

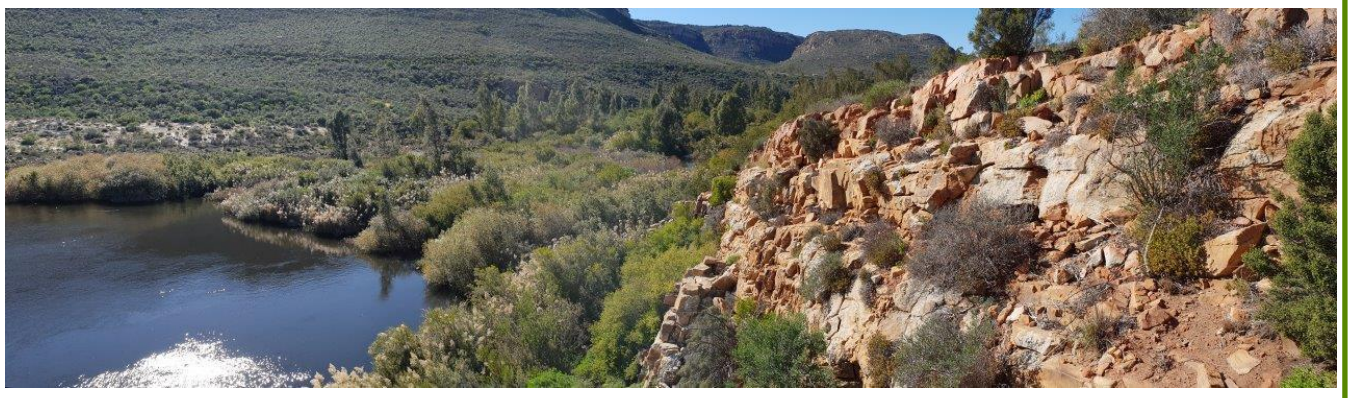


water & sanitation

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Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Post Feasibility Bridging Study for the Proposed Bulk Conveyance Infrastructure from the
Raised Clanwilliam Dam (WP0485)

Environmental Screening Sub-Report



November 2020

Department of Water and Sanitation
Directorate: Options Analysis

**POST FEASIBILITY BRIDGING STUDY FOR THE PROPOSED BULK CONVEYANCE
INFRASTRUCTURE FROM THE RAISED CLANWILLIAM DAM**

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DEPARTMENT OF WATER AND SANITATION

Directorate: Options Analysis

**Post Feasibility Bridging Study for the Proposed Bulk Conveyance
Infrastructure from the Raised Clanwilliam Dam**

ENVIRONMENTAL SCREENING SUB-REPORT

November 2020

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Post Feasibility Bridging Study for the Proposed Bulk Conveyance Infrastructure from the Raised Clanwilliam Dam

Reports produced as part of this project are indicated below.

Bold type indicates this report.

Report Index	Report Number	Report Title
1		Inception Report
2	P WMA 09/E10/00/0417/2	Capacity Building & Training Year 1
3	P WMA 09/E10/00/0417/3	Capacity Building & Training Year 2
4	P WMA 09/E10/00/0417/4	Water Requirements Assessment
5	P WMA 09/E10/00/0417/5	Distribution of Additional Available Water
6		Existing Infrastructure and Current Agricultural Development Sub-Report
7	P WMA 09/E10/00/0417/6	Existing Conveyance Infrastructure and Irrigated Land
8		Suitable Agricultural Areas and Land Ownership Report
9		Evaluation of Development Options Sub-Report
10	P WMA 09/E10/00/0417/10	Suitable Areas for Agricultural Development
11		Right Bank Canal Design Sub-Report
12		Conceptual Design Sub-Report
13		Environmental Screening Sub-Report
14		Jan Dissels and Ebenhaeser Schemes Design Sub-Report
15	P WMA 09/E10/00/0417/13	Feasibility Design
16	P WMA 09/E10/00/0417/7	Topographical Surveys
17	P WMA 09/E10/00/0417/8	Geotechnical Investigations
18	P WMA 09/E10/00/0417/9	Soil Survey
19		Financial Viability of Irrigation Farming Sub-Report
20	P WMA 09/E10/00/0417/11	Agricultural Production and Farm Development
21		Right Bank Canal Cost Analysis Sub-Report
22		Socio-Economic Impact Analysis Sub-Report
23	P WMA 09/E10/00/0417/12	Socio-Economic Impact Analysis
24	P WMA 09/E10/00/0417/14	Record of Implementation Decisions Report
25	P WMA 09/E10/00/0417/1	Main Report
26	P WMA 09/E10/00/0417/15	Historically Disadvantaged Farmers Report

Concise Description of the Content of Study Reports

Report Index	Report Number	Report Title and Description of Content
1		<p>Inception The report forms part of the contract and stipulates the scope of work for the study, the contract amount and the contract period. It contains a detailed description of tasks and methodology, a study programme, human resource schedule, budget and deliverables. The Capacity Building and Training Plan has been included.</p>
2	P WMA 09/E10/00/0417/2	<p>Capacity Building & Training Year 1 Describes the range of capacity building and training activities planned for the study, and the activities undertaken during the first year of the study, including field-based training, training workshop 1 and mentorship of DWS interns through secondment.</p>
3	P WMA 09/E10/00/0417/3	<p>Capacity Building & Training Year 2 Describes the range of capacity building and training activities planned for the study, and the activities undertaken during the second year of the study, including field-based training, training workshop 2 and mentorship of DWS interns through secondment.</p>
4	P WMA 09/E10/00/0417/4	<p>Water Requirements Assessment Provides an analysis of the existing water use and current water allocations in the study area, and addresses ecological water requirements, water use for irrigated agriculture and projections for future use, current domestic and industrial water use and projections for future use, water use for hydropower and water losses in the water supply system.</p>
5	P WMA 09/E10/00/0417/5	<p>Distribution of Additional Available Water Confirms the volume of additional water available for development, after water has been reserved for the current water uses, as well as making recommendations on how the additional yield should be distributed among water use sectors and water users.</p>
6		<p>Existing Infrastructure and Current Agricultural Development Sub-Report Provides an overview of the extent and general condition of the current bulk water storage and conveyance infrastructure. This report also provides an overview of the locality and extent of the existing agricultural areas determined by reviewing Geographic Information System (GIS) data obtained from various sources.</p>
7	P WMA 09/E10/00/0417/6	<p>Existing Conveyance Infrastructure and Irrigated Land An update of the Sub-Report, providing a refinement of the current agricultural water requirements following evaluation of the current crop types, an assessment of the desirability of diverting releases for downstream irrigators via the Clanwilliam Canal and Jan Dissels River, to meet the summer ecological flows in the lower Jan Dissels River, and presents an Implementation Action Plan with costs.</p>

Report Index	Report Number	Report Title and Description of Content
8		Suitable Agricultural Areas and Land Ownership Sub-Report Description of the collection of information and the preparation undertaken for the analysis of options, which includes a summary of existing irrigated areas and water use, cadastral information, land ownership, environmental sensitivity, soils suitability, water quality considerations and constraints, and the initiation of the process to identify additional areas suitable for irrigation.
9		Evaluation of Development Options Sub-Report Describes the salient features, costs and impacts of identified potential irrigation development options for new irrigation development in the lower Olifants River. This provides the background and an introduction to the discussions at the Options Screening Workshop held in December 2018.
10	P WMA 09/E10/00/0417/10	Suitable Areas for Agricultural Development Describes the supporting information, process followed and the salient features, costs and impacts of identified potential irrigation development options for new irrigation development in the lower Olifants River. Recommends the preferred options to be evaluated at feasibility level.
11		Right Bank Canal Feasibility Design Sub-Report Describes the Design Criteria Memorandum, based on best practice in engineering and complying with recognised codes and standards. Description of route alignments and salient features of the new Right Bank canal. Feasibility-level design of bulk infrastructure, including evaluation of capacities, hydraulic conditions, canal design, surface flow considerations, canal structures, power supply and access roads. Operational considerations and recommendations.
12		Conceptual Design Sub-Report Describes the scheme layouts at a conceptual level and infrastructure components to be designed, alternatives to consider or sub-options, and affected land and infrastructure, as well as the updated recommended schemes for new irrigation development.
13		Environmental Screening Sub-Report Describes and illustrates the opportunities and constraints, and potential ecological risks/impacts and recommendations for the short-listed bulk infrastructure development options at reconnaissance level. Describes relevant legislation that applies to the proposed irrigation developments.

Report Index	Report Number	Report Title and Description of Content
14		<p>Jan Dissels and Ebenhaeser Schemes Feasibility Design Sub-Report Describes the Design Criteria Memorandum, based on best practice in engineering and complying with recognised codes and standards. Description of route alignments and salient features of the Jan Dissels and Ebenhaeser schemes. Feasibility-level design of bulk infrastructure, including evaluation of capacities, hydraulic conditions, intake structures, balancing dams and reservoirs, rising mains and gravity pipelines and trunk mains where relevant, power supply and access roads. Operational considerations and recommendations.</p>
15	P WMA 09/E10/00/0417/13	<p>Feasibility Design Description of the approach to and design of selected bulk infrastructure at feasibility level, with supporting plans and implementation recommendations.</p>
16	P WMA 09/E10/00/0417/7	<p>Topographical Surveys Describes the contour surveys for the proposed identified bulk infrastructure conveyance routes and development areas, the surveying approach, inputs and accuracy, as well as providing the survey information.</p>
17	P WMA 09/E10/00/0417/8	<p>Geotechnical Investigations Presents the findings of geotechnical investigations of the various identified sites, as well as the approach followed, field investigations and testing, laboratory testing, interpretation of findings and geotechnical recommendations.</p>
18	P WMA 09/E10/00/0417/9	<p>Soil Survey Describes the soil types, soil suitability and amelioration measures of the additional area covering about 10 300 ha of land lying between 60 to 100 m above river level, between the upper inundation of the raised Clanwilliam Dam and Klawer.</p>
19		<p>Financial Viability of Irrigation Farming Sub-Report Describes the findings of an evaluation of the financial viability of pre-identified crop-mixes, within study sub-regions, and advises on the desirability of specific crops to be grown in these sub-regions. It includes an evaluation of the financial viability of existing irrigation farming or expanding irrigation farming, as well as the identification of factors that may be obstructive for new entrants from historically disadvantaged communities.</p>
20	P WMA 09/E10/00/0417/11	<p>Agricultural Production and Farm Development This report will focus on policy, institutional arrangements, available legal and administrative mechanisms as well as the proposed classes of water users and the needs of each. This would include identifying opportunities for emerging farmers, including grant and other types of Government and private support, and a recommendation on the various options and opportunities that exist to ensure that land reform and water allocation reform will take place through the project implementation.</p>

Report Index	Report Number	Report Title and Description of Content
21		Right Bank Canal Cost Analysis Sub-Report Provides an economic modelling approach to quantify the risk of the failure of the existing main canal and the determination of the economic viability of the construction of the new right bank canal to reduce the risk of water supply failure.
22		Socio-Economic Impact Analysis Sub-Report Describes the socio-economic impact analysis undertaken for the implementation of the new irrigation development schemes, for both the construction and operational phases. This includes a description of the social and economic contributions, the return on capital investment, as well as the findings of a fiscal impact analysis.
23	P WMA 09/E10/00/0417/12	Socio-Economic Impact Analysis Synthesis of agricultural economic and socio-economic analyses undertaken, providing an integrated description of agricultural production and farm development and socio-economic impact analysis, as well as the analysis of the right bank canal costs and benefits.
24	P WMA 09/E10/00/0417/14	Record of Implementation Decisions Describes the scope of the project, the specific configuration of the schemes to be implemented, the required implementation timelines, required institutional arrangements and the required environmental and other approval requirements and mitigation measures, to ensure that the project is ready for implementation.
25	P WMA 09/E10/00/0417/1	Main Report Provides a synthesis of approaches, results and findings from the supporting study tasks and interpretation thereof, culminating in the study recommendations. Provides information in support of the project funding motivation to be provided to National Treasury.
26	P WMA 09/E10/00/0417/15	Historically Disadvantaged Farmers Report Describes the activities undertaken by an independent consultant to evaluate existing HDI Farmers policies and legislative context, identify, map and analyse prospective HDI farmers and potential land for new irrigation, as well as propose a mechanism for the identification and screening of HDI farmers.

Executive Summary

Introduction

This report describes and illustrates the opportunities and constraints, and potential ecological risks/impacts and recommendations for the short-listed bulk infrastructure development options at reconnaissance level. The sections below also describe relevant legislation that applies to the proposed irrigation developments.

Information regarding the changes to preliminary preferred options, design meetings, site visits, phasing of schemes and supporting investigations is described in more details in the *Conceptual Design Sub-Report*.

Schemes and associated infrastructure assessed

The following schemes were evaluated and assessed for environmental sensitivity:

- **Jan Dissels Scheme**, pumping from Clanwilliam Dam:

The scheme is very feasible from a cost perspective and offers a good opportunity for the inclusion of smallholder plots, given its proximity to Clanwilliam.

A botanical survey was undertaken to confirm the extent of environmental sensitivity for the potential agricultural areas.

Two sub-options for bulk water supply, which cannot be distinguished in terms of technical aspects or cost, were evaluated and assessed in terms of sensitivity, namely either:

- Sub-option 1: Pumping via a rising main (RM) pipeline (RM Route 1) directly from a floating intake on the lake of the raised Clanwilliam Dam, or
- Sub-option 2: Pumping from an outlet on the right bank of the dam wall (RM Route 2).

An access road must be constructed from the 'Ou Kaapse' Road, or the township development located close by, for the RM Route 1 option.

Sub-option 1 involves the construction of a 653 m long, 500 mm diameter RM pipeline from the shore of the raised Clanwilliam Dam (above the 1:100 year floodline) to a small 11.6 Mℓ balancing reservoir.

Sub-option 2 involves the construction of a 3 619 m long, 500 mm diameter RM pipeline from the raised dam wall along the right bank of the Clanwilliam Dam to the same 11.6 Mℓ

balancing reservoir. An access road would also have to be constructed and should be considered during the EIA process.

Additional electrical supply must be planned for. As the supply for Clanwilliam Town must also be upgraded, the supply requirement can be potentially combined with that of the town. A possibility is for the scheme to be (inter-alia) supplied from the future proposed hydro power plant, to be located on the left bank at the raised Clanwilliam Dam.

- **Right Bank Canal Scheme**, replacing the existing left bank main canal with increased capacity and constructing a new canal on the right bank of the Olifants River, including the capacity to supply new downstream irrigation development and other future uses:

This scheme is essential to ensure a secured future supply, given the high risk of disruption and shortfall in supply that the poor state of the existing canals, and especially the main (Trawal section) canal, poses to the lower Olifants River irrigators and other users, and to the prosperity of the region.

The recommended Right Bank Canal Scheme infrastructure is designed for a flow of 11.4 m/s throughout, providing for existing irrigators (current allocations plus increased assurance of supply), new irrigation from a raised Clanwilliam Dam and other future uses. The scheme uses the existing outlet works from the Bulshoek Weir and requires upgrading of the first three (3) km of the existing Left Bank Canal, where it then crosses the Olifants River to connect into a new Right Bank Canal. The Right Bank Canal continues until it reaches the existing siphon at Verdeling, with a new 1.3 km siphon crossing at the Doring River.

This Right Bank Canal will supply the four significant potential irrigation areas in the Trawal region, namely the Zypherfontein 1, Zypherfontein 2, Trawal and Melkboom irrigation areas. The scheme is situated on privately-owned land.

- **Ebenhaeser Scheme**, making use of spare flow capacity in existing right bank and left bank canal sections, supplying a combination of Ebenhaeser restitution farms and augmenting the Ebenhaeser community scheme:

Augmentation of the water supply to prioritised restitution farms has a high priority from a social and political perspective, to ensure that such restitution farms can be successfully farmed, by increasing their currently inadequate water allocations. In addition, this scheme can augment supply to the existing historically disadvantaged community at Ebenhaeser. Five water requirement clusters were identified in consultation with community representatives. Six sub-options were identified and compared, and a preferred sub-option was further evaluated and assessed in terms of environmental sensitivity.

