

**THE PROPOSED ENLARGEMENT OF LANGRUG-
BOONSTE NR1 DAM, ALSO KNOWN AS HELPMEKAAR
DAM, CONSTRUCTION OF A NEW BUFFER DAM AND
ASSOCIATED INFRASTRUCTURE, ON FARM
RIETRIVIER 202, PORTION 5, CERES, WESTERN CAPE**



**DRAFT
ENVIRONMENTAL IMPACT REPORT**

WCDEA&DP REF: 16/3/3/2/B5/2/1043/26

SEPTEMBER 2026

STERKWATER BOERDERY (PTY) LTD.

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INDEPENDENCE & CONDITIONS

EnviroAfrica is an independent consulting firm that has no interest in the proposed activity other than fair remuneration for services rendered. Remuneration for services is not linked to approval by decision-making authorities, and EnviroAfrica has no interest in secondary or downstream development as a result of this project. There are no circumstances that compromise the objectivity of this Environmental Impact Report. The findings, results, observations and recommendations given here are based on the author's best scientific and professional knowledge and available information. EnviroAfrica reserves the right to modify aspects of this report, including the recommendations, if new information becomes available which may have a significant impact on the findings of this report.

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ACRONYMS

BGIS	Biodiversity Geographic Information System
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs
WCDEA&DP	Western Cape Department of Environmental Affairs and Development Planning
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act (Act No. 73 of 1989)
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
EWR	Environmental Water Requirements
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
I&APs	Interested and Affected Parties
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NID	Notice of Intent to Develop
NWA	National Water Act
OESA	Other Ecological Support Area
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
WULA	Water Use Licence Application

1. INTRODUCTION

1.1 BACKGROUND

Agriculture is a key contributor to the Cape Winelands District economy, supporting employment and the livelihoods of local communities. The Koue Bokkeveld region is recognised as one of South Africa's principal deciduous fruit-producing areas, where agricultural productivity is highly dependent on reliable and well-managed irrigation water.

The proposed development is intended to support the conversion of approximately 45 ha of existing annual cropland to permanent fruit orchards. Sterkwater Boerdery (Pty) Ltd proposes the enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), the construction of a supplementary Buffer Dam with a storage capacity of approximately 27 000 m³, and the installation of an underground connecting pipeline. Two pipeline alignments are considered as alternatives in this EIR and Appendix 9: the preferred Green Pipeline Route, approximately 1.7 km long, and the alternative Blue Pipeline Route, approximately 2 km long. The specialist findings for the broader development area inform the assessment of both alternatives where relevant to their respective alignments. Both routes connect the same proposed dam infrastructure, with the Green Route forming part of the preferred development layout.

The proposed enlargement would increase the storage capacity of Helpmekaar Dam from approximately 390 000 m³ to approximately 800 000 m³, representing a net increase of approximately 410 000 m³. Together with the supplementary Buffer Dam and connecting pipeline, the development is intended to improve the storage and transfer of winter runoff for irrigation during the drier summer months.

A Hydrological Assessment, titled Investigation into Availability of Surplus Water in the Leeu Catchment, was undertaken to investigate water availability and the potential downstream implications of enlarging Helpmekaar Dam. The assessment modelled the proposed increase in dam capacity and its effect on the supply of water for existing irrigation requirements and on downstream Wydekloof Dam. Under the modelled conditions, the average annual irrigation supply from the combined upstream dam system increased from approximately 1.10 million m³ to 1.26 million m³. The average annual spill volume from Wydekloof Dam decreased from approximately 3.31 million m³ to 3.17 million m³, while its modelled irrigation supply remained unchanged.

The availability and lawful use of water for the proposed development, including any additional abstraction, storage and irrigation requirements, remain subject to the separate Water Use Licence Application (WULA) process. Environmental Authorisation under NEMA would not, on its own, authorise additional water use.

