRVAS scheme makes extensive use of existing infrastructure, namely the existing Voelvlei Dam, water treatment works and Cape Town's pipeline from the treatment works as well as existing infrastructure of the West Coast District Municipality.

The operation and maintenance costs that were used in the URV calculation are based on the widely accepted general estimates for costing of these items.

- Civil O&M cost at 0.5% of the civil capital cost; and
- Mechanical and electrical O&M cost at 4% of the mechanical and electrical capital cost.

Additionally, allowance was made for refurbishment of the mechanical and electrical equipment every 15 years, estimated to be 60% of the initial capital cost. Preliminary and general items and contingencies are included in the base capital cost estimate, but professional fees, servitudes and compensation are treated as incidental costs.

Ecological flows are critical during winter since all abstraction from the Berg River is strictly limited to this period of the year. Summer abstraction is not allowed. In summer, the pipeline is operated in reverse to meet downstream water requirements including providing for estuarine requirements. A connection for reverse operation is provided on the dam outlet structure upstream of the abstraction weir and pump station. Releases amounting to 8 million m<sup>3</sup> per annum (0.5 m<sup>3</sup>/s) will be let down the river.

The pumps are operated on a stepped-pumping rule with abstraction initiated only when at least 1 m<sup>3</sup>/s is spilling over the weir to meet ecological flow requirements. A set of four pump units are installed, each with a capacity of 1 m<sup>3</sup>/s. The first pump is activated when the flow exceeds 1 m<sup>3</sup>/s base flow plus the unit pumping rate of 1 m<sup>3</sup>/s. An additional pump is progressively activated each time the flow increases by another 1 m<sup>3</sup>/s. The first pump is activated when the flow exceeds 2 m<sup>3</sup>/s, the second pump when flow reaches 3 m<sup>3</sup>/s, and so forth until all the four pumps are connected. Abstraction according to this stepped-pumping rule is relatively simple to implement. A level sensor detecting the amount of flow arriving at the monitoring point is used to determine the pumping rate and the number of pumps to activate.

#### **5) IMPLEMENTATION ARRANGEMENTS**

In view of the dire situation in the Cape Town Metropolitan and surrounding smaller urban centres, the Minister of Water and Sanitation recently appointed the Trans-Caledon Tunnel Authority (TCTA) to secure funding and implement the BRVAS scheme on a fast-tracked basis on behalf of government. The scheme involves expansion of the existing Berg River (Voelvlei Dam) Government Waterworks in terms of Section 109 of the National Water Act, 1998 (Act No. 36 of 1998).

The land and land rights required to implement the project need be expropriated and registered by the Minister in terms of section 64 of the National Water Act.

A comprehensive implementation programme showing timelines for funding and other implementation milestones is required. In addition to the processes prescribed by the Public Finance Management Act, 1999 (Act No. 1 of 1999), funding must be approved by National Treasury. Project governance both during construction and operational phases needs proper attention. Institutional arrangements must allow for the effective participation of TCTA, Eskom, City of Cape Town, West Coast District Municipality and

other bulk water users. To this end, a Project Coordinating Committee needs to be established drawing membership from the key role players.

## **B. SUMMARY OF THE ENVIRONMENTAL IMPACT ASSESSMENT**

Environmental Impact Assessment (EIA) for the BRVAS project was undertaken in terms of section 110 of the National Water Act, 1998 (Act No. 36 of 1998) and in terms of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998). Authorisation for the project was granted on 23 February 2018.

In response to the appeal that was lodged against the project, it was resolved to place the pipeline along the servitude of the existing canal where possible.

The environmental authorisation requires construction to commence within a period of five (5) years from the date of authorisation, and once construction has begun it must be completed within a period of five (5) years. This means authorisation will lapse if construction does not commence by 23 February 2023, or as revised. Conditions of authorisation must be observed during construction as well as during operation. To this end, the Department of Water and Sanitation is required during construction to appoint an independent environmental control officer, reporting to the Department of Environmental Affairs, to monitor compliance with conditions of authorisation.

The receiving environment was assessed in terms of climate, geology and soils, geohydrology, topography, surface water, flora, fauna, land capability, land use, heritage, socio-economic environment, physical planning, existing infrastructure, air quality, noise and visual landscape. Findings of the specialist studies are summarized in the sections that follow.