From the right bank Retshof diversion, water will be pumped via a 450 mm diameter, 888 m long RM pipeline, to a 28 Mℓ small combined balancing reservoir. Water will also be diverted from the left bank Vredendal canal to the combined small balancing reservoir, from behind the existing long weir. From the combined small balancing reservoir water will be pumped via a 700 mm diameter, 362 m long RM pipeline, to a 2.302 million m³ lined earthfill balancing dam, to be situated South-West of and close to the Vredendal left bank canal diversion point, opposite the R363 road between Vredendal and Lutzville.

From the large earthfill balancing dam, water will be pumped to a 10.45 Mℓ concrete balancing reservoir, via a 500 mm diameter, 2 160 m long RM pipeline. From the balancing reservoir, water will be gravitated to high points adjacent to the water requirement clusters, with adequate minimum pressure provided, via a 600/500/400 mm diameter, 17 300 m long pipeline gravity pipeline.

The diversion infrastructure, RM pipelines, balancing earthfill dam and reservoirs would be located on privately-owned land. Most of the gravity pipeline will be located on State land.

Recommendations

The following recommendations are made regarding the environmental considerations of the development options, which have been recommended for feasibility design:

- Undertake site specific specialist assessments and field clarifications to guide engineering design, prior to undertaking the Environmental Impact Assessment (EIA) process.
- Consider an alternative to constructing a RM pipeline through the Ramskop Nature Reserve (RM Route 2 of the Jan Dissels Scheme).
- Proceed with the evaluation of the preferred RM sub-option for the Jan Dissels Scheme.
- Determine the exact road and power supply related infrastructure and assess the proposed impacts as part of the EIA process.
- The Department of Water and Sanitation (DWS) should make a formal submission about the planned Clanwilliam Dam raising conveyance infrastructure development to the authorities involved with the gazetting of the Critical Biodiversity Areas (CBAs), following acceptance of the recommendations. Evaluation of schemes has confirmed that the ecological impact and environmental issues relating to the proposed new developments significantly influence and limit the scope of development options. Dialogue around these issues has started and further discussion should take place between departments as soon as possible, to agree on the way forward.

- The Department of Water and Sanitation (DWS) should consult internally to determine whether integrated water use licences (WULs) will be applied for each scheme for identified activities in terms of the NWA, including abstraction, storage and working in watercourses.
- Alternative options for, or prior to, environmental authorisation in terms of the NEMA, should be considered, such as the undertaking of an SEA or EMF for all the schemes and associated infrastructure.

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Acronyms

BA	Basic Assessment
CA	Competent Authority
CBA	Critical Biodiversity Area
CMA	Catchment Management Agency
Covid-19	Coronavirus disease 2019
DEA&DP	Western Cape Provincial Department of Environmental Affairs and Development Planning
DEFF	Department of Environment, Forestry and Fisheries
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GA	General Authorisation
GIS	Geographical Information System
GN	Government Notice
GWS	Government Water Scheme
Ha	Hectare
HDI	Historically Disadvantaged Individual
HWC	Heritage Western Cape
LIDAR	Light Detection and Ranging
LORGWS	Lower Olifants River Government Water Scheme
LORWUA	Lower Olifants River Water User Association
MEC	Member of the Executive Council
Ml	Megaliter
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NEMPAA	National Environmental Management Protected Areas Act
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resource Act

NPAES	National Protected Area Expansion Strategy
NWA	National Water Act
RM	Rising Main pipeline
SAHRA	South African Heritage Resources Agency
SEA	Strategic Environmental Assessment
WUA	Water User Association
WUL	Water Use Licence

1 Introduction

1.1 Study objectives

The objective of the overarching *Post Feasibility Bridging Study for the Proposed Bulk Conveyance Infrastructure from the Raised Clanwilliam Dam* is to provide recommendations on the bulk conveyance infrastructure options (new developments/upgrading/rehabilitation) required for the equitable distribution of the existing and additional water from the raised Clanwilliam Dam, after investigation of:

- The existing water allocation and projections for the supply area;
- New areas for agricultural development;
- Options for the required conveyance infrastructure; and
- Appropriate farming models and cost of irrigation water.

As part of the study, environmental screening of the proposed development areas and activities is essential to determine the best ecological option and to minimise impacts on the natural environment. Environmental sensitivities are areas considered to be of priority for conservation of species and ecosystems. Sensitivity maps and development recommendations were generated for each of the water supply options being investigated for the Jan Dissels, Right Bank Canal and Ebenhaeser schemes. These maps show where the activities are located in relation to the environmental sensitivities and are presented in the sections below.

1.2 Report Objectives

This report describes the main environmental features and sensitivities of the bulk water supply to the revised suite of preferred irrigation development options. The objective of the report is more specifically to:

- a) Document the desktop-based screening assessment undertaken to identify any environmental sensitivities within the proposed development areas and in close proximity of the regulated areas of ecological features. The assessment was done using the online South African National Biodiversity Institute (SANBI) Geographic Information System (GIS) data, Cape Farm Mapper tool and online screening tool of the Department of Environment, Forestry and Fisheries (DEFF).

- b) Document the review of all relevant environmental legislation in order to identify potential authorisations required for specific activities. The legislation includes the National Environmental Management Act (Act No. 107 of 1998) (NEMA), National Water Act (Act No. 36 of 1998) (NWA) and National Heritage Resource Act (Act No. 25 of 1999) (NHRA).
- c) Document the findings of the environmental screening exercise based on the desktop findings to highlight environmental constraints in close proximity to the proposed development areas and activities, and therefore provide direction on the consideration to be taken into account during the planning phase of the project.

In addition to the previous Conceptual Design Sub-Report, the following further feasibility design reports will be produced:

- Jan Dissels and Ebenhaeser Schemes Design Sub-Report;
- Right Bank Canal Design Sub-Report; and
- Feasibility Design Report.

These feasibility design reports will be supported by the Topographical Survey Report and the Geotechnical and Soils Investigations Report/s.

1.3 Background to the Project

The Clanwilliam Dam is situated in the Olifants River near the town of Clanwilliam in the Olifants River Catchment in the Western Cape. **Figure 1.1** shows the study area and provides an overview of the existing conveyance infrastructure. A feasibility study was completed in 2008, which concluded that the raising of Clanwilliam Dam and further associated agricultural development is economically viable and socially desirable.

The environmental authorisation for the raising of Clanwilliam Dam is effective from February 2010 and the project was approved by the then Minister of Water and Environmental Affairs as a Government Water Works in August 2010. The implementation of this project is currently in the construction stage, which commenced in October 2018, after a significant delay.

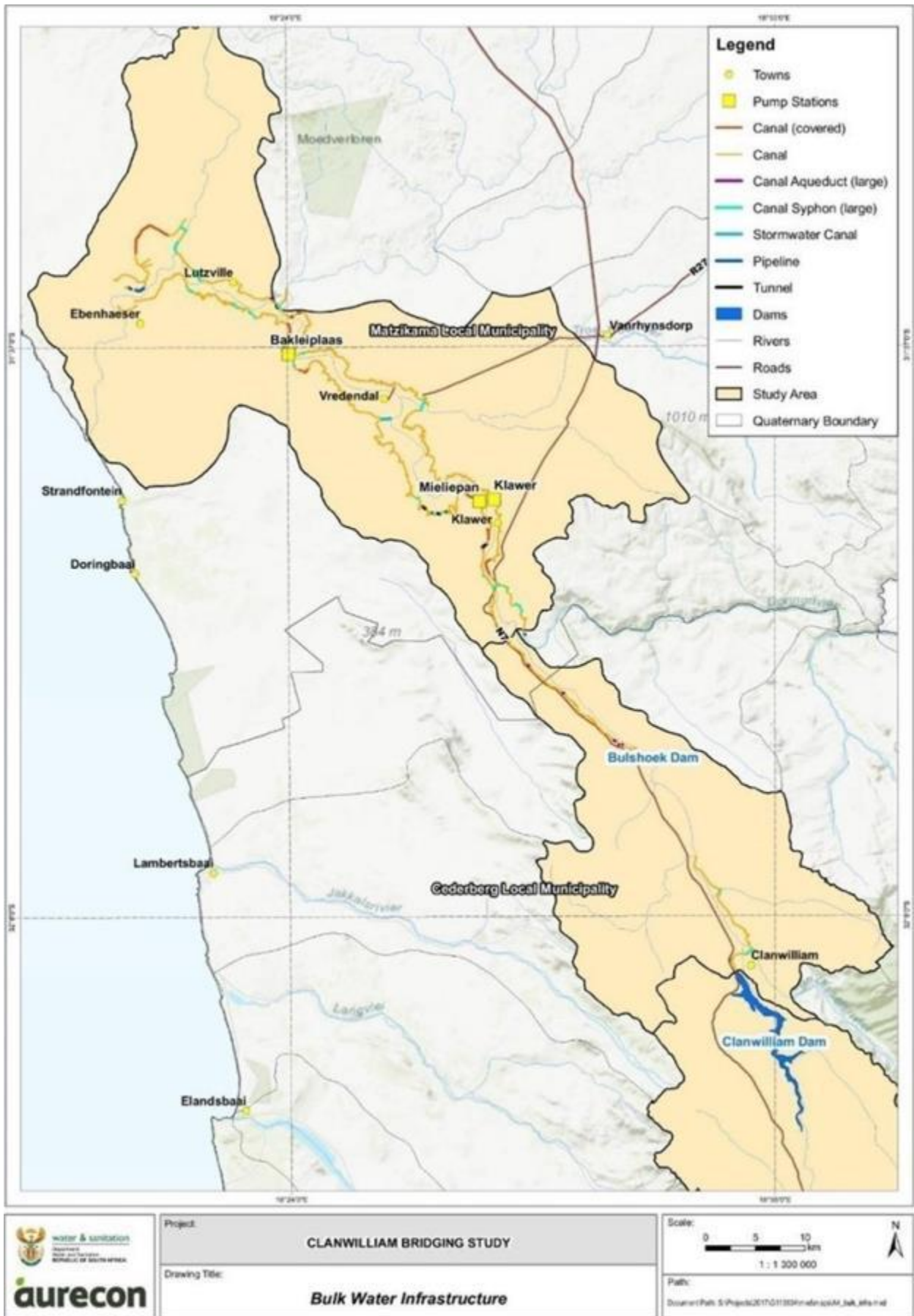


Figure 1.1: Study Area and Bulk Water Infrastructure

1.4 Content of this Report

Chapter 1: Introduction (this Chapter); introduces and provides background to the environmental screening process for the proposed bulk water supply options for the schemes.

Chapter 2: Recommended Options; summarises the proposed schemes and associated infrastructure.

Chapter 3: Regulatory Framework; describes the relevant environmental legislation which was applied as part of the environmental screening.

Chapter 4: Jan Dissels Scheme; describes the proposed infrastructure to supply water to the irrigation areas, and details the environmental considerations and authorisations required to guide planning and design.

Chapter 5: Right Bank Canal; describes the proposed infrastructure to supply water to the irrigation areas, and details the environmental considerations and authorisations required to guide planning and design.

Chapter 6: Ebenhaeser Scheme; describes the proposed infrastructure to supply water to the irrigation areas, and details the environmental considerations and authorisations required to guide planning and design.

Chapter 7: Conclusions; summarises the findings as described in this report.

Chapter 8: Recommendations; provides recommendations regarding the supporting specialist investigations, authorisations required and initiatives to support the implementation of the projects.

2 Recommended Options

This chapter identifies the three (3) options to be designed at feasibility level and for which environmental screening was undertaken for the bulk water supply infrastructure options.

2.1 Proposed schemes and associated infrastructure

The following schemes will be assessed in this study, to determine the environmental sensitivity and development considerations for each:

- **Jan Dissels Scheme**, pumping from Clanwilliam Dam. The scheme is very feasible from a cost perspective and offers a good opportunity for the inclusion of smallholder plots, given its proximity to Clanwilliam.

A botanical survey was undertaken to confirm the extent of environmental sensitivity for the agricultural areas.

Two sub-options for bulk water supply were evaluated and assessed in terms of sensitivity, namely either pumping via a rising main (RM) pipeline (RM Route 1) directly from a floating intake on the lake of the raised Clanwilliam Dam or pumping from an outlet on the right bank of the dam wall (RM Route 2). An access road must be constructed from the 'Ou Kaapse' Road or the township development located close by for the RM Route 1 option.

The RM Route 1 sub-option involves the construction of a 653 m long, 500 mm diameter RM pipeline from the shore of the raised Clanwilliam Dam (above the 1:100 year floodline) to a small 11.6 Mℓ balancing reservoir. The RM Route 2 sub-option involves the construction of a 3 619 m long, 500mm diameter RM pipeline from the raised dam wall along the right bank of the Clanwilliam Dam to the same 11.6 Mℓ balancing reservoir as mentioned above (refer to **Figure 2.1** which indicates the proposed route along the right bank of the Clanwilliam Dam from the raised dam wall location).

An additional electrical supply is required. As the supply for Clanwilliam Town must also be upgraded, the supply requirement can be potentially combined with that of the town. A possibility is for the scheme to be (inter-alia) supplied from the future proposed hydro power plant, to be located on the left bank at the raised Clanwilliam Dam. At the time of this screening process the detail regarding power supply was not available and therefore

the environmental sensitivities relating to the power supply infrastructure is not included in this report.



Figure 2.1: Photo taken along the proposed RM Route 2 on the right bank of the Clanwilliam Dam

- **Right Bank Canal Scheme**, replacing the existing left bank main canal with increased capacity and constructing a new canal on the right bank of the Olifants River, including the capacity to supply new downstream irrigation development and other future uses. This scheme is essential to ensure a secured future supply, given the high risk of disruption and shortfall in supply that the poor state of the existing canals, and especially the main (Trawal section) canal, poses to the lower Olifants River irrigators and other users, and to the prosperity of the region.

The recommended Right Bank Canal Scheme infrastructure is designed for a flow of 11.4 m³/s throughout, providing for existing irrigators (current allocations plus increased assurance of supply), new irrigation from a raised Clanwilliam Dam and other future uses. The scheme uses the existing outlet works from the Bulshoek Weir and requires upgrading of the first three (3) km of the existing Left Bank Canal, where it then crosses the Olifants River to connect into a new Right Bank Canal (Refer to **Figure 2.2**). The Right Bank Canal continues until it reaches the existing siphon at Verdeling, and includes a new 1.3 km siphon crossing at the Doring River. This Right Bank Canal will supply the four significant potential irrigation areas in the Trawal region, namely the Zypherfontein 1, Zypherfontein 2, Trawal and Melkboom irrigation areas. The scheme is situated on privately-owned land.



Figure 2.2: Location of the Olifants river siphon from the left bank canal to the proposed new right bank canal

- **Ebenhaeser Scheme**, making use of spare flow capacity in the existing right bank and left bank canal sections, supplying a combination of Ebenhaeser restitution farms and augmenting the Ebenhaeser community scheme. Augmentation of the water supply to prioritised restitution farms has a high priority from a social and political perspective, to ensure that such restitution farms can be successfully farmed, by increasing their currently inadequate water allocations. In addition, this scheme can augment supply to the existing historically disadvantaged community at Ebenhaeser. Five water requirement clusters were identified in consultation with community representatives. Six sub-options were identified and compared, and the preferred sub-option was further evaluated and assessed in terms of environmental sensitivity.

From the right bank Retshof canal diversion, water will be pumped via a 450 mm diameter, 888 m long RM pipeline, to a 28 Mℓ small combined balancing reservoir. Water will also be diverted from the left bank Vredendal canal to the combined small balancing reservoir, from the existing long weir. From the combined small balancing reservoir water will be pumped via a 700 mm diameter, 362 m long RM pipeline, to a 2.302 million m³ lined earthfill balancing dam, to be situated South-West of and close to the Vredendal left bank canal diversion point, opposite the R363 road between Vredendal and Lutzville.