The availability of suitable dam sites is a key consideration in planning additional water-storage infrastructure. Enlarging the existing Helpmekaar Dam would make use of established water-storage infrastructure, while the supplementary Buffer Dam would assist with water transfer and distribution within the proposed irrigation system. The preferred Green Pipeline Route and alternative Blue Pipeline Route have been considered in the EIR and Appendix 9. The Helpmekaar Dam enlargement and Buffer Dam footprints remain unchanged under both pipeline alternatives; the alternatives differ in the alignment and length of the connecting pipeline. The proposed development includes the preferred Green Route, subject to the findings of the EIA and applicable specialist recommendations.

The proposed development may provide socio-economic benefits through improved flexibility in managing irrigation water and support for the continued operation of the farming enterprise. Subject to the availability and authorisation of the required water, the proposed conversion to permanent fruit orchards may also support agricultural production and associated employment opportunities in orchard establishment, maintenance, harvesting, packing and distribution.

The potential environmental and socio-economic impacts of the proposed development, including effects on freshwater ecosystems, downstream water availability, biodiversity and agricultural land, are assessed in this Environmental Impact Report and the associated impact assessment tables. The relevant mitigation, management and monitoring measures are incorporated into the Environmental Management Programme (EMPr), with water-use-specific requirements to be addressed through the WULA process and applicable authorisation conditions.

1.2 DESCRIPTION OF THE PROPOSED ACTIVITY

FOR THE PROPOSED ENLARGEMENT OF LANGRUG-BOONSTE NR1 DAM, ALSO KNOWN AS HELPMEKAAR DAM, CONSTRUCTION OF A NEW BUFFER DAM AND ASSOCIATED INFRASTRUCTURE, ON FARM RIETRIVIER 202, PORTION 5, CERES, WESTERN CAPE WCDEADP REFERENCE: 16/3/3/2/B5/2/1043/26

The proposed development comprises the enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), the construction of a supplementary buffer dam, and the installation of an underground connecting pipeline between the two dams. The project also includes ancillary infrastructure required for the construction, operation and maintenance of the proposed water storage and transfer system.

The existing Helpmekaar Dam has an approximate storage capacity of 390 000 m³. The proposed enlargement will increase its storage capacity to approximately 800 000 m³, representing a net increase of approximately 410 000 m³. The enlarged dam wall will have a maximum height of approximately 13.9 m and a crest length of approximately 320 m. At full supply level, the reservoir will inundate approximately 16.3 ha, with an overall dam footprint of approximately 20 ha.

The proposed supplementary buffer dam, located east of Helpmekaar Dam, will have a storage capacity of approximately 27 000 m³ and an inundated area of approximately 2.1 ha. The buffer dam wall will be approximately 5.4 m high, with a crest length of approximately 392 m. The buffer dam is intended to regulate irrigation supply, improve operational flexibility and enhance the efficiency of water distribution across the farming enterprise.

An underground connecting pipeline, approximately 1 m in diameter, will connect the enlarged Helpmekaar Dam to the supplementary Buffer Dam. Two pipeline alignments are considered as alternatives in this EIR and Appendix 9: the preferred Green Pipeline Route and the alternative Blue Pipeline Route. Both routes connect the same proposed dam infrastructure. The specialist findings for the broader development area inform the assessment of both alternatives where relevant to their respective alignments.

Preferred Alternative – Green Pipeline Route

The preferred Green Route is approximately 1.7 km long and follows disturbed agricultural land and existing farm access corridors, where practicable, to minimise disturbance to natural vegetation, watercourses and other environmentally sensitive features.

The connecting pipeline alignment shown in the project KMZ extends between the following mapped endpoints:

Pipeline point	Latitude	Longitude
First mapped point	32.917654° S	19.238025° E
Last mapped point	32.927250° S	19.248721° E

These coordinates represent the first and last mapped points of the connecting pipeline feature in the project KMZ. The final connection points and alignment will be confirmed during detailed design.

Alternative – Blue Pipeline Route

The alternative Blue Route is approximately 2 km long and follows an existing farm access road across previously cultivated and disturbed land. Its longer alignment would require a longer pipeline and may result in a greater extent of temporary trenching and construction disturbance. Any difference in pumping requirements or operational costs would need to be confirmed through engineering design.

The Blue Route is retained as an alternative for assessment in this EIR and Appendix 9. The findings of the specialist investigations into the broader development area, including identified biodiversity and freshwater sensitivities, inform the assessment of the Blue Route where relevant to its alignment.