### **1) TERRESTRIAL ECOLOGICAL IMPACT ASSESSMENT**

The project falls within the Boland Mountains Important Bird and Biodiversity Area (IBA). The IBA encompasses a continuous chain of mountains and includes several State forests, mountain catchment areas and provincial nature reserves. The area comprises habitats such as rivers, riparian vegetation and grasslands that are suitable for mammalian species. During the field assessments, some small rodent species were observed but the identity of these species could not be verified and only nine species were recorded. None of the species recorded had conservation value.

The Voelvlei Dam is habitat to a wide range of water birds which congregate in large numbers at this site. It is particularly important for the near-endemic South African Schelduck, large flocks of which use the site as a safe refuge for their annual breeding moult. Other red data species found on site were the blue crane, great white pelican and jackal buzzard. Bird species endemic to South Africa are important as they are not found elsewhere in the world. Nest sites identified in the EIA survey shall be plotted and demarcated as focal sites for subsequent monitoring.

The grasslands and riparian vegetation in the project area are of high importance to reptiles. Parts of the project area have undergone habitat modification mainly as a result of farming activities. Increased human presence and associated disturbances are causal factors in the alteration and disappearance of reptile diversity in many areas. According to the South African Reptile Conservation Assessment, two red data species in the area are oelofsen's girdled lizard and geometric tortoise which are listed as near-threatened and critically endangered respectively. Two red data frog species, the cape rain frog and cape caco, are listed as vulnerable.

Any area cleared and disturbed during construction shall be appropriately rehabilitated to avoid cumulative impacts. Through a Search, Rescue and Relocation Plan,



concerted efforts will be made to prevent the loss of red data, protected and endangered flora and fauna species.

## **2) RIPARIAN HABITAT AND WETLAND DELINEATION**

The area is a predominantly agricultural and livestock farming region. Farming activities and other local land uses together have had impacts on the aquatic system, rendering the Berg River system as largely modified. Water quality is generally poor although the integrated habitat was assessed as good. Low flow is recorded as 0.3 m<sup>3</sup>/s on average and clarity measures around 28 cm, indicative of eutrophic conditions. A biotic integrity of C is indicative of moderately modified conditions. River ecology is seriously modified and largely modified for the Voelvllei Dam itself.

Numerous wetlands exist in the area including valley bottom systems, hill-slope seeps, depressions and the Berg River floodplain. The estuary and floodplain are a long distance from the project area and their proper functioning is not under threat from this winter abstraction scheme. The floodplain ecology is largely modified while the wetlands integrity is moderately modified in some places and largely modified in others.

The design and operation of the weir and fish ladder will address recommendations of the wetlands specialist.

## **3) AGRICULTURAL IMPACT ASSESSMENT**

Some of the areas affected by the project are currently farmed for small grain, cattle and sheep farming, and grape farming among others. Soil suitability analysis and agricultural economic assessment, at farm level, were undertaken.

A typical 600 hectare farm consisting of 300 hectares of wheat, 300 hectares of grazing and 450 sheep was assumed for financial analysis. This is a typical farming model in the region. A gross margin analysis was conducted to determine the impact of alternative scheme configurations on agricultural land. The higher the gross margin the higher the impact.

Depending on the chosen pipeline route and access road alignment agricultural land ranging between 20 and 50 hectares could potentially be affected, which translates to a loss in agricultural income amounting to R1 135 000 per annum. This loss of income must, however, be weighed against the benefits of the project such as, *inter alia*, stabilisation of the system supplying Cape Town Metropolitan and surrounding smaller urban centres with water.

Although the impact on agricultural production is minor, appropriate mitigation measures should form part of the implementation process with a view to conserving natural resources. The following aspects need special attention.

1. Avoiding sensitive areas such as wetlands, slopes and existing soil conservation works such as contours,
2. Proper planning of road alignments so that roads follow contours as far as possible or where contours are crossed, proper structures must be constructed to ensure proper functioning of existing contours,
3. Conservation of topsoil during construction and rehabilitation of the construction site,
4. Protection of vegetation and veld by adequate maintenance of service roads, and
5. Timing the construction activity to minimise disturbance on farming operations.