From the earthfill balancing dam, water will be pumped to a 10.45 Mℓ concrete balancing reservoir, via a 500 mm diameter, 2 160 m long RM pipeline. From the balancing reservoir, water will be gravitated to high points adjacent to the water requirement clusters, with adequate minimum pressure provided, via a 600/500/400 mm diameter, 17 300 m long gravity pipeline (**Figure 2.3**).

The diversion infrastructure, RM pipelines, balancing earthfill dam and reservoirs would be located on privately owned land. Most of the gravity pipeline will be located on State land.



Figure 2.3: Proposed location of new gravity pipeline from the earthfill balancing dam towards Ebenhaeser

3 Regulatory Framework

3.1 National Environmental Management Act (Act No. 107 of 1998)

With reference to NEMA, certain activities may not commence without an Environmental Authorisation (EA) having been received from the relevant competent authority (CA). In terms of the 2014 Environmental Impact Assessment (EIA) regulations, as amended in 2017, pursuant to NEMA (GN R982), certain activities that may have a detrimental impact on the environment (termed Listed Activities) require an EA from the CA.

The installation of pipelines, abstraction from watercourses, construction through, over or under watercourses, upgrades to existing infrastructure, construction of dams and reservoirs and the upgrading or construction of canals could potentially trigger NEMA Listing Notices 1 (GN R983), 2 (GN R983) and 3 (GN R985) and therefore require subsequent authorisation from the CA. The potential listed activities which could be triggered by the bulk water supply infrastructure for the proposed developments are listed in Table 3.1 below.

Table 3.1: Summary of Listed Activities relevant for bulk water supply infrastructure

Listing Notice	Activity #	Activity description	Applicability
TRANSFORMATION OF LAND			
1	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	This activity would be applicable for the clearing of vegetation related to the construction of dams, reservoirs, pump stations, etc.
3	12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. i. Western Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act (NEMBA) or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;	This activity would be applicable for the clearing of vegetation for pipelines, pumpstations, roads, powerlines, reservoirs and dams within CBA areas and critically endangered or endangered vegetation types. This activity could

Listing Notice	Activity #	Activity description	Applicability
		ii. Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the Member of the Executive Council (MEC) or Minister.	also be triggered during road construction.
ELECTRICITY GENERATION, TRANSMISSION & DISTRIBUTION			
1	11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	Development of any powerlines or substations with a capacity of more than 33 kV.
MINING			
1	21	Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource ; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies.	The development of borrow pits for the excavation of material to be used for foundation, stabilisation, road construction or backfilling of construction areas. NOTE an application and EMPr would have to be submitted to the Department of Mineral Resources (DMR) in this regard.
STORAGE OF WATER			
1	13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	Development of reservoirs / dams with a combined capacity of 50 000 m ³ or more for a scheme.

Listing Notice	Activity #	Activity description	Applicability
2	16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.	Development of a dam with a dam wall higher than 5 m or covering an area of 10 ha or more at full capacity. Also note that this size dam would require registration with the Department of Water and Sanitation (DWS) as a dam with a safety risk.
3	2	The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres i. Western Cape i. A protected area identified in terms of the National Environmental Management Protected Areas Act (NEMPAA), excluding conservancies; ii. In areas containing indigenous vegetation; or iii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose.	Development of reservoirs in areas containing indigenous vegetation.
3	16	The expansion of reservoirs, excluding dams, where the capacity will be increased by more than 250 cubic metres. i. Western Cape i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. In areas containing indigenous vegetation; or iii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose, including residential areas.	Expansion of existing reservoirs
BULK TRANSPORTATION OF WATER			
1	9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	Construction of bulk water supply pipelines outside road reserves or urban areas.
1	45	The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure— (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and	Expansion of a canal where the throughput capacity will be increased by 10% or more.

Listing Notice	Activity #	Activity description	Applicability
		(a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion— (aa) relates to transportation of water or storm water within a road reserve or railway line reserve; or (bb) will occur within an urban area.	
2	11	The development of facilities or infrastructure for the transfer of 50 000 cubic metres or more water per day, from and to or between any combination of the following — (i) water catchments; (ii) water treatment works; or (iii) impoundments; excluding treatment works where water is to be treated for drinking purposes.	Development of canals and pipelines which would transfer water between quaternary catchments.
CONSTRUCTION IN WATERCOURSE			
1	12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure (including borrow pits) or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	Development of canals or pipelines within 32 m from the edge of a watercourse exceeding 100 m ² in size.
1	19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging,	Excavation, dredging or infilling undertaken within a watercourse which exceeds 10m ³ in size.

Listing Notice	Activity #	Activity description	Applicability
		excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	
1	48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding— (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 23 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.	The expansion of canals, water crossing structures or pipelines within 32 m from the edge of a watercourse exceeding 100 m ² in size.
3	14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. i. Western Cape i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA,	Development of canals or pipelines within 32 m from the edge of a watercourse exceeding 10 m ² in size within CBA and ESA areas.

Listing Notice	Activity #	Activity description	Applicability
		excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Core areas in biosphere reserves; or (hh) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.	
ROADS			
3	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape i. Areas zoned for use as public open space or equivalent zoning; ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation; (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or iii. Inside urban areas: (aa) Areas zoned for conservation use; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.	The construction of an access road wider than 4 metres through areas containing indigenous vegetation.
PHASED ACTIVITIES			
1	67	Phased activities for all activities— (i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; excluding the following activities listed in this Notice- 17(i)(a-d); 17(ii)(a-d); 17(iii)(a-d); 17(iv)(a-d); 17(v)(a-d); 20; 21; 22; 24(i); 29; 30; 31; 32; 34; 54(i)(a-d); 54(ii)(a-d); 54(iii)(a-d); 54(iv)(a-d); 54(v)(a-d); 55; 61; 64; and 65; or (ii) listed as activities 5, 7, 8(ii), 11, 13, 16, 27(i) or 27(ii) in Listing Notice 2 of 2014 or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.	The commencement of a phase of the development or proposed schemes, where the activities related to that phase in itself does not trigger a listed activity, but which would trigger a listed activity when considering the full scope of works for a scheme / development.

Listing Notice	Activity #	Activity description	Applicability
3	26	<p>Phased activities for all activities—</p> <p>i. listed in this Notice and as it applies to a specific geographical area, which commenced on or after the effective date of this Notice; or</p> <p>ii. similarly listed in any of the previous NEMA notices, and as it applies to a specific geographical area, which commenced on or after the effective date of such previous NEMA Notices—</p> <p>where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold; —</p> <p>excluding the following activities listed in this Notice—</p> <p>7; 8; 11; 13; 20; 21; and 24.</p> <p>All the areas as identified for the specific activities listed in this Notice.</p>	<p>The commencement of a phase of the development or proposed schemes, where the activities related to that phase in itself does not trigger a listed activity, but which would trigger a listed activity when considering the full scope of works for a scheme / development, within a specific geographic area.</p>

In terms of the activities listed in the table above, there are certain activities which would be restricted by the identification of CBA areas, especially in the Jan Dissels Scheme area. Within the Western Cape, these CBA areas have not been adopted yet by the Competent Authority (CA), but have been identified as areas to be avoided, according to early conversations with CapeNature. Since these CBA areas limit the scope of potential agricultural development in these areas, further discussion should take place between departments to agree on the way forward.

Alternative options for, or prior to, environmental authorisation in terms of the NEMA, is to undertake a Strategic Environmental Assessment (SEA) or an Environmental Management Framework (EMF) process for all the schemes and associated infrastructure. Although not required by law in South Africa, a SEA can be an important tool to help project planners understand the cumulative impacts in a geographical area of different land uses. An EMF aims to integrate various environmental management instruments to assist a holistic decision-making process. An EMF process identifies and highlights the opportunities and constraints for development within defined control zones and sensitive areas within a specific region. An EMF has been developed for the Sandveld and Agter-Cederberg regions, which does not include the Jan Dissels, Right Bank Canal and Ebenhaeser development areas.

3.2 National Heritage Resources Act (Act No. 29 of 1999)

With regards to NHRA, certain activities may not be initiated without prior approval/consent from the CA, which in this case would be Heritage Western Cape (HWC). Prior approval is required if activities have a potential to impact on the heritage or cultural features considered to be a national estate and need to be preserved or protected. Cultural features include structures older than 60 years, landscapes and natural features of cultural significance, geological sites of scientific or

cultural importance, archaeological and palaeontological sites, graves and burial grounds, sites of significance relating to slavery or movable objects.

Section 38 (1) of the NHRA provides a list of the activities which should be authorised by HWC and is quoted below:

Section 38 (1): Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(c) any development or other activity which will change the character of a site—

(i) exceeding 5 000 m² in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

3.3 National Water Act (Act No. 36 of 1998)

The NWA aims to regulate the use of water and/or activities which may potentially impact on water resources through the categorisation of water use activities as described in Section 21 of the said Act:

(a) Taking water from a water resource;

(b) Storing water;

(c) Impeding or diverting the flow of water in a watercourse;

(d) Engaging in a stream flow reduction activity contemplated in section 36;

(e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);

(f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;

(g) Disposing of waste in a manner that may detrimentally affect a water resource;

- (h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;*
- (i) Altering the bed, banks, course or characteristics of a watercourse;*
- (j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and*
- (k) Using water for recreational purposes.”*

The regulated area of a watercourse is 100 m from the edge of a stream / river and 500 m from the edge of a wetland. Any activity taking place within this regulated area has the potential to impact on the quality or characteristics of that watercourse. For this reason, any activity taking place in this regulated area should be authorised in terms of a General Authorisation (GA) or a Water Use Licence (WUL) through the DWS, or any relevant Catchment Management Agency (CMA). For the West Coast Municipality, the DWS is the CA for water use authorisations.

In terms of the development of an irrigation scheme, integrated WUL's could be considered for each scheme, which would include the abstraction and storage of water, as well as the work to be undertaken within the regulated areas of watercourses for the development of the schemes.

4 Jan Dissels Scheme

This section describes the proposed infrastructure options and associated environmental considerations for the Jan Dissels Scheme.

4.1 Introduction

The potential irrigable area, located south-east of Clanwilliam town in the Jan Dissels River valley, was defined during an options analysis, which was undertaken after an environmental screening of the options. A botanical survey was also undertaken by Nick Helme to refine the extent of the sensitivity on site. Based on the feedback received, the irrigable areas were refined, and associated infrastructure could be planned to supply water from the Clanwilliam Dam to these areas. These infrastructure options are discussed in the sections below.

4.2 Proposed Infrastructure Components

The high point that is suitable for a reservoir location, from where irrigation water can be gravitated to almost the entire area, is indicated by 'Balancing reservoir' in **Figure 4.1**, with the light blue areas indicating the potential irrigable areas. This report focusses on the water supply sub-options which include the following:

- Sub-option 1: Rising Main (RM) Route 1, pumping from a floating inlet directly from a raised Clanwilliam Dam.
- Sub-option 2: Rising Main Route 2, pumping from an outlet point provided below the raised dam wall, on the right bank.
- A 11.6 Ml balancing reservoir.

The abstraction point of Sub-option 1 will be affected by the rise/fall of the water level and potentially by floods passing through the dam basin. Pumping for Sub-option 2 will not be affected by the water level in the dam.

Both scheme sub-options have favourable costing, but it was not possible to differentiate between the sub-options in terms of technical features or cost at reconnaissance-level evaluation. Both options could be feasible from an environmental point of view. Both these options would also require the construction or upgrading of access roads.

The proposed infrastructure for bulk water supply to the Jan Dissels scheme is described in Section 2.1.



Figure 4.1: Location and Layout of Jan Dissels Scheme sub-options

4.3 Environmental Considerations

The Jan Dissels Scheme was assessed using the provided sub-options for water supply pipelines from the Clanwilliam Dam and proposed balancing reservoir. Sensitivity of these components was assessed to guide design and planning of the work to be undertaken for these areas. The description of the regulatory guidelines in terms of NEMA, NWA and NHRA (Act No. 25 of 1999), which should be considered, is given below.

The construction of pipelines and dams / reservoirs could potentially trigger NEMA Listing Notices 1 (GN R983), 2 (GN R983) and 3 (GN R985) and therefore require subsequent authorisation from the CA. All potentially triggered Listed Activities for bulk water supply are listed in **Table 3.1** above and the specific Listed Activities for the water supply infrastructure (RM Route 1, RM Route 2 and storage reservoir) for the Jan Dissels area are described in **Table 4.1**.

Table 4.1: Summary of potential Listed Activities for the Jan Dissels Scheme

Listing Notice	Activity #	Activity description	Applicability
TRANSFORMATION OF LAND			
1	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	This activity would be applicable for the clearing of vegetation at the reservoir site, should the clearing exceed 1ha.
2	15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	This activity would be applicable to construction of reservoirs, dams or pumphouse structures which would entail clearing of more than 20 ha of indigenous vegetation.
3	12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. i. Western Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.	This activity would be applicable for the clearing of vegetation along the RM Route 1 pipeline, since it is located in a CBA 1 mapped area and also for the RM Route 2 pipeline where it traverses the Ramskop Nature Reserve. This activity could also be triggered during road construction, although information on access roads was not available at the time of the screening.
ELECTRICITY GENERATION, TRANSMISSION & DISTRIBUTION			
1	11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;	Development of any powerlines or substations with a capacity of more than 33kV. Details are not yet available for the power supply infrastructure to the pump

Listing Notice	Activity #	Activity description	Applicability
		excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	station near the dam, but this activity could potentially be triggered and should be considered once information is available.
MINING			
1	21	Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource ; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies.	The development of borrow pits for the excavation of material to be used for foundation, stabilisation, road construction or backfilling of construction areas. NOTE that an application and EMPr would have to be submitted to the DMR in this regard.
STORAGE OF WATER			
1	13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	This activity will not be applicable since the proposed reservoir will be 11 600 cubic metres in size. Should any additional reservoirs / dams be planned, the combined capacity of these should be considered.
2	16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.	This activity is not applicable.
3	2	The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres i. Western Cape i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. In areas containing indigenous vegetation; or iii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose.	Development of the reservoir in areas containing indigenous vegetation.

Listing Notice	Activity #	Activity description	Applicability
3	16	The expansion of reservoirs, excluding dams, where the capacity will be increased by more than 250 cubic metres. i. Western Cape i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. In areas containing indigenous vegetation; or iii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose, including residential areas.	This activity is not applicable.
BULK TRANSPORTATION OF WATER			
1	9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	Construction of RM Route 1 and RM Route 2 which is located outside road reserves and urban areas.
1	45	The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure— (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion— (aa) relates to transportation of water or storm water within a road reserve or railway line reserve; or (bb) will occur within an urban area.	This activity is not applicable.
2	11	The development of facilities or infrastructure for the transfer of 50 000 cubic metres or more water per day, from and to or between any combination of the following — (i) water catchments; (ii) water treatment works; or (iii) impoundments; excluding treatment works where water is to be treated for drinking purposes.	This activity is not applicable.

Listing Notice	Activity #	Activity description	Applicability
CONSTRUCTION IN WATERCOURSE			
1	12	<p>The development of—</p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</p> <p>(ii) infrastructure (including borrow pits) or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —</p> <p>excluding—</p> <p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area;</p> <p>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</p> <p>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</p>	<p>This activity would be applicable to the construction of the RM Route 2 pipeline which would cross small drainage lines and also for the construction of the pipeline and pumphouse on the edge of the Clanwilliam Dam (which is also considered a watercourse), considering the pipeline and pumphouse infrastructure exceeds 100 square metres in size within the 32 m buffer area.</p>
1	19	<p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <p>(a) will occur behind a development setback;</p> <p>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	<p>This activity could be applicable to the RM Route 2 pipeline where the construction would take place within drainage lines, considering the pipeline trenches through the drainage lines would exceed 10 m³ in size.</p>

Listing Notice	Activity #	Activity description	Applicability
1	48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding— (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 23 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.	This activity is not applicable.
3	14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. i. Western Cape i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention;	This activity could be applicable for the construction of the RM Route 1 pipeline and pumphouse structure within the CBA 1 area and within 32 m from the edge of the dam.