The Helpmekaar Dam enlargement and buffer dam footprints remain identical under both pipeline alternatives. The alternatives differ in the alignment and length of the connecting pipeline, rather than in the location or dimensions of the proposed dams.

Purpose of the Proposed Development and Hydrological Considerations

The primary purpose of the proposed development is to store winter runoff from the upper tributaries of the Leeu River for use during the dry summer period. The proposed increase in storage capacity is intended to improve the management of irrigation water and support the applicant's proposed conversion of approximately 45 ha of existing annual cropland to permanent fruit orchards.

A Hydrological Assessment, titled Investigation into Availability of Surplus Water in the Leeu Catchment (Appendix 8B), was undertaken to investigate water availability within the upper Leeu River catchment and the potential downstream implications of enlarging Helpmekaar Dam. The assessment considered the applicable Environmental Water Requirements (EWR) used in the analysis and modelled the proposed increase in Helpmekaar Dam's storage capacity from approximately 390 000 m³ to 800 000 m³.

For the reservoir simulation, Helpmekaar Dam and the nearby Langrug 2 Dam were modelled as a combined upstream storage system. The model indicated that the proposed enlargement would improve the ability of the combined dams to supply existing irrigation requirements. The modelled average annual irrigation supply increased from approximately 1.10 million m³ to 1.26 million m³ under the proposed storage configuration.

The assessment also considered the potential effect of increased upstream storage on downstream Wydekloof Dam. The model indicated that the average annual spill volume from Wydekloof Dam would decrease from approximately 3.31 million m³ to 3.17 million m³, representing a reduction of approximately 0.14 million m³ per annum. The modelled irrigation supply from Wydekloof Dam remained unchanged under the assessed conditions.

The Hydrological Assessment's findings relate to water availability and reservoir operation under the modelled conditions. They do not constitute a water-use authorisation or guarantee the availability of water during all seasons or drought conditions. The availability of water for abstraction and storage, downstream water-user considerations, ecological flow requirements and operational arrangements remain subject to the outcome and conditions of the Water Use Licence Application (WULA) process. Environmental Authorisation under NEMA will not, on its own, authorise additional water abstraction, storage or use.

Construction Materials

Material required for the enlargement of the Helpmekaar Dam wall and the construction of the supplementary buffer dam will be sourced, where suitable, from within the proposed dam basin footprints and/or from identified and approved borrow areas on the farm. The exact source areas and material volumes

will be confirmed during detailed design and assessed as necessary before material is obtained. No material will be sourced from watercourses or environmentally sensitive areas without the required authorisations.

Environmental Assessment

The proposed development is located within an established agricultural landscape characterised by orchards, cultivated lands, farm roads, existing farm dams and associated irrigation infrastructure.

Its potential environmental and socio-economic impacts, including the preferred Green Pipeline Route, the alternative Blue Pipeline Route and the No-Go Alternative, are assessed in this Environmental Impact Report and Appendix 9. The assessment of the pipeline alternatives draws on the relevant specialist findings for the broader development area, the available route information, and the differences in pipeline length and construction footprint. The assessment also considers the potential implications of increased upstream storage for downstream water availability, as informed by the Hydrological Assessment.

The competent authority will consider the findings of the specialist studies, the public participation process, the proposed mitigation measures and the Environmental Management Programme (EMPr) when deciding the Environmental Authorisation application.