#### **4) HERITAGE IMPACT ASSESSMENT**

Generally, the proposed development has little impact on heritage resources in the area. This is corroborated by the statement made by Heritage Western Cape, the local heritage authority, in response to the Notice of Intent to Develop: "*You are hereby notified that since there is no reason to believe that the proposed water distribution lines and associated infrastructure will impact on heritage resources, no further action under section 38 of the National Heritage Resources Act (Act 25 of 1999) is required*".

Some Early Stone Age artefacts were identified in a pile of rock on the edge of a wheat field belonging to farm Goudklip 648/1. These were rated of low significance and no mitigation is required. No impact is expected on the Elandsberg Nature Reserve Provincial Heritage Site located to the south of Voelvlei Dam.

#### **5) SOCIO-ECONOMIC IMPACT ASSESSMENT**

The project has potential to improve regional water security. On a regional scale, this will allow a more reliable supply to domestic, agricultural and industrial water users. In an area where agriculture is the dominant economic sector, it is important that this industry be adequately supplied. Construction of the works does however place some burden on the surrounding farming community though no huge impact is anticipated. Access roads, for example, that will be opened up for construction and operation of the scheme will consume some arable land.

The project has potential for job creation mainly during the construction phase. The construction itself will generate temporary employment as workers are hired for the duration of the contract. There exists also potential for secondary employment from small businesses employing more people to sell goods and services to the construction workers. These employment opportunities transfer skills to the local unemployed population most of whom have very low levels of education, which skills can be employed elsewhere later in life after the project. Only 15% of the population over the age of 20 years have matriculated or attained a higher education. Breaking the poverty cycle in the area requires more than a secondary school education; higher education and further skills training are required.

A number of business opportunities will be created for the SMME sector. These opportunities range from site clearing to fencing and construction as well as supplying construction materials. There also exist opportunities for community members to provide catering services, accommodation and other related services to the hired workers and visitors. Since these are local SMMEs, the profits generated will stay in the area, thereby stimulating the local economy and improving welfare.

The following negative impacts will need close monitoring and mitigation.

- 1) Sudden influx of job seekers into the area resulting in various social problems such as competition with local residents for the limited job opportunities and increased incidents of sexually transmitted diseases including HIV/Aids as construction workers will be separated from families for extended periods,
- 2) Heavy duty trucks and other construction services vehicles inflicting severe damage to local roads as well as contributing to traffic congestion in the area,
- 3) Restricted access across the length of the pipeline corridor during construction. Mitigation measures should ensure limited disruption to the mobility of landowners as well as ensure strict access control on private property,

- 4) Risk of criminal activity during construction due to additional traffic on local roads and an increase in job seekers, and
- 5) Dust and various air borne pollutants emitted by construction machinery and equipment. Vehicular traffic is also likely to contribute to the overall exhaust emissions. Dust not only affects human and animal health through inhalation, but also stunts healthy crop growth. Dust suppression techniques must be applied to minimise the impact.

#### **6) PUBLIC PARTICIPATION**

The public participation process was initiated during the technical Feasibility Study for the project. This included public meetings, landowner meetings and stakeholder committee meetings that were held in Elgin, Grabouw, Worcester, Wolseley and Wellington. Environmental screening of potential surface water schemes was conducted during the pre-feasibility phase and scheme prioritisation involved full participation of registered interested and affected parties. The Feasibility Study findings were presented at the public meetings and stakeholder forums.

During the Scoping phase, public participation entailed compilation of a database of interested and affected parties, notification of affected landowners, announcing the project, distribution of Background Information Document, convening public meetings and authorities meetings to present findings, and recording comments and responses.

Draft Scoping and EIA reports were made available for review by the public at Gouda Library. They were also made available to relevant regulatory authorities and, in addition, a project webpage was created on the website of the Department of Water and Sanitation for access by the general public.