Listing Notice	Activity #	Activity description	Applicability
		(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Core areas in biosphere reserves; or (hh) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.	
ROADS			
3	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape i. Areas zoned for use as public open space or equivalent zoning; ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation; (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or iii. Inside urban areas: (aa) Areas zoned for conservation use; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.	This activity could be applicable for the construction of the proposed access roads to be constructed for the pipelines and pumphouses, considering these roads would be wider than 4 metres through areas containing indigenous vegetation.
PHASED ACTIVITIES			
1	67	Phased activities for all activities— (i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; excluding the following activities listed in this Notice- 17(i)(a-d); 17(ii)(a-d); 17(iii)(a-d); 17(iv)(a-d); 17(v)(a-d); 20; 21; 22; 24(i); 29; 30; 31; 32; 34; 54(i)(a-d); 54(ii)(a-d); 54(iii)(a-d); 54(iv)(a-d); 54(v)(a-d); 55; 61; 64; and 65; or (ii) listed as activities 5, 7, 8(ii), 11, 13, 16, 27(i) or 27(ii) in Listing Notice 2 of 2014 or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.	This activity could be applicable should the development of the bulk water supply infrastructure be broken up into development phases where the one phase does not trigger any Listed Activity but where the combined phases for development would trigger any Listed Activity. For this reason, all activities planned for the bulk water supply to the Jan Dissels irrigation areas should be considered as one to determine the applicable Listed Activities.

Listing Notice	Activity #	Activity description	Applicability
3	26	<p>Phased activities for all activities—</p> <p>i. listed in this Notice and as it applies to a specific geographical area, which commenced on or after the effective date of this Notice; or</p> <p>ii. similarly listed in any of the previous NEMA notices, and as it applies to a specific geographical area, which commenced on or after the effective date of such previous NEMA Notices—</p> <p>where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold; —</p> <p>excluding the following activities listed in this Notice—</p> <p>7; 8; 11; 13; 20; 21; and 24.</p> <p>All the areas as identified for the specific activities listed in this Notice.</p>	<p>This activity could be applicable should the development of the bulk water supply infrastructure be broken up into development phases where the one phase does not trigger any Listed Activity but where the combined phases for development would trigger any Listed Activity. For this reason, all activities planned for the bulk water supply to the Jan Dissels irrigation areas should be considered as one to determine the applicable Listed Activities, within a specific geographical area.</p>

Most of the Jan Dissels Rising Main (RM) Route 2 pipeline area is mapped as ESA 1 (Ecological Support Area), except for the most southern part where a small balancing reservoir will be constructed, which is mapped as CBA 1 (Critical Biodiversity Area). The route along the RM Route 1 pipeline direct from the dam is also mapped as CBA 1 (refer to **Figure 4.2**). Reasons for environmental sensitivity includes ecological processes, vegetation types, threatened vertebrate, water resource and wetland protection, upland-lowland interface and groundwater recharge. The entire study area is mapped as Citrusdal Vygieveld, which is regarded as a Least Threatened (LT) vegetation type.

The pipeline routes, pumphouse and reservoir site would require detailed site assessment by botanical specialists to determine accurate on-site sensitivity, mitigation measures and location of protected species. It should also be noted that, due to the sensitivity of the CBA 1 mapped areas, there might be a need for biodiversity offsets, if residual impacts are significant in these areas.



Figure 4.2: CBAs and ESAs in the Jan Dissels area

It is also important to note that a section of the RM Route 2 pipeline would be constructed through the Ramskop Nature Reserve, which is a municipal protected area (**Figure 4.3**). The Ramskop Nature Reserve (Plot 357) was proclaimed a nature reserve in 1970 under Section 54(1)(a) of the Nature Conservation Ordinance 1965 and was also confirmed in the Cederberg Municipal by-law of 2004 which was published under Provincial Notice 824/1979. It is therefore recommended to seek alternative routes which avoids construction through this protected area. Should construction through this nature reserve be unavoidable, authorisation should be obtained from the Management Authority, which is the Cederberg Municipality in this case. Depending on the exact route and micro-siting sensitivities through this protected area, construction through this section might prove to be a challenge, but would have to be assessed in consultation with the Municipality.



Figure 4.3: Location of the Ramskop Nature Reserve along the RM Option 2

Based on the information available for the proposed developments for the Jan Dissels Scheme, authorisation would have to be obtained for triggered Listed Activities in terms of NEMA as per **Table 4.1**. The authorisation processes required would depend on the details of the proposed developments and should be reviewed before an application is submitted, in case there have been changes from the drafting of this report and the application for authorisation. A Basic Assessment would be required for activities such as the clearance of indigenous vegetation and the construction of pipelines, pumphouses and balancing reservoir. It is not anticipated that any Listing Notice 2 activities will be triggered which requires an EIA.

With regards to the NHRA, certain activities may not be initiated without prior approval/consent from the CA, which in this case would be HWC, if they have a potential to impact on the heritage or cultural features. Based on the information available for the proposed water supply pipeline options for the Jan Dissels Scheme, authorisation would have to be obtained for Section 38 (a) and (c) activities for the construction of a pipeline and balancing reservoir in terms of the NHRA. The authorisation process would require the submission of a Notice of Intent to Develop to the HWC for determination of the need for further paleontological or archaeological specialist studies and impacts assessments. Should further studies be required, an integrated Heritage Impact Assessment with specialist studies would have to be undertaken and submitted to HWC for authorisation. It is also known that near the gauging station on the Jan Dissels River are some caves of historical value, which would have to be taken into consideration during the heritage impact assessment.

With regards to the NWA, certain water use activities need to be authorised by the DWS through means of a GA or WUL, depending on the impact on freshwater resources in the area. Based on the information available for the proposed water supply infrastructure for the Jan Dissels Scheme, authorisation would have to be obtained for Section 21 (a), (b), (c) and (i) water uses in terms of the NWA. Although the pipeline routes do not cross any major rivers, there are numerous drainage lines, which could support aquatic ecosystems and would need to be assessed by a freshwater ecologist to undertake a risk assessment (**Figure 4.4**).

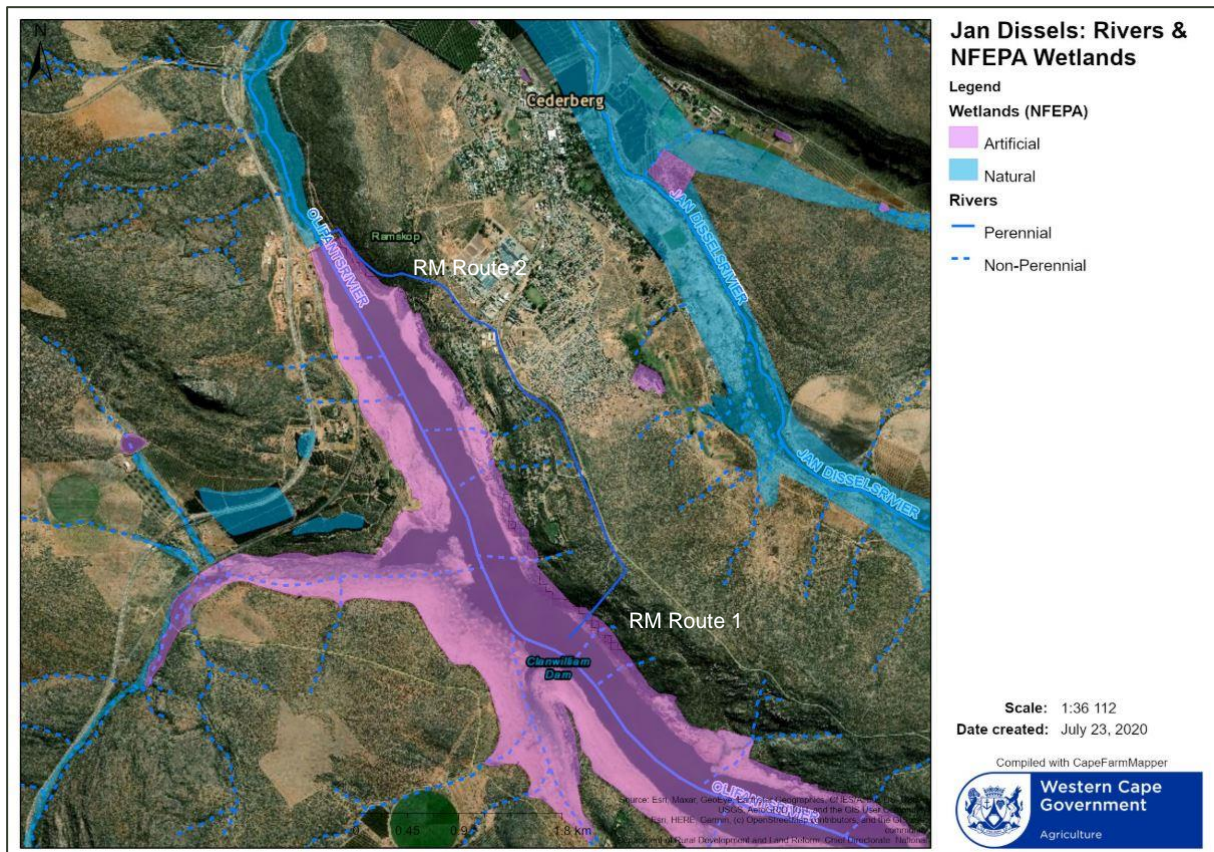


Figure 4.4: National Freshwater Ecosystem Priority Areas (NFEPA) wetland areas and rivers in the Jan Dissels area

The authorisation process would require an integrated approach for the entire scheme and would include a freshwater impact assessment and risk assessment to be undertaken. It is likely that the integrated authorisation would require a full WUL and not a GA, but this would be confirmed during a risk assessment process to be undertaken by the freshwater specialist. Activities which pose a low risk to the aquatic ecosystems would only require a GA, and medium and high-risk activities would require a WUL.

Based on the information provided, screening results and available site information, both the RM pipeline route options could be feasible and would have to be further assessed by means of on-site botanical sensitivity and consultation with the Municipality and landowners. This could not be done at screening level.

5 Right Bank Canal

This section describes the proposed infrastructure options and environmental considerations for the Right Bank Canal Scheme, which will be supplied from the existing Bulshoek Weir.

5.1 Introduction

Several major breaks have been experienced along the Bulshoek / Lower Olifants Canal due to ageing infrastructure. After more than 80 years of usage, the concrete lining of the existing canal has become frail and prone to damage, which results in canal breaks occurring frequently.

It is evident that the poor state of the existing canals, especially the main (Trawal) section, poses a high risk of disruption and potential shortfall in water supply to the lower Olifants River irrigators and other users, which includes towns in the area. Water is the driving force supporting the prosperity of the region. Therefore, the Right Bank Canal Scheme is being investigated as a means to ensure a secured future water supply to sustain existing development in the region, as well as to supply new irrigators. The Right Bank Canal Scheme is designed to upgrade a portion of the Left Bank Canal and replace the remainder of the existing main canal with a new canal on the right bank of the Olifants River, which will have an increased capacity to also supply new downstream irrigation development and other future uses.

5.2 Proposed Infrastructure Components

An initial reconnaissance assessment of alternatives for supplying water from Bulshoek Weir considered several options, including options for refurbishing the existing canal and to construct a new canal on the right bank from Bulshoek Weir to 'Verdeling'. The proposed scheme would be required to serve the identified new irrigation areas of Trawal, Zypherfontein 1, Zypherfontein 2, and Melkboom as shown in **Figure 5.1**.

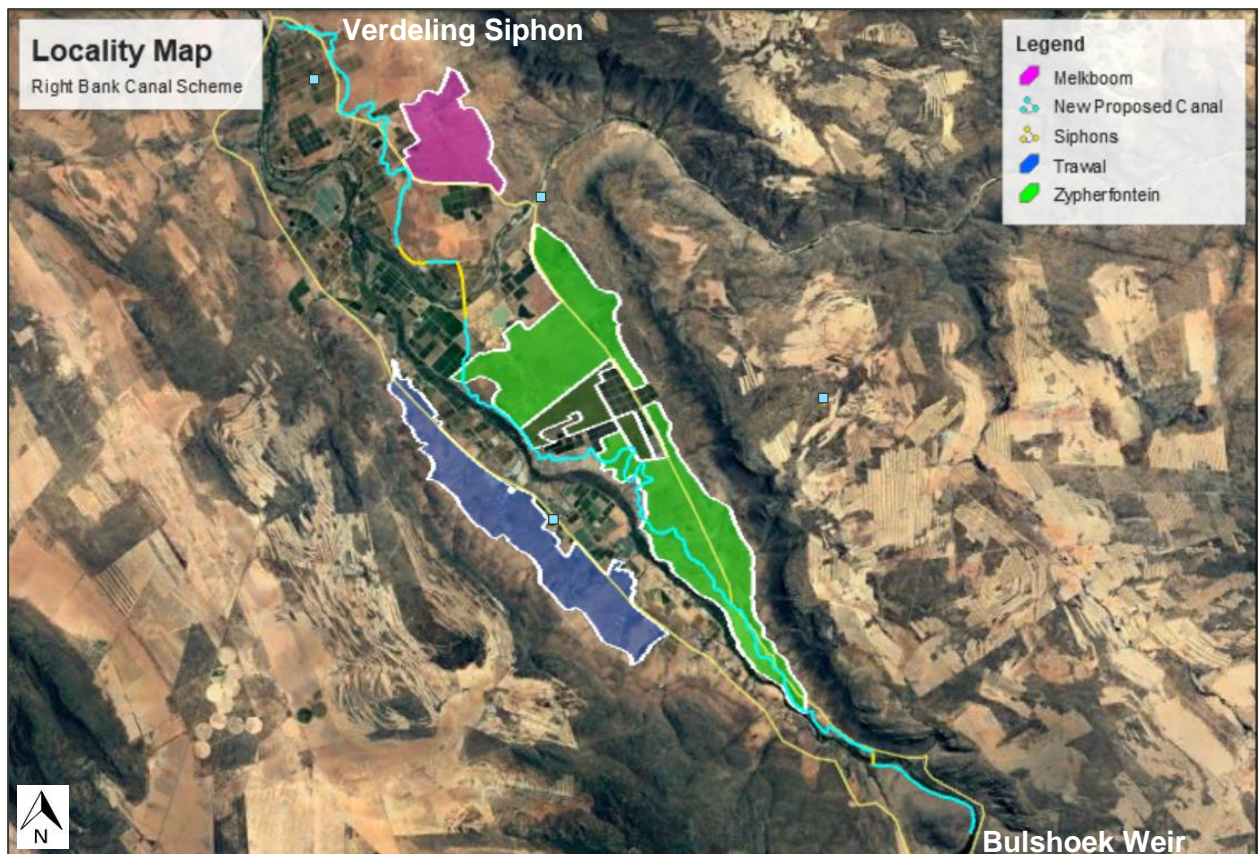


Figure 5.1: Layout of Right Bank Canal Scheme from Bulshoek Weir to Verdeling Siphon

The proposed Right Bank Canal Scheme involves construction of the following components to convey water from the Bulshoek Weir to the existing siphon at Verdeling:

- A 30 km trapezium-shaped concrete-lined canal with a capacity of 11.4 m³/s.
- Construction of access bridges spanning the canal.
- Construction of watercourse crossing infrastructure.
- Raising and lining of 3 km of the main left bank canal below Bulshoek Weir, up to the start of the new right bank canal section.
- Tying in of the new canal section to the existing left bank main canal.
- Tying in of the new right bank canal section to the siphon at Verdeling.
- Changes to the existing siphon at 'Verdeling'.
- Construction of flood mitigation and control infrastructure.
- Construction of canal access roads and fencing.