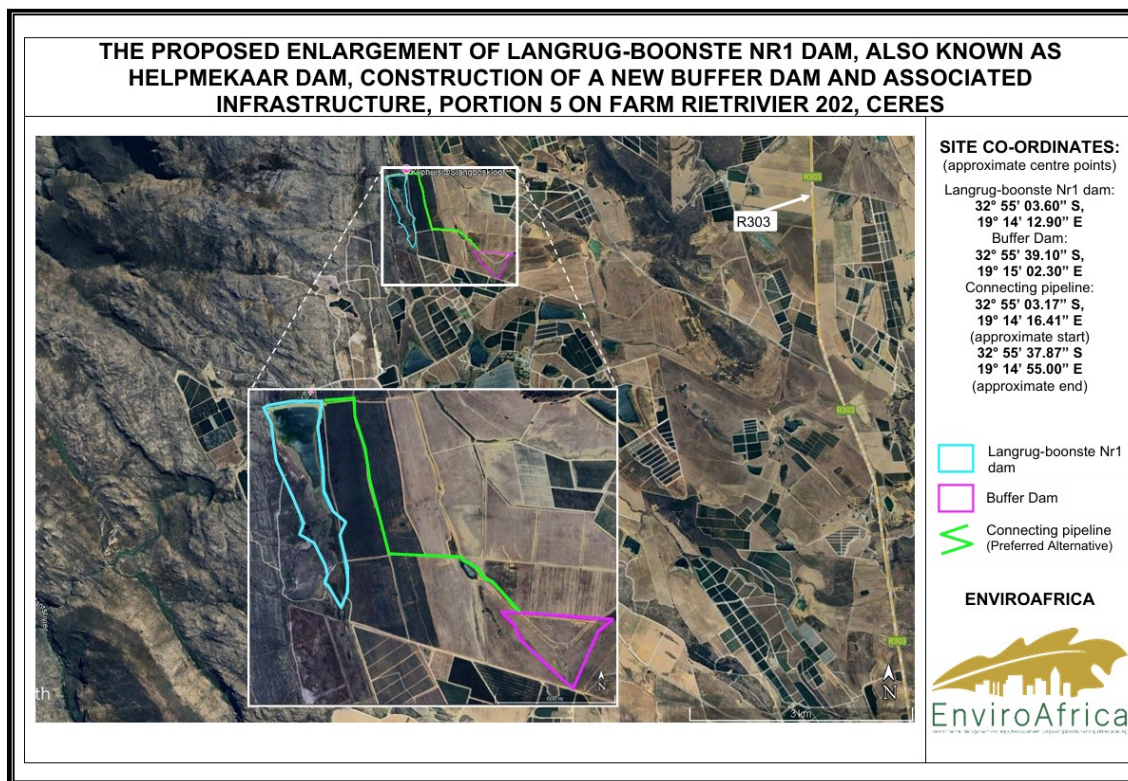


Figure 1: Proposed development site – Development footprint

The proposed enlargement of Helpmekaar Dam (Langrug-Boonste Nr. 1 Dam), construction of the supplementary buffer dam and installation of the associated connecting pipeline will involve water uses regulated under Section 21 of the National Water Act, 1998 (Act No. 36 of 1998). A Water Use Licence Application (WULA) is underway with the Department of Water and Sanitation (DWS).

The proposed development will increase the storage capacity of Helpmekaar Dam from approximately 390 000 m³ to approximately 800 000 m³, representing a net increase of approximately 410 000 m³. The supplementary buffer dam will provide an additional storage capacity of approximately 27 000 m³.

A Hydrological Assessment, titled Investigation into Availability of Surplus Water in the Leeu Catchment (Appendix 8B), has been completed to investigate water availability and the potential downstream implications of the proposed enlargement of Helpmekaar Dam. The assessment indicates that runoff in the upper Leeu River catchment is strongly seasonal, with winter runoff potentially available for storage and subsequent irrigation use during the drier summer period. Water availability will nevertheless vary between years, including during drought conditions.

The Hydrological Assessment modelled the enlargement of Helpmekaar Dam from approximately 390 000 m³ to 800 000 m³, treating Helpmekaar Dam and Langrug 2 Dam as a combined upstream storage system. Under the modelled conditions, the average annual irrigation supply from the combined upstream dams increased from approximately 1.10 million m³ to 1.26 million m³ for existing irrigation requirements. The modelled average annual spill volume from downstream Wydekloof Dam decreased from approximately 3.31 million m³ to 3.17 million m³, while its modelled irrigation supply remained unchanged.

The Hydrological Assessment considered the applicable Environmental Water Requirements (EWR) in its analysis; it does not constitute a new EWR or Reserve determination. The volumes available for lawful abstraction and storage, operational arrangements, ecological flow requirements and potential effects on downstream water users remain subject to consideration through the WULA process.