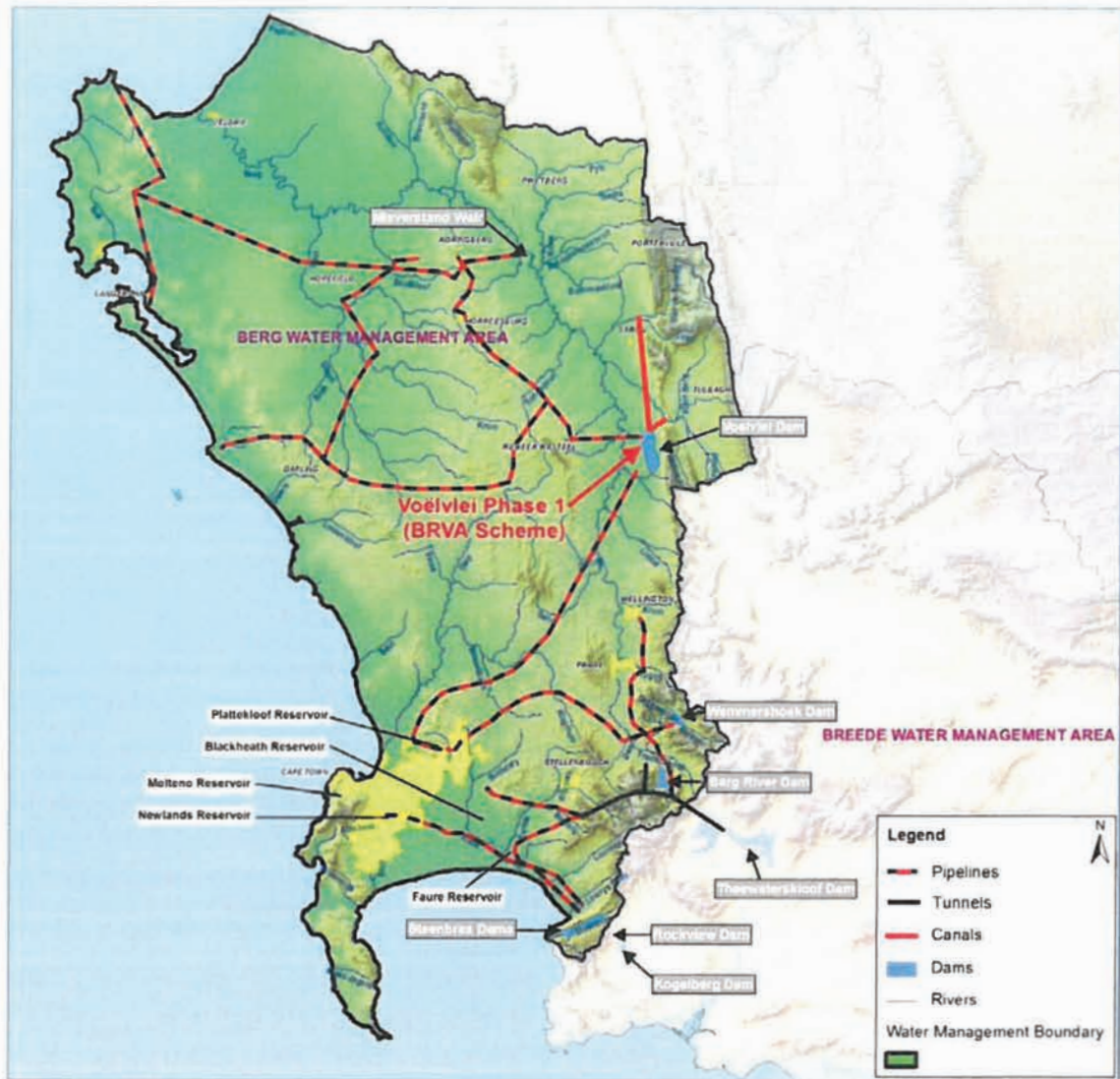
#### **7) ENVIRONMENTAL MANAGEMENT PROGRAMME**

An Environmental Management Programme (EMPr) was prepared as annexure to the Environmental Impact Report. The EMPr, which sets out environmental mitigation measures required, will be updated in due course before and during implementation as directed by the Department of Environmental Affairs.



**NKWINTI GE (MP)  
MINISTER OF WATER AND SANITATION**

DATE: 20/09/2018



Location of the Berg River – Voelvlei Augmentation Scheme