The proposed sub-options for the bulk water supply infrastructure are described in detail in the *Conceptual Design Report*.

5.3 Environmental Considerations

The Right Bank Canal Scheme was assessed using the preferred sub-options for water supply infrastructure from the Bulshoek Weir. Sensitivity was assessed to guide design and planning work to be undertaken for these areas. The description of the regulatory guidelines in terms of NEMA, NWA and the NHRA, which should be considered, is given below.

The upgrading and construction of canals and construction of pipelines / siphons could potentially trigger NEMA Listing Notices 1 (GN R983), 2 (GN R983) and 3 (GN R985) and therefore require subsequent authorisation from the CA. All potentially triggered Listed Activities for bulk water supply are listed in **Table 3.1** and the specific Listed Activities for the water supply infrastructure for the Right Bank Canal scheme are described in **Table 5.1**.

Table 5.1: Summary of potential Listed Activities for the Right Bank Canal Scheme

Listing Notice	Activity #	Activity description	Applicability
TRANSFORMATION OF LAND			
1	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	This activity is not applicable since the canal is a linear activity.
2	15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	This activity is not applicable.
3	12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. i. Western Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or v. On land designated for protection or conservation	This activity would be applicable for the clearing of vegetation along the Left Bank Canal upgrading section where it traverses Leipoldt Sand Fynbos (EN) vegetation types, the Rondeberg Oord Private Nature Reserve and also for the areas of the proposes upgraded and new canals located in CBA mapped areas. This activity could also be triggered during road construction, although information on access roads was not

Listing Notice	Activity #	Activity description	Applicability
		purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.	available at the time of the screening.
ELECTRICITY GENERATION, TRANSMISSION & DISTRIBUTION			
1	11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	This activity is not applicable since the canal would flow under gravity.
MINING			
1	21	Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource ; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies.	The development of borrow pits for the excavation of material to be used for foundation, stabilisation, road construction or backfilling of construction areas. NOTE an application and EMPr would have to be submitted to the DMR in this regard.
STORAGE OF WATER			
1	13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	This activity will not be applicable.
2	16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.	This activity is not applicable.
3	2	The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres i. Western Cape i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. In areas containing indigenous vegetation; or iii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial	This activity is not applicable.

Listing Notice	Activity #	Activity description	Applicability
		Development Frameworks adopted by the competent authority, or zoned for a conservation purpose.	
3	16	The expansion of reservoirs, excluding dams, where the capacity will be increased by more than 250 cubic metres. i. Western Cape i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. In areas containing indigenous vegetation; or iii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose, including residential areas.	This activity is not applicable.
BULK TRANSPORTATION OF WATER			
1	9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	Construction of a new Right Bank Canal which is located outside road reserves and urban areas.
1	45	The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure— (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion— (aa) relates to transportation of water or storm water within a road reserve or railway line reserve; or (bb) will occur within an urban area.	This upgrading of the Left Bank Canal to allow for an increase of more than 10% of the throughput capacity. The first 3 km of the existing LORGWS main canal with a capacity of 7.7 m ³ /s will be replaced by a canal with capacity of 11.4 m ³ /s (capacity increase of 48%).
2	11	The development of facilities or infrastructure for the transfer of 50 000 cubic metres or more water per day, from and to or between any combination of the following — (i) water catchments; (ii) water treatment works; or (iii) impoundments; excluding treatment works where water is to be treated for drinking purposes.	The transfer of more than 50 000 m ³ or more per day between quaternary catchments from E10K to E24M and E33G where the potential irrigation areas are located.
CONSTRUCTION IN WATERCOURSE			
1	12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or	This activity would be applicable to the construction of the siphons through the

Listing Notice	Activity #	Activity description	Applicability
		<p>(ii) infrastructure (including borrow pits) or structures with a physical footprint of 100 square metres or more; where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>—</p> <p>excluding—</p> <p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area;</p> <p>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</p> <p>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</p>	<p>Olifants and Doring rivers, considering the infrastructure required for the siphons exceeds 100 square metres in size within the 32 m buffer area.</p>
1	19	<p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <p>(a) will occur behind a development setback;</p> <p>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	<p>This activity could be applicable to the siphons through the Olifants and Doring rivers, considering the siphons will be open trenched through the river sections and would exceed 10 m³ in size.</p>
1	48	<p>The expansion of—</p> <p>(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or</p> <p>(ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;</p> <p>where such expansion occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding—</p> <p>(aa) the expansion of infrastructure or structures within</p>	<p>The upgrading of the existing Left Bank Canal where the work will be undertaken within 32 m from the edge of the Olifants river.</p>

Listing Notice	Activity #	Activity description	Applicability
		existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 23 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.	
3	14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. i. Western Cape i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Core areas in biosphere reserves; or (hh) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.	This activity could be applicable for the upgrade and construction of canals and siphons within the nature reserve, CBA areas and within 32 m from the edge of the Doring and Olifants rivers.
ROADS			
3	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape i. Areas zoned for use as public open space or equivalent zoning; ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation; (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no	This activity could be applicable for the construction of proposed access roads to be constructed, considering these roads would be wider than 4 metres through

Listing Notice	Activity #	Activity description	Applicability
		such setback line has been determined; or iii. Inside urban areas: (aa) Areas zoned for conservation use; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.	areas containing indigenous vegetation.
PHASED ACTIVITIES			
1	67	Phased activities for all activities— (i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; excluding the following activities listed in this Notice— 17(i)(a-d); 17(ii)(a-d); 17(iii)(a-d); 17(iv)(a-d); 17(v)(a-d); 20; 21; 22; 24(i); 29; 30; 31; 32; 34; 54(i)(a-d); 54(ii)(a-d); 54(iii)(a-d); 54(iv)(a-d); 54(v)(a-d); 55; 61; 64; and 65; or (ii) listed as activities 5, 7, 8(ii), 11, 13, 16, 27(i) or 27(ii) in Listing Notice 2 of 2014 or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.	This activity could be applicable should the development of the bulk water supply infrastructure be broken up into development phases where the one phase does not trigger any Listed Activity but where the combined phases for development would trigger any Listed Activity. For this reason, all activities planned for the Right Bank Canal infrastructure should be considered as one to determine the applicable Listed Activities.
3	26	Phased activities for all activities— i. listed in this Notice and as it applies to a specific geographical area, which commenced on or after the effective date of this Notice; or ii. similarly listed in any of the previous NEMA notices, and as it applies to a specific geographical area, which commenced on or after the effective date of such previous NEMA Notices— where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold; — excluding the following activities listed in this Notice— 7; 8; 11; 13; 20; 21; and 24. All the areas as identified for the specific activities listed in this Notice.	This activity could be applicable should the development of the bulk water supply infrastructure be broken up into development phases where the one phase does not trigger any Listed Activity but where the combined phases for development would trigger any Listed Activity. For this reason, all activities planned for the Right Bank Canal infrastructure should be considered as one to determine the applicable Listed Activities, within a specific geographical area.

There are four (4) areas along the Right Bank Canal Scheme infrastructure which are mapped as CBA areas. These include an area along the proposed upgrading of the Left Bank Canal from the Bulshoek Weir (**Figure 5.2**), a section along the new proposed Right Bank Canal, which runs parallel to the Olifants River (**Figure 5.3**), areas along the Doring River where the proposed siphon will be constructed (**Figure 5.4**) and a section along the proposed new Right Bank Canal or siphon north of the Doring River (**Figure 5.4**). Reasons for environmental sensitivity include ecological processes, vegetation types, threatened vertebrates, water resource and wetland protection, upland-lowland interface and groundwater recharge. It should also be noted that, due to the sensitivity of the CBA 1 mapped areas, there might be a need for biodiversity offsets, if residual impacts are significant in these areas.

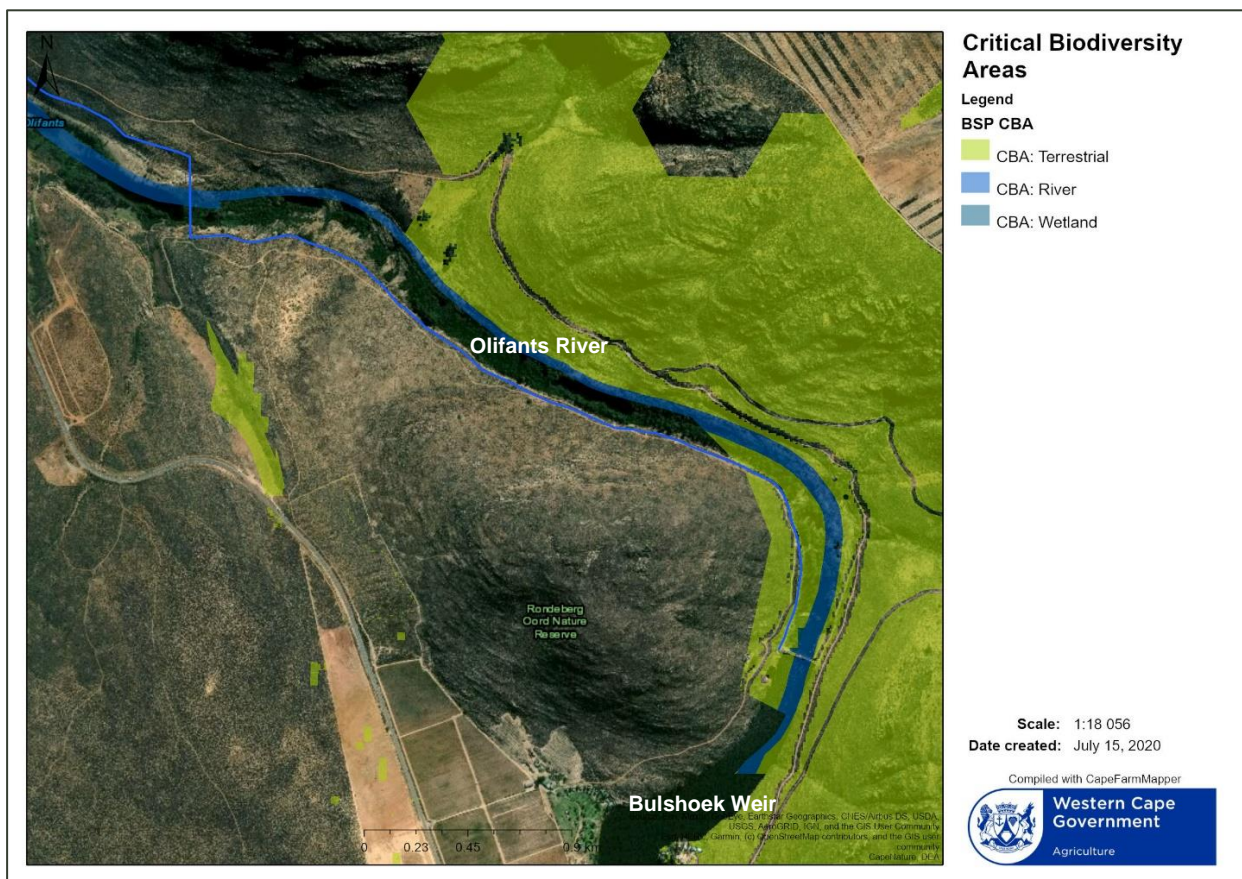


Figure 5.2: CBAs along the proposed Left Bank Canal

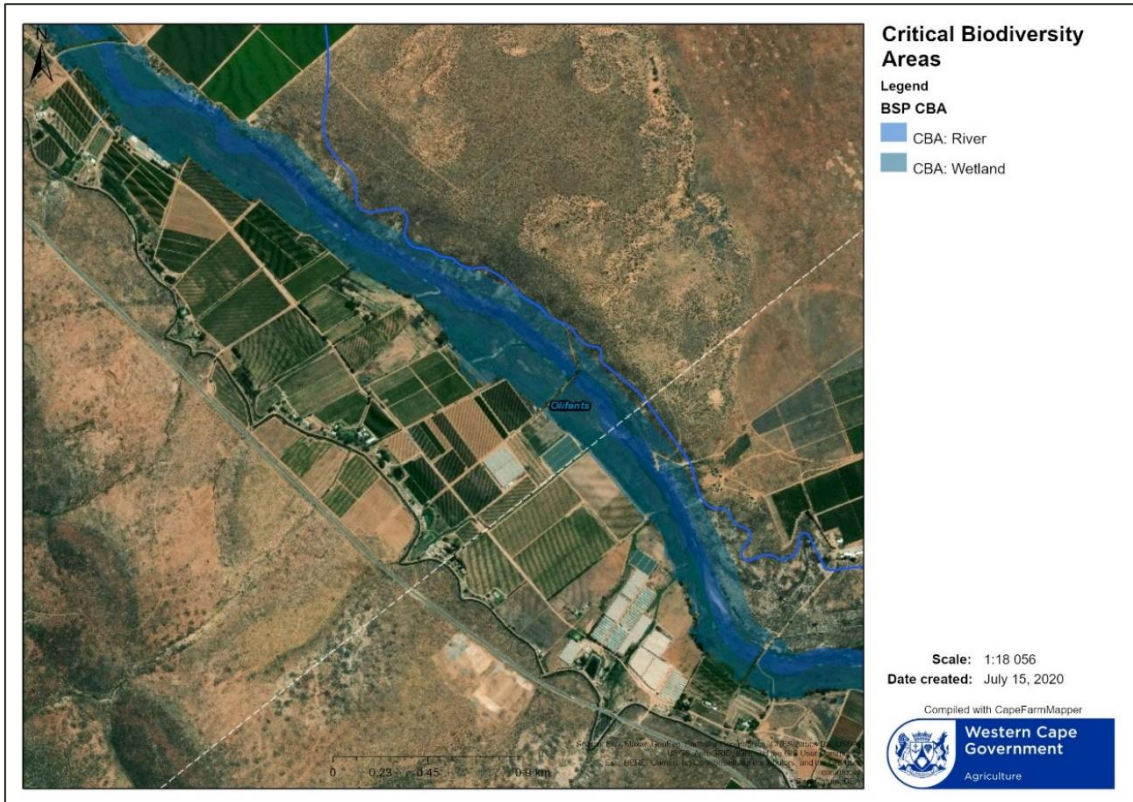


Figure 5.3: CBAs along the new proposed Right Bank Canal where it is located close to the Olifants River

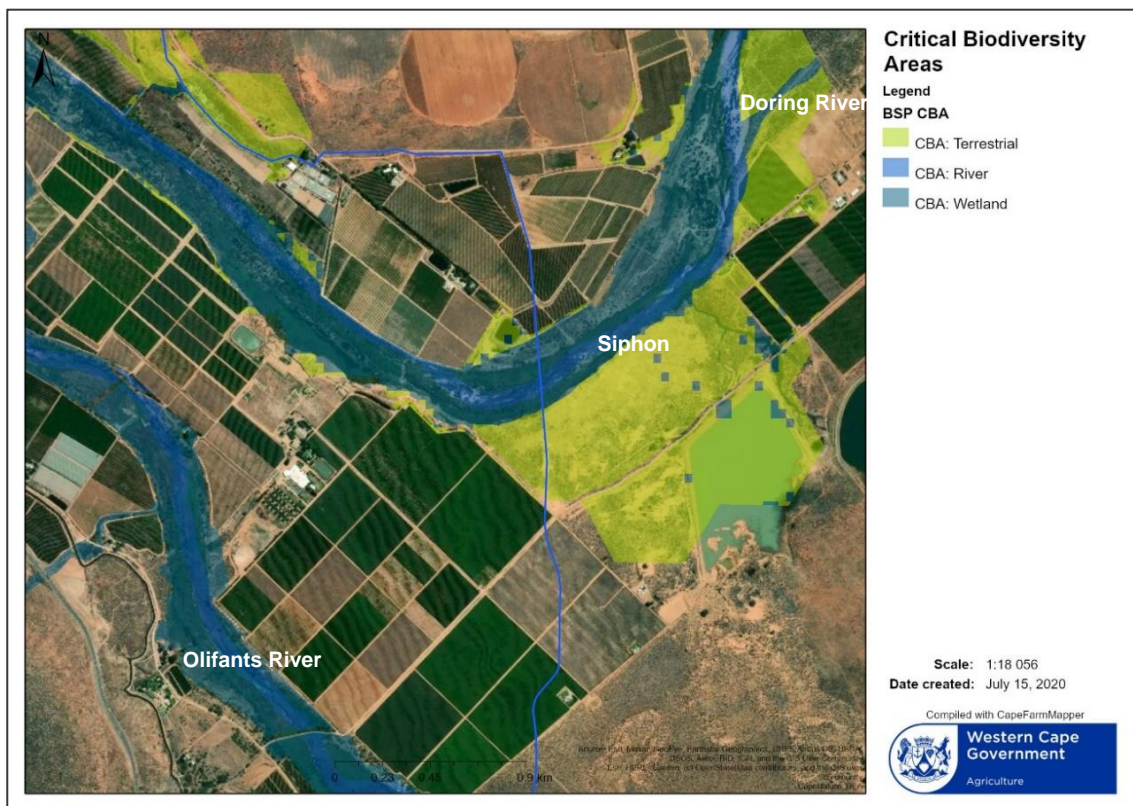


Figure 5.4: CBAs along the new proposed Right Bank Canal and Siphon through the Doring River

The study area varies in vegetation types ranging from Least Threatened (LT) and Vulnerable (VU) to Endangered (EN) vegetation types. The mapped threatened ecosystems for the area include Vanrhynsdorp Gannabosveld (LT), Namaqualand Riviere (LT), Klawer Sandy Shrubland (VU), Knersvlakte Quartz Vygieveld (LT), Graafwater Sandstone Fynbos (LT), Doringrivier Quartzite Karoo (LT) and Leipoldt Sand Fynbos (EN). The section along the proposed upgrade of the Left Bank Canal, where endangered vegetation type occurs, is shown in **Figure 5.5**. The canal and siphon routes would require detailed site assessment by botanical specialists to determine accurate on-site sensitivity, mitigation measures and location of protected species.