Environmental Authorisation under NEMA does not constitute a water-use authorisation. Additional water abstraction, storage or use may only be undertaken in accordance with the applicable water-use authorisation and its conditions.

The following Section 21 water uses have been identified for inclusion in the WULA:

- Section 21(a): Taking water from a water resource;
- Section 21(b): Storing water;
- Section 21(c): Impeding or diverting the flow of water in a watercourse; and
- Section 21(i): Altering the bed, banks, course or characteristics of a watercourse.

The applicability of each water use to the dam enlargement, buffer dam and connecting pipeline, including any pipeline crossings or works within regulated watercourse areas, must be confirmed in the WULA documentation. Construction and operation must comply with the water-use authorisation issued by DWS and any associated conditions.

2. NEED AND DESIRABILITY

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), and the Environmental Impact Assessment Regulations, 2014 (as amended), the Environmental Impact Report (EIR) must describe the need and desirability of the proposed activity. This consideration includes the purpose and timing of the development, its suitability within the surrounding land-use context, potential socio-economic benefits, environmental constraints and the sustainable use of natural resources.

The need for the proposed development relates primarily to the farming enterprise's requirement for more reliable seasonal irrigation water storage and distribution. Its desirability depends on whether the proposed infrastructure can meet that requirement at the selected location while avoiding or minimising environmental impacts and protecting the interests of other water users.

Water availability in the Ceres/Koue Bokkeveld region is influenced by seasonal rainfall, climate variability and agricultural demand. The proposed development is intended to improve the storage and management of winter runoff for irrigation use during the dry summer months. Comments received during the public participation process have, however, highlighted the importance of establishing whether the proposed storage and associated water use can be accommodated without adversely affecting existing lawful water uses, downstream users or ecological flow requirements. The completed Hydrological Assessment provides information on water availability and the potential downstream implications of enlarging Helpmekaar Dam under the modelled conditions. The lawful abstraction, storage and use of water, including any additional irrigation demand associated with the proposed orchard conversion, must be addressed through the Water Use Licence Application (WULA) process.

The proposed enlargement of Helpmekaar Dam, construction of a supplementary buffer dam and installation of the connecting pipeline are intended to:

- Increase the storage capacity of the existing Helpmekaar Dam by approximately 410 000 m³, from 390 000 m³ to 800 000 m³, and provide an additional 27 000 m³ of storage in the supplementary buffer dam.
- Improve the storage, transfer and management of winter runoff for irrigation during the dry summer months, subject to confirmation of water availability and the necessary water use authorisations.
- Support the proposed conversion of approximately 45 ha of annual crops into permanent fruit orchards, subject to confirmation that the water required for the proposed orchard irrigation is available and may lawfully be used.
- Improve irrigation management and operational flexibility within the existing farming enterprise.
- Reduce the farming enterprise's exposure to seasonal water shortages, to the extent supported by available and lawfully authorised water resources.
- Support continued agricultural production and associated employment opportunities.

The desirability of the development is linked to its location within an established agricultural landscape and its use of existing water storage infrastructure. Enlarging Helpmekaar Dam would increase the capacity of an existing farm dam rather than require an entirely new primary storage facility at another location. The supplementary buffer dam and connecting pipeline are intended to improve the transfer and distribution of stored water within the farming enterprise. The use of an existing dam does not, however, remove the potential environmental effects of enlarging its wall and inundation area or constructing the additional infrastructure. These effects must be considered alongside the proposed agricultural benefits.

The development has been considered and refined through the Scoping and EIA processes, taking account of engineering requirements, environmental constraints and comments received from authorities and Interested and Affected Parties (I&APs). The following considerations are relevant to its need and desirability:

Site selection: The proposal involves enlarging an existing farm dam and constructing a supplementary buffer dam within the established farming landscape. The suitability of these locations must be considered in relation to their development footprints, affected watercourses, surrounding biodiversity and agricultural land uses.