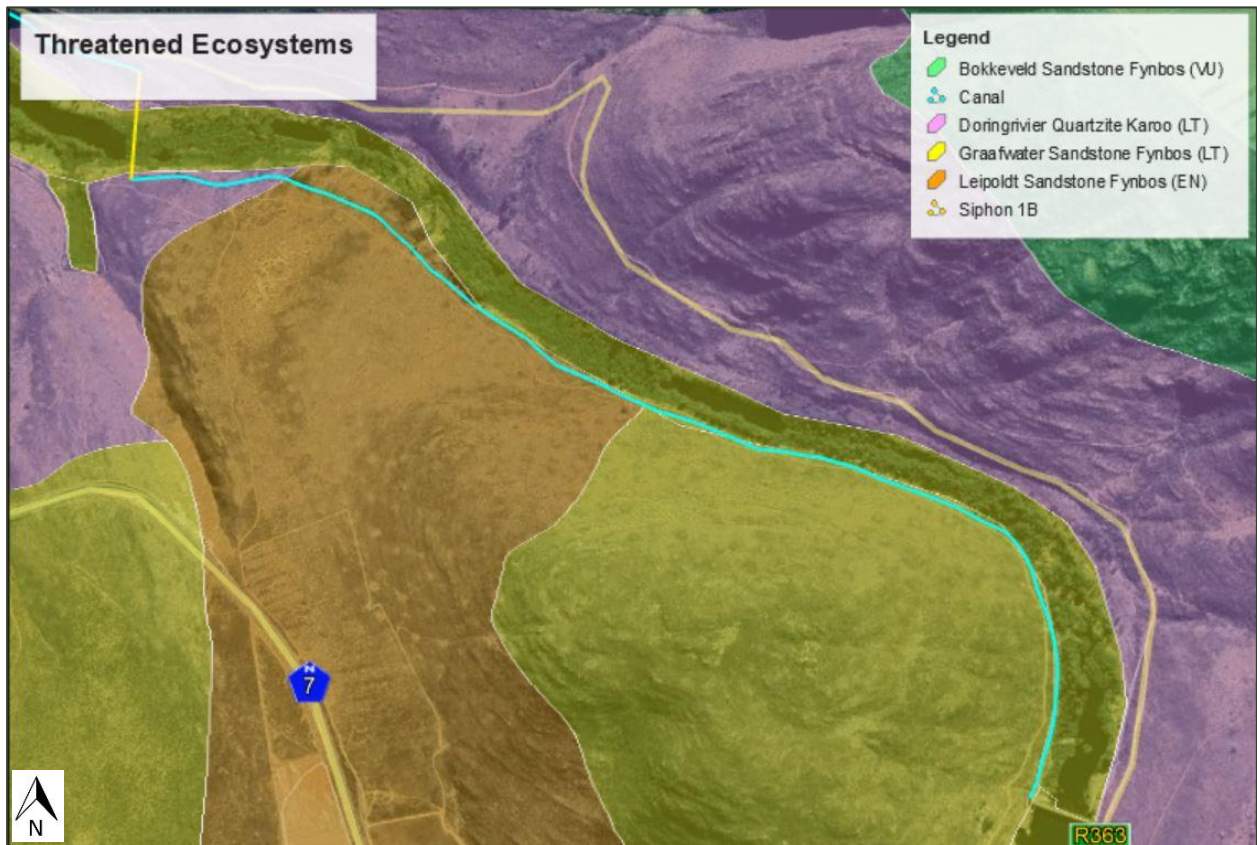


Figure 5.5: Threatened Ecosystems along the proposed Left Bank Canal

It is also important to note that a section, where the Left Bank Canal is proposed to be upgraded, traverses the Rondeberg Oord Private Nature Reserve (**Figure 5.6**). For construction through this nature reserve, authorisation should be obtained from the landowners of this private nature reserve. Depending on the exact route, boundaries of the actual nature reserve area and micro-siting sensitivities through and adjacent to this protected area, construction along this section might prove to be a challenge but would have to be assessed in consultation with the landowners.



Figure 5.6: Protected area along the proposed Left Bank Canal

Based on the information available for the proposed developments for the Right Bank Canal Scheme, authorisation would have to be obtained for triggered Listed Activities in terms of the NEMA as per **Table 5.1**. The authorisation processes required would depend on the details of the proposed developments, and should be reviewed before an application is submitted, in case there have been changes since the drafting of this report. A Basic Assessment would be required for activities such as the clearance of indigenous vegetation, working in watercourses and the construction and upgrading of canals. It is not anticipated that any Listing Notice 2 activities will be triggered, which require an EIA.

With regards to the NHRA, certain activities may not be initiated without prior approval/consent from the CA, which in this case would be HWC if they have a potential to impact on the heritage or cultural features. Based on the information available for the proposed water supply options for the Right Bank Canal scheme, authorisation would have to be obtained for Section 38 (a) and 38 (c) activities for the construction of a canal in terms of the NHRA. The authorisation process would require the submission of a Notice of Intent to Develop to the HWC for determination of the need for further paleontological or archaeological specialist studies and impacts assessment. Should further studies be required, an integrated Heritage Impact Assessment with specialist studies would have to be undertaken and submitted to HWC for authorisation.

With regards to the NWA, certain water use activities need to be authorised by the DWS through means of a GA or WUL, depending on the impact on freshwater resources in the area. Based on the information available for the proposed water supply infrastructure for the Right Bank Canal scheme, authorisation would have to be obtained for Section 21 (a), (c) and (i) water uses in terms of the NWA. The construction related activities in close proximity to the wetland areas and rivers (as indicated in **Figure 5.7**, **Figure 5.8** and **Figure 5.9**), which could support sensitive aquatic ecosystems, would need to be assessed by a freshwater ecologist to undertake a risk assessment.

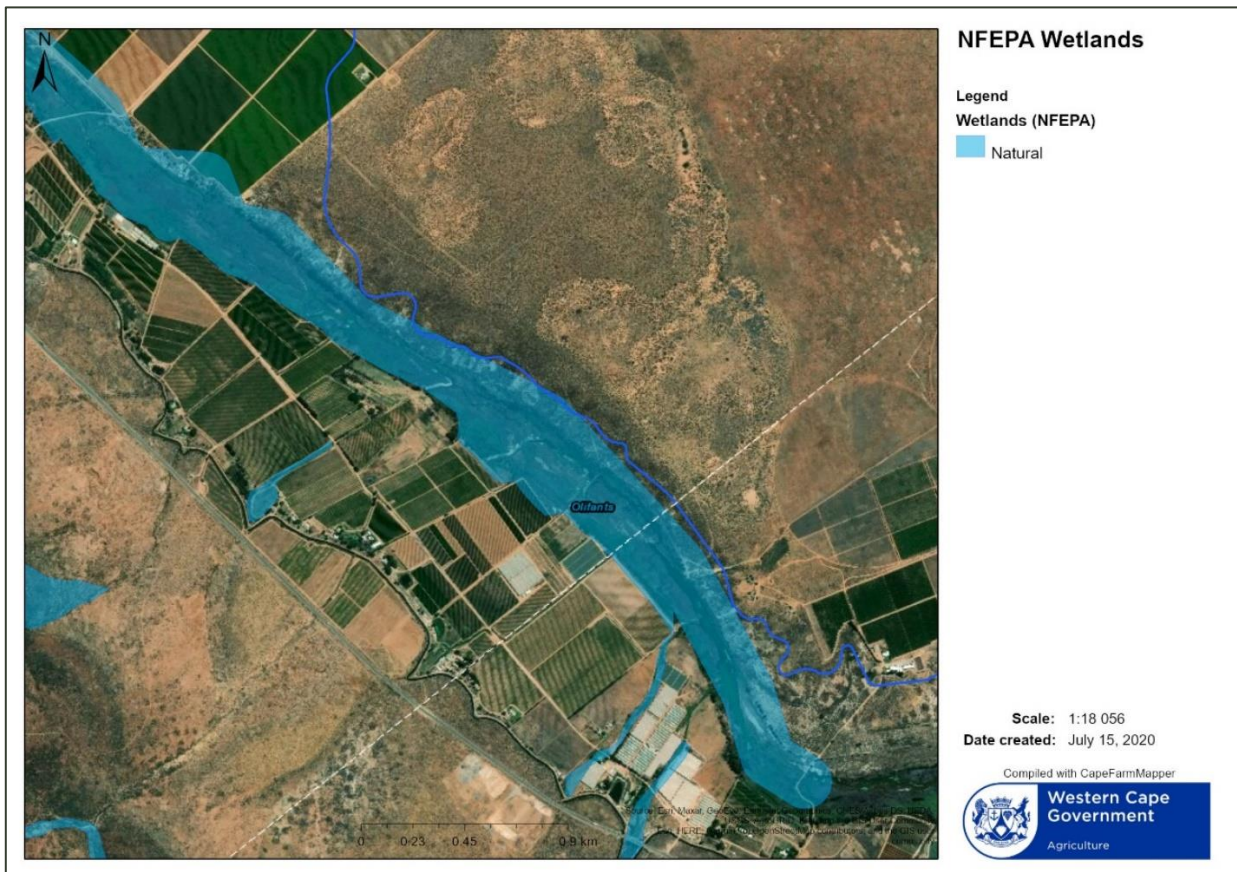


Figure 5.7: NFEPA wetland areas along the Olifants River and new proposed Right Bank Canal section

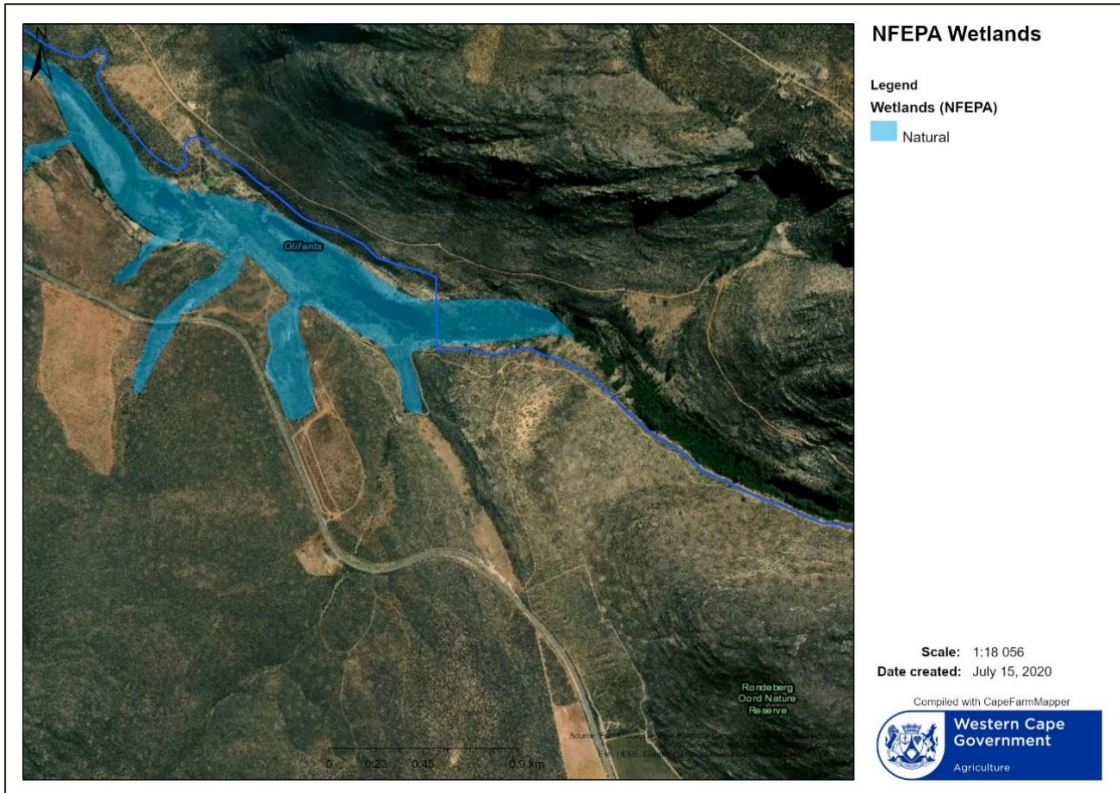


Figure 5.8: NFEPA wetland area along the Olifants River where the siphon will be constructed downstream of Bullshoek Weir

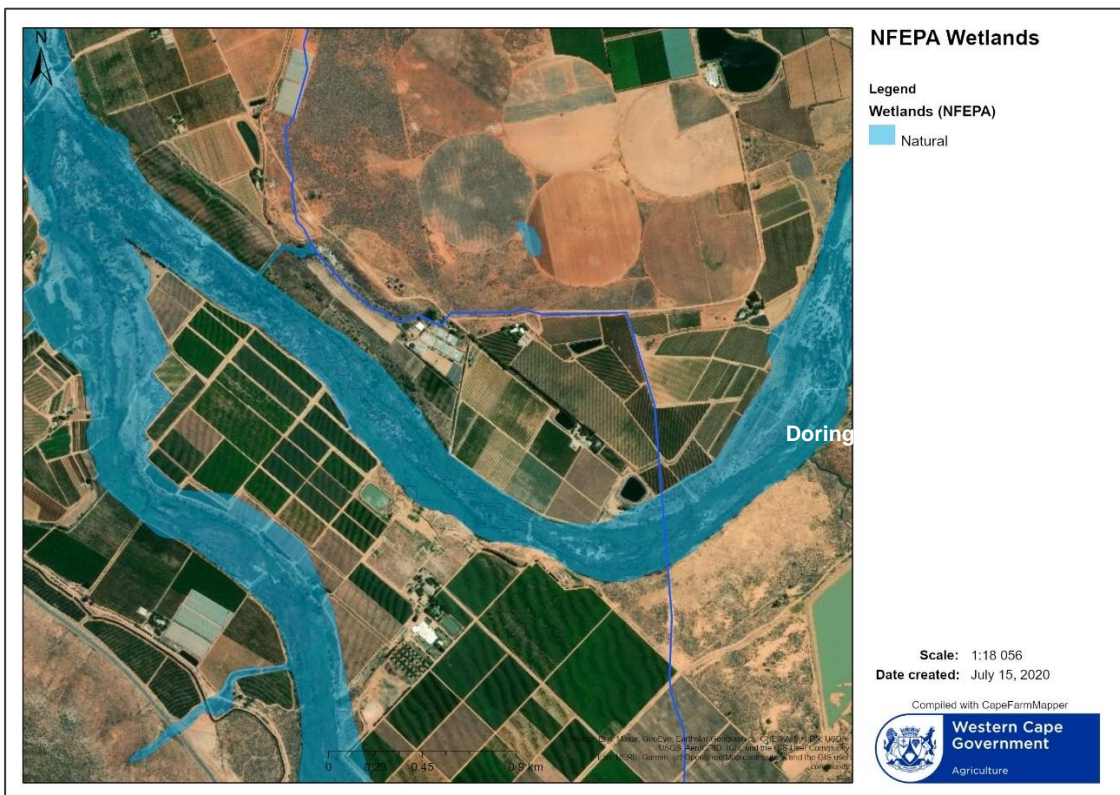


Figure 5.9: NFEPA wetland areas along the Doring River where the siphon will be constructed as part of the new proposed Right Bank Canal section

The authorisation process would require an integrated approach for the entire scheme and would include a freshwater impact assessment and risk assessment to be undertaken for work within close proximity and through the watercourses. It should also be noted that, should open trench construction be planned through the Olifants and Doring rivers, the timing of such construction would be critical due to floods that occur in the rivers (**Figure 5.10**). The works should therefore take place during the dry summer months. It should also be noted that the Doring River is an important fish sanctuary and seen as a hotspot for indigenous fish species. This would have to be assessed by a freshwater ecologist to determine the impact of construction along the Doring River catchment.