Pipeline alternatives: During initial project planning, two potential underground connecting pipeline alignments were identified: the Green Route, approximately 1.7 km long, and the Blue Route, approximately 2 km long. The Green Route is the preferred alignment, while the Blue Route is retained as an alternative for assessment in this EIR and Appendix 9. The relevant findings of the specialist investigations into the broader development area, including identified biodiversity and freshwater sensitivities, inform the consideration of both alignments. The assessment considers the differences in route length, construction requirements and potential environmental impacts. The pipeline alignment authorised for implementation must comply with the applicable specialist recommendations, mitigation measures and conditions of the Environmental Authorisation.

Specialist investigations: The completed Terrestrial Biodiversity Statement, Freshwater Assessment, Hydrological Assessment, Heritage Impact Assessment and Agricultural Compliance Statement inform the assessment of potential impacts and the identification of mitigation measures. The Terrestrial Biodiversity Statement identifies vegetation sensitivities within the development area and recommends that the connecting pipeline follow the existing farm road/firebreak across Langrug Ridge to minimise disturbance to natural vegetation. Its findings inform the assessment of the pipeline alternatives and the identification of appropriate avoidance, mitigation and rehabilitation measures. The Hydrological Assessment specifically informs the consideration of water availability, the operation of the enlarged Helpmekaar Dam and potential implications for downstream Wydekloof Dam.

Hydrological assessment and irrigation demand: The Hydrological Assessment modelled the proposed enlargement of Helpmekaar Dam from approximately 390 000 m³ to 800 000 m³, with Helpmekaar Dam and Langrug 2 Dam represented as a combined upstream storage system. Under the modelled conditions, the average annual irrigation supply from the combined upstream dams increased from approximately 1.10 million m³ to 1.26 million m³ for existing irrigation requirements. The modelled average annual spill volume from downstream Wydekloof Dam decreased from approximately 3.31 million m³ to 3.17 million m³, while its modelled irrigation supply remained unchanged. These are modelled average annual outcomes and do not establish that the same volumes will be available in every year or during drought conditions.

Water resource sustainability: The proposed increase in storage capacity does not establish that additional water is available for abstraction or use. Although the Hydrological Assessment considered the applicable Environmental Water Requirements (EWR) in its analysis, it does not constitute a new EWR or Reserve determination or replace the consideration of water-use requirements by the Department of Water and Sanitation (DWS). The WULA process must address the proposed water uses, available volumes, downstream water-user considerations, ecological flow requirements and applicable operational conditions. Environmental Authorisation under NEMA would not replace the water-use authorisation required under the National Water Act.

Environmental management: Measures to avoid, minimise and manage identified impacts must be incorporated into the Environmental Management Programme (EMPr), as applicable. These may include construction-phase erosion and sediment control, protection of watercourses and sensitive vegetation, rehabilitation of disturbed areas, monitoring and operational management requirements. Water-use-specific requirements must also be addressed through the applicable WULA documentation and authorisation conditions.

The potential agricultural and socio-economic benefits of the proposed development must be considered alongside its environmental impacts, including the additional inundation associated with the dam enlargement and buffer dam, disturbance arising from construction of the connecting pipeline under the Green and Blue Route alternatives, and potential effects on water resources and downstream users. The

No-Go Alternative provides a basis for comparison by considering the implications of not proceeding with the proposed infrastructure.

The need for the proposed development is supported by its stated purpose of improving seasonal irrigation water storage and distribution within an existing farming enterprise. Its overall desirability remains subject to the findings of the EIA, including consideration of the completed Terrestrial Biodiversity Statement and the assessment of the pipeline alternatives, the outcome of the public participation process and confirmation through the WULA process that the proposed water uses can be lawfully accommodated. The Hydrological Assessment supports consideration of the proposed dam enlargement under the modelled existing irrigation requirements but does not, on its own, confirm water availability for the proposed additional orchard irrigation demand.

2.1 CONSISTENCY WITH PLANNING AND POLICY FRAMEWORKS

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of a supplementary buffer dam and installation of the associated connecting pipeline have been considered in relation to the national, provincial and municipal planning frameworks relevant to the project area. The development is intended to support continued agricultural production on the property by improving seasonal water storage and irrigation management.