It is likely that the integrated authorisation would require a full WUL and not a GA, but would be confirmed during a risk assessment process to be undertaken by the freshwater specialist. Activities which pose a low risk to the aquatic ecosystems would only require a GA, and medium and high-risk activities would require a WUL.



Figure 5.10: Photo taken at the proposed siphon location through the Olifants River while the river was in flood during July 2020

6 Ebenhaeser Scheme

This section describes the proposed infrastructure options and environmental considerations for the Ebenhaeser Scheme.

6.1 Introduction

The existing Ebenhaeser Community Project is located approximately 12 km from Lutzville. Ebenhaeser is scheduled under LORWUA for 257 ha of water use entitlements, which needs to be distributed to 153 plots (1.68 ha each) plus a commercial farmer with 8.6 ha. The water is delivered to an existing balancing dam at the end of the canal system. A pumped scheme delivers the water under pressure.

The successful land claim lodged by the Ebenhaeser Community has resulted in thirteen farm parcels being handed over to the Ebenhaeser Community Project Association in March 2019, with further farms to be handed over in the future. These farms have a need for additional water, and some land parcels have no water allocation at all. Five water requirement clusters to augment the supply to restitution farms have been identified, that will use 80% of the scheme's water supply, with an area of 165 ha that can be irrigated, at an allocation of 12 000 m³/ha/a, to match that of surrounding commercial farms. The remaining 20%, a total of 59 ha will be used for expansion of the Ebenhaeser Community Project irrigation area, at an allocation of 8 437 m³/ha/a. Significantly more land is available for irrigation, if water could feasibly be conveyed to the area.

For this scheme, irrigators could pump water from existing canal sections during weeks with surplus flow, from the end of the Vredendal canal section on the left bank canal, as well as from the Retshof canal section of the right bank canal, to a 2.302 million m³ earthfill balancing dam on the left bank. The balancing storage includes a volume of 150 000 m³ to be used by the LORWUA for stabilising the operation of the lower sections of the right and left bank canals. From the balancing dam, water will be pumped to a reservoir and gravitated to the irrigators.

6.2 Proposed Infrastructure Components

A reconnaissance assessment of alternatives for supplying water to the irrigation areas proposed for the Ebenhaeser Scheme was undertaken. The proposed scheme would be required to serve the identified new irrigation areas as shown in **Figure 6.1**.

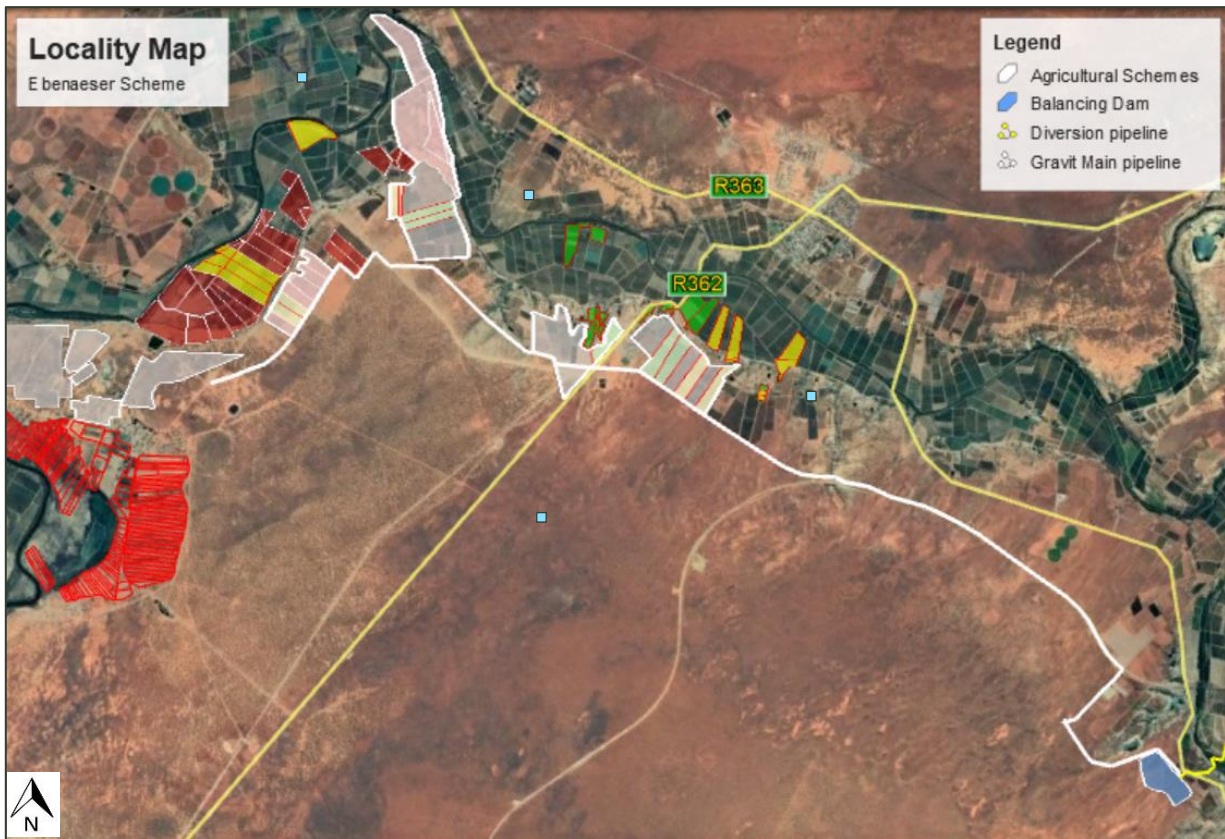


Figure 6.1: Location and Layout of the proposed Ebenhaeser Scheme and associated infrastructure

The Ebenhaeser Scheme will comprise of the following bulk infrastructure:

- An off-take structure from the existing Retshof right bank canal section.
- A 600 mm diameter and 750 m long gravity pipeline from the Retshof canal diversion point to a combined 28 Mℓ diversion balancing reservoir.
- A 100 m siphon through the Olifants River.
- An off-take structure from the existing Vredendal right bank canal section.
- A 600 mm diameter 100 m long gravity pipeline from the Vredendal canal diversion to the diversion balancing reservoir
- Construction of the combined diversion balancing reservoir (28 Mℓ).
- A pump house at the combined diversion balancing reservoir.
- A booster pump station at the lined earthfill balancing reservoir.
- An 800 mm diameter 520 m long rising main pipeline from the diversion balancing reservoir to the lined earthfill balancing dam.
- Construction of a lined earthfill balancing dam of 2.302 million m³ capacity.
- Construction of inlet and outlet structures required to make operational releases from the lined earthfill balancing dam to the Retshof and Vredendal canal sections.

- Construction of a 500 mm diameter and 2200 m long rising main pipeline to a small balancing reservoir.
- Construction of a 10.45 Ml small balancing reservoir.
- A 17 700 m long 700/600/500/400 mm diameter gravity main pipeline to the five water requirement clusters.
- Access roads would be required for the dam and pipelines; however, the exact location and dimensions are not known at this stage.
- An electricity supply will be required for lighting, pumps, etc.

Two existing powerlines would need to be relocated, and the route of a third planned powerline may have to be changed. It should however be noted that should any existing powerlines be relocated, the impact of this should be assessed. The scheme sub-options are described in detail in the *Conceptual Design Report*.

6.3 Environmental Considerations

The Ebenhaeser Scheme was assessed in terms of environmental sensitivity, using the preferred sub-options for water supply infrastructure, with the aim of providing guidance for design and planning in these areas. The description of the regulatory guidelines in terms of NEMA, NWA and the NHRA, which should be considered, is given below.

The construction of pipelines, siphons, reservoirs and dams could potentially trigger NEMA Listing Notices 1 (GN R983), 2 (GN R983) and 3 (GN R985) and therefore require subsequent authorisation from the CA. All potentially triggered Listed Activities for bulk water supply are listed in Table 3.1 and the specific Listed Activities for the water supply infrastructure for the Ebenhaeser Scheme are described in **Table 6.1**.

Table 6.1: Summary of potential Listed Activities for the Ebenhaeser Scheme options

Listing Notice	Activity #	Activity description	Applicability
TRANSFORMATION OF LAND			
1	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Clearance of indigenous vegetation for the construction of reservoirs and the lined earthfill dam, which would be more than 1 ha.
2	15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	This activity will be triggered with the construction of the lined earthfill dam which would have a surface area of more than 20ha.

Listing Notice	Activity #	Activity description	Applicability
3	12	<p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>i. Western Cape</p> <p>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</p> <p>ii. Within critical biodiversity areas identified in bioregional plans;</p> <p>iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;</p> <p>iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or</p> <p>v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.</p>	<p>This activity would be applicable for the clearing of vegetation along the Left Bank Canal upgrading section and also for the areas of the proposed reservoirs, dam and pipelines located in CBA mapped areas. This activity could also be triggered during road construction, although information on access roads was not available at the time of the screening.</p>
ELECTRICITY GENERATION, TRANSMISSION & DISTRIBUTION			
1	11	<p>The development of facilities or infrastructure for the transmission and distribution of electricity—</p> <p>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or</p> <p>(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;</p> <p>excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —</p> <p>(a) temporarily required to allow for maintenance of existing infrastructure;</p> <p>(b) 2 kilometres or shorter in length;</p> <p>(c) within an existing transmission line servitude; and</p> <p>(d) will be removed within 18 months of the commencement of development.</p>	<p>Development of any powerlines or substations with a capacity of more than 33 kV. Details are not yet available for the power supply infrastructure to pump stations near the rising main pipelines, but this activity could potentially be triggered and should be considered once information is available.</p>
MINING			
1	21	<p>Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including</p> <p>(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource ; or</p> <p>(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;</p> <p>but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction,</p>	<p>The development of borrow pits for the excavation of material to be used for foundation, stabilisation, road and dam construction or backfilling of construction areas. NOTE an application and EMPr would have to be submitted to the DMR in this regard.</p>

Listing Notice	Activity #	Activity description	Applicability
		refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies.	
STORAGE OF WATER			
1	13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	This activity would be triggered for the construction of reservoirs and dams which would have a combined capacity of more than 50 000 m ³ .
2	16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.	This activity will be triggered by the proposed lined earthfill dam which would have a dam wall higher than 5 m and would cover an area of more than 10 ha.
3	2	The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres i. Western Cape i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. In areas containing indigenous vegetation; or iii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose.	This activity would be applicable since a dam and reservoirs will be constructed in areas containing indigenous vegetation.
3	16	The expansion of reservoirs, excluding dams, where the capacity will be increased by more than 250 cubic metres. i. Western Cape i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. In areas containing indigenous vegetation; or iii. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose, including residential areas.	This activity is not applicable.
BULK TRANSPORTATION OF WATER			
1	9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	Construction of a new pipeline which is located outside road reserves and urban areas.

Listing Notice	Activity #	Activity description	Applicability
1	45	The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure— (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion— (aa) relates to transportation of water or storm water within a road reserve or railway line reserve; or (bb) will occur within an urban area.	This activity is not applicable.
2	11	The development of facilities or infrastructure for the transfer of 50 000 cubic metres or more water per day, from and to or between any combination of the following — (i) water catchments; (ii) water treatment works; or (iii) impoundments; excluding treatment works where water is to be treated for drinking purposes.	This activity is only applicable for a small section of pipeline but not the entire transfer length between quaternary catchments E33G and E33H.
CONSTRUCTION IN WATERCOURSE			
1	12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure (including borrow pits) or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	This activity would be applicable to the construction of the siphon through the Olifants River, considering the infrastructure required for the siphons exceeds 100 square metres in size within the 32 m buffer area.
1	19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or	This activity could be applicable to the siphon

Listing Notice	Activity #	Activity description	Applicability
		moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	through the Olifants River, considering the siphons will be open trenched through the river sections and would exceed 10 m ³ in size.
1	48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding— (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 23 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.	This activity is not applicable.
3	14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. i. Western Cape i. Outside urban areas:	This activity could be applicable for the construction of a siphon and pipeline within CBA areas and within 32 m from the edge of the Olifants River.

Listing Notice	Activity #	Activity description	Applicability
		(aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Core areas in biosphere reserves; or (hh) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.	
ROADS			
3	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape i. Areas zoned for use as public open space or equivalent zoning; ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation; (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or iii. Inside urban areas: (aa) Areas zoned for conservation use; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.	This activity could be applicable for the construction of proposed access roads to be constructed, considering these roads would be wider than 4 metres through areas containing indigenous vegetation.
PHASED ACTIVITIES			
1	67	Phased activities for all activities— (i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; excluding the following activities listed in this Notice- 17(i)(a-d); 17(ii)(a-d); 17(iii)(a-d); 17(iv)(a-d); 17(v)(a-d); 20; 21; 22; 24(i); 29; 30; 31; 32; 34; 54(i)(a-d); 54(ii)(a-d); 54(iii)(a-d); 54(iv)(a-d); 54(v)(a-d); 55; 61; 64; and 65; or (ii) listed as activities 5, 7, 8(ii), 11, 13, 16, 27(i) or 27(ii) in Listing Notice 2 of 2014 or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices; where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.	This activity could be applicable should the development of the bulk water supply infrastructure be broken up into development phases where the one phase does not trigger any Listed Activity but where the combined phases for development would trigger any Listed Activity. For this reason, all activities planned for the Ebenhaeser Scheme infrastructure should be considered as one to determine the applicable Listed Activities.

Listing Notice	Activity #	Activity description	Applicability
3	26	<p>Phased activities for all activities—</p> <p>i. listed in this Notice and as it applies to a specific geographical area, which commenced on or after the effective date of this Notice; or</p> <p>ii. similarly listed in any of the previous NEMA notices, and as it applies to a specific geographical area, which commenced on or after the effective date of such previous NEMA Notices—</p> <p>where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold; —</p> <p>excluding the following activities listed in this Notice— 7; 8; 11; 13; 20; 21; and 24.</p> <p>All the areas as identified for the specific activities listed in this Notice.</p>	<p>This activity could be applicable should the development of the bulk water supply infrastructure be broken up into development phases where the one phase does not trigger any Listed Activity but where the combined phases for development would trigger any Listed Activity. For this reason, all activities planned for the Ebenhaeser Scheme infrastructure should be considered as one to determine the applicable Listed Activities, within a specific geographical area.</p>

Small areas in the northern parts of the Ebenhaeser Scheme are mapped as CBA 1. Small ESA 1 and ESA 2 corridors occur along the pipeline route and watercourses in the area. Reasons for environmental sensitivity include ecological processes, vegetation types, threatened vertebrate, water resource and wetland protection, and upland-lowland interface. Should the development of the proposed sites be initiated, the activities would require detailed site assessment by freshwater and botanical specialists to determine accurate on-site sensitivity and location of protected species. It would be necessary for a freshwater specialist to delineate all wetlands, watercourses and floodlines.

The Ebenhaeser Scheme area varies in vegetation types which are all classified as Least Threatened (LT) vegetation types. The mapped threatened ecosystems for the area include Namaqua Riviere (LT), Namaqua Strandveld (LT) and Namaqua Spinescent Grassland (LT). Although there are no critically endangered or endangered vegetation types mapped for the area, the pipeline, reservoir and dam development areas would require detailed site assessment by botanical specialists to determine accurate on-site sensitivity, mitigation measures and location of protected species. Based on the information available for the proposed developments for the Ebenhaeser Scheme, authorisation would have to be obtained for triggered Listed Activities in terms of the NEMA as per **Table 6.1**.

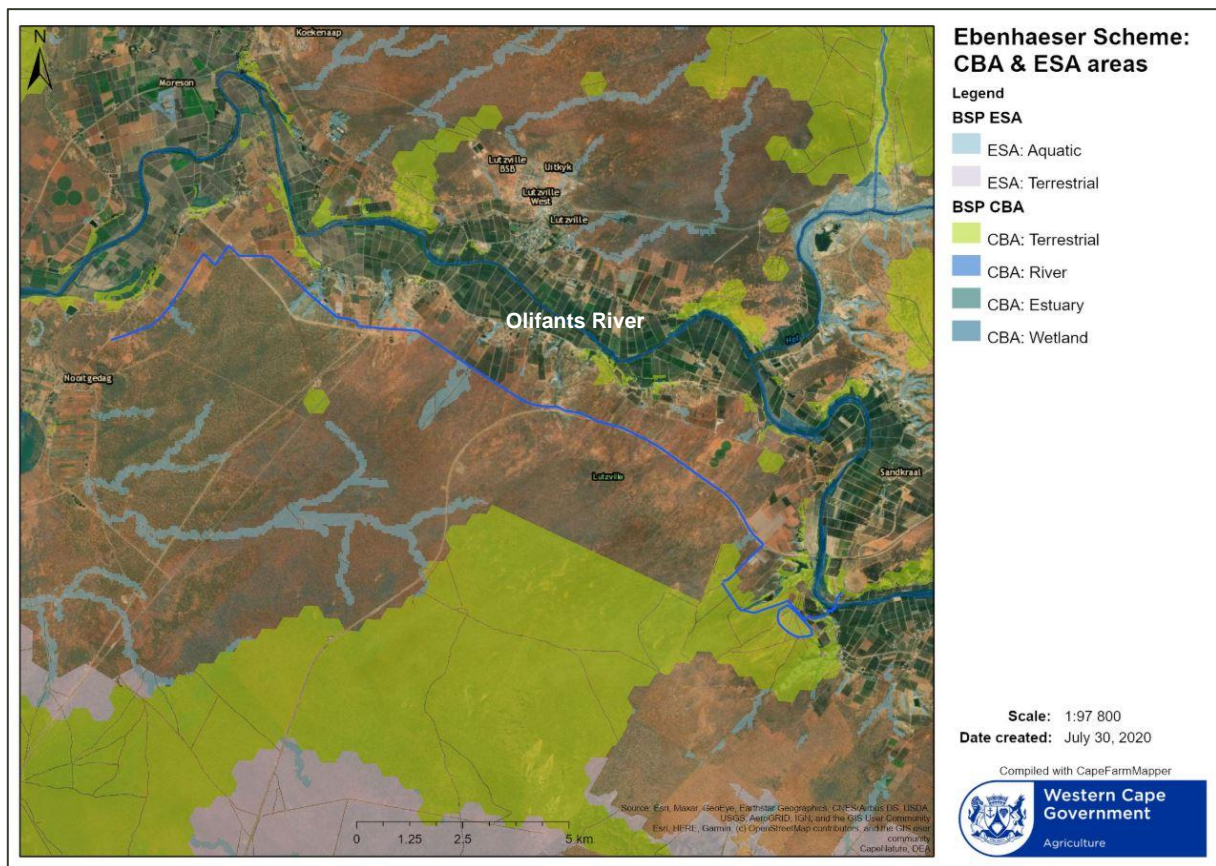


Figure 6.2: CBAs and ESAs along the proposed Ebenhaeser Scheme bulk infrastructure

The authorisation processes required would depend on the details of the proposed developments. A Basic Assessment would be required for activities such as the clearance of indigenous vegetation, pipelines, dams, reservoirs, working within, or in close proximity to watercourses, and development of new roads. There are however two (2) activities that would require an EIA, which includes the clearance of more than 20 ha of indigenous vegetation and the construction of a dam, where the dam wall is higher than 5 m or the dam area exceeds 10 ha in extent.

With regards to the NHRA, certain activities may not be initiated without prior approval/consent from the CA, which in this case would be HWC, if they have a potential to impact on the heritage or cultural features. Based on the information available for the proposed water supply options for the Ebenhaeser Scheme, authorisation would have to be obtained for Section 38 (a) and (c) activities for the construction of reservoirs, pipelines and a large earthfill dam in terms of the NHRA. The authorisation process would require the submission of a Notice of Intent to Develop to HWC for determination of the need for further paleontological or archaeological specialist studies and impacts assessment. Should further studies be required, an integrated Heritage Impact Assessment with specialist studies would have to be undertaken and submitted to HWC for authorisation.

With regards to the NWA, certain water use activities need to be authorised by the DWS through means of a GA or WUL, depending on the impact on freshwater resources in the area. Based on the information available for the proposed water supply infrastructure for the Ebenhaeser Scheme, authorisation would have to be obtained for Section 21 (a), (b), (c) and (i) water uses in terms of the NWA. An application for the registration of a dam with a safety risk is also required for the lined earthfill dam, since the dam wall is higher than 5 m. The construction related activities in close proximity to the wetland areas and rivers (as indicated in **Figure 6.3**), which could support sensitive aquatic ecosystems, would need to be assessed by a freshwater ecologist to undertake a risk assessment.

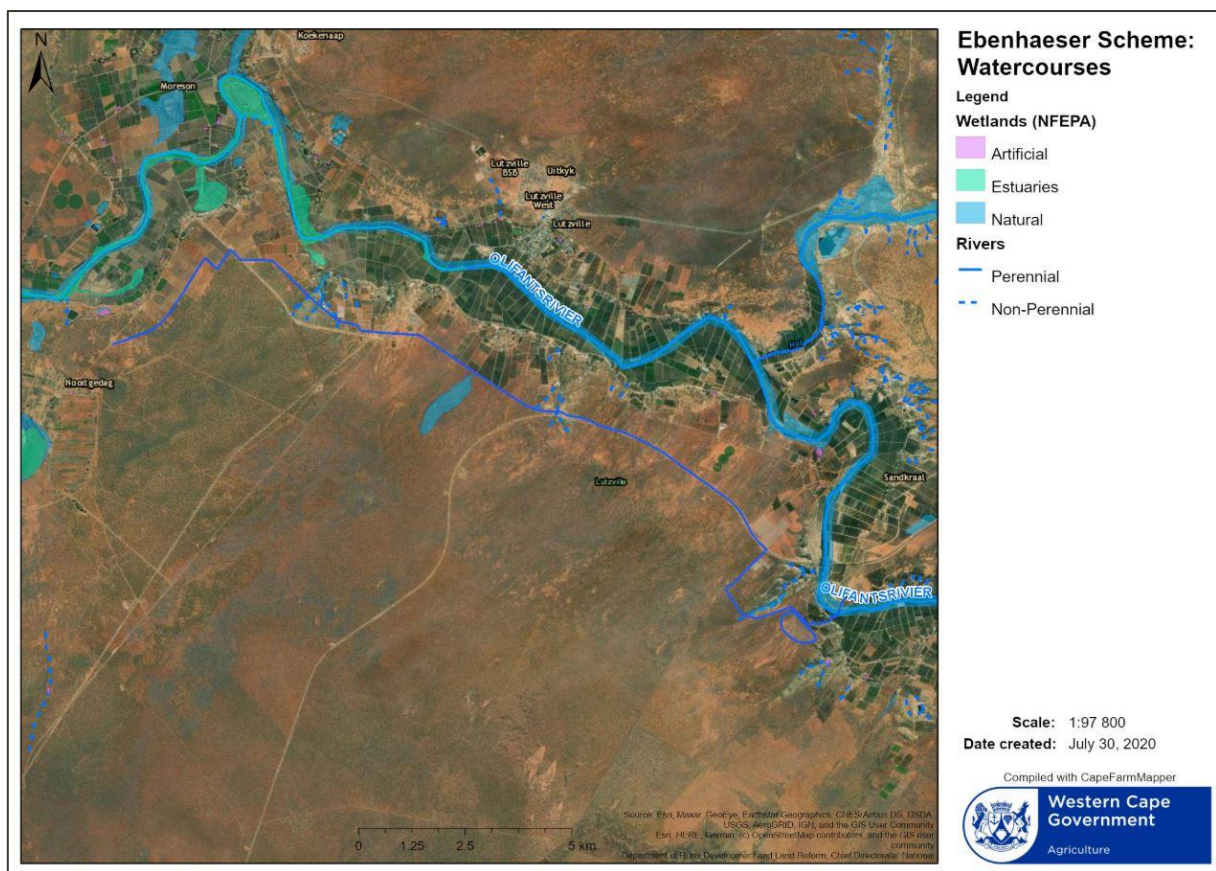


Figure 6.3: NFEPA wetland areas and rivers along the proposed development areas for bulk water supply to the Ebenhaeser irrigation areas

The authorisation process would require an integrated approach for the entire scheme and would include a freshwater impact assessment and risk assessment to be undertaken. It is likely that the integrated authorisation would require a full WUL and not a GA due to the size of the lined earthfill dam. Activities which pose a low risk to the aquatic ecosystems would only require a GA, and medium and high-risk activities would require a WUL.

7 Conclusions

The following conclusions have been made regarding the environmental considerations of the development options, which have been recommended for feasibility design:

- 1) The **Jan Dissels Scheme** offers 2 sub-options for infrastructure routes to convey bulk water from the raised Clanwilliam Dam to the Jan Dissels irrigation areas.
 - Sub-option 1 (RM Route 1) is located within an area mapped as a CBA. This option would include the removal of indigenous vegetation, but with the pipeline route being much shorter than the alternative, Sub-option 2 (RM Route 2).
 - RM Route 2 is not located in any CBA mapped areas, but does transect the Ramskop Nature Reserve, which is managed by the Cederberg Municipality.
 - There are indications that existing pipelines are present in this area and that the construction of the pipeline could potentially be approved by the Management Authority, which would be the Municipality in this case.
 - This route does however include the removal of indigenous vegetation and would probably require temporary and permanent access tracks to be constructed.
 - The proposed scheme will be subject to further on-site specialist assessments by a botanical specialist.
 - The proposed infrastructure would require a Basic Assessment to obtain authorisation from DEFF
 - If borrow pits are proposed, an application for authorisation should also be submitted to the DMR for mining activities.
 - The proposed infrastructure would also require heritage authorisation in terms of Section 38 (a) and (c) of the NHRA and water use authorisation in terms of Section 21 (a), (b), (c) and (i) of the NWA.
- 2) The **Right Bank Canal Scheme** will use the existing outlet works from the Bulshoek Weir, gravity flow along an upgraded canal on the left bank of the Olifants River, crossing the river 3 km further downstream, and continue along the right bank of the Olifants River up to Verdeling.
 - The upgrading of the left bank canal should consider vegetation clearance, since the site is located partly within a CBA, the Rondeberg Oord Private Nature Reserve and an endangered vegetation type.

- The proposed works should be subject to further on-site specialist assessments by a freshwater and botanical specialist to determine the best environmental options within the sensitive areas and especially the watercourses.
 - The work to be undertaken as part of the left bank canal upgrade, siphons through the Olifants and Doring rivers, construction of the Right Bank Canal and any other associated infrastructure would require a Basic Assessment to obtain authorisation from DEFF.
 - If borrow pits are proposed, an application for authorisation should also be submitted to the DMR for mining activities.
 - The proposed infrastructure would also require heritage authorisation in terms of Section 38 (a) and (c) of the NHRA.
 - A water use authorisation in terms of Section 21 (a), (c) and (i) of the NWA is required.
- 3) The **Ebenhaeser Scheme** involves the use of spare flow capacity in both the existing left bank (Vredendal section) and right bank (Resthof section) canals. Water will be pumped to a small combined balancing reservoir, from where it will be pumped to a 2.302 million m³ lined earthfill balancing dam, to be situated South-West of and close to the Vredendal left bank canal diversion point. From the balancing dam, water will be pumped to a 11 Mℓ concrete balancing reservoir, and from there gravitated to irrigators and supplied under pressure.
- The proposed works should be subject to further on-site specialist assessments by a freshwater and botanical specialist to determine the best environmental options within the sensitive areas and especially the watercourses.
 - The work to be undertaken as part of the diversions, siphon through the Olifants River, construction of balancing reservoirs, a large earthfill dam and any other associated infrastructure would require an EIA to obtain authorisation from DEFF.
 - If borrow pits are proposed, an application for authorisation should also be submitted to the DMR for mining activities.
 - Should the earthfill dam be removed from the scope of works, then only a Basic Assessment would be required for the authorisation of the remaining infrastructure.
 - The proposed infrastructure would also require heritage authorisation in terms of Section 38 (a) and (c) of the NHRA.
 - A water use authorisation in terms of Section 21 (a), (c) and (i) of the NWA is required.

8 Recommendations

The following recommendations are made regarding the environmental considerations of the development options, which have been recommended for feasibility design:

- 1) Undertake site specific specialist assessments and field clarifications to guide engineering design, prior to undertaking the Environmental Impact Assessment (EIA) process.
- 2) Consider an alternative to constructing a RM pipeline through the Ramskop Nature Reserve (RM Route 2 of the Jan Dissels Scheme).
- 3) Determine the preferred RM sub-option for the Jan Dissels Scheme.
- 4) Determine the exact road and power supply related infrastructure and assess the proposed impacts as part of the EIA process.
- 5) The DWS should make a formal submission about the planned Clanwilliam Dam raising conveyance infrastructure development to the authorities involved with the gazetting of the CBAs, following acceptance of the recommendations. Evaluation of schemes has confirmed that the ecological impact and environmental issues relating to new development significantly influence and limit the scope of development options. Dialogue around these issues has started and further discussion should take place between departments as soon as possible, to agree on the way forward.
- 6) The DWS should consult internally to determine whether integrated WULs should be submitted for each scheme, including abstraction, storage and working in watercourses.
- 7) Alternative options for, or prior to, environmental authorisation in terms of the NEMA, should be considered, such as the undertaking of an SEA or EMF for all the schemes and associated infrastructure.



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