Consistency with the objectives of these frameworks must be considered alongside the proposed development's environmental effects, water resource requirements and potential implications for downstream water users. Alignment with agricultural development objectives does not, in itself, establish the environmental acceptability of the proposal or confer a right to additional water use.

National and Provincial Planning

The National Development Plan (NDP) 2030 recognises the role of agriculture in rural economic development, food security and employment. The proposed development is relevant to these objectives insofar as it is intended to support continued agricultural production and the proposed conversion of approximately 45 ha of annual crops into permanent fruit orchards. Its contribution to these objectives depends, in part, on the availability of water that may lawfully be stored and used.

The Western Cape Provincial Spatial Development Framework (PSDF) provides a strategic basis for considering agricultural production, the sustainable use of natural resources and the protection of environmentally sensitive areas. The proposal would expand water storage infrastructure within an existing agricultural landscape. Its consistency with the PSDF must therefore be considered in relation to both the intended agricultural benefits and the potential impacts on watercourses, biodiversity and other natural resources. This includes consideration of the proposed increase in upstream storage and its potential implications for downstream water availability.

Cape Winelands District Municipality

Agriculture is an established economic activity within the Cape Winelands District. The proposed development is intended to support the continued operation of an existing farming enterprise through increased on-farm storage capacity and improved irrigation water distribution.

The potential contribution of the proposal to agricultural production and associated employment is relevant to district-level economic development objectives. The Hydrological Assessment provides modelled information on the implications of enlarging Helpmekaar Dam for the combined upstream storage system and downstream Wydekloof Dam. These findings inform the consideration of water-resource impacts alongside the project's anticipated agricultural benefits. The proposed water uses remain subject to the Water Use Licence Application (WULA) process administered by the Department of Water and Sanitation (DWS).

Witzenberg Local Municipality

The proposed development is situated within the Witzenberg Local Municipality, in an area characterised by established agricultural activities and associated infrastructure. The enlargement of Helpmekaar Dam, construction of the supplementary buffer dam and installation of the connecting pipeline are directly associated with the existing agricultural use of the property.

The proposal is relevant to municipal objectives concerning the continued use of productive agricultural land, agricultural infrastructure and rural economic activity. Compatibility with the surrounding agricultural land use does not eliminate the need to assess the proposed inundation areas, pipeline construction disturbance and effects on water resources and environmentally sensitive features.

The proposed development must also comply with any applicable municipal land-use planning requirements. The EIA process does not replace any municipal approval that may be required.

Environmental Planning

The proposal would enlarge an existing primary storage dam rather than establish an entirely new primary dam elsewhere within the catchment. It would also introduce a supplementary Buffer Dam and an underground pipeline connecting the two dams. Although the use of existing infrastructure is relevant to site selection, the enlargement and associated works will result in additional inundation and construction disturbance that require assessment.

Two connecting pipeline alignments are assessed as alternatives in this EIR and Appendix 9: the preferred Green Pipeline Route of approximately 1.7 km and the alternative Blue Pipeline Route of approximately 2 km. Both routes connect the same proposed dam infrastructure. The relevant specialist findings for the broader development area inform the assessment of both alternatives where applicable to their respective alignments. The assessment considers the route lengths, construction requirements and potential environmental impacts associated with each alternative.

Environmental constraints identified through the DFFE Screening Tool, Site Sensitivity Verification Report and completed specialist investigations have informed the assessment of the proposal. The completed Terrestrial Biodiversity Statement (Appendix 8D) addresses botanical, vegetation, plant-species and animal-species considerations within the development area. Its recommendations, including measures to protect sensitive vegetation and minimise disturbance along the connecting pipeline corridor, must be implemented where applicable. Relevant mitigation and rehabilitation measures are incorporated into the Environmental Management Programme (EMPr).

The completed Hydrological Assessment considered the enlargement of Helpmekaar Dam from approximately 390 000 m³ to 800 000 m³, with Helpmekaar Dam and Langrug 2 Dam modelled as a combined upstream storage system. For existing irrigation requirements, the modelled average annual irrigation supply from the combined upstream dams increased from approximately 1.10 million m³ to 1.26 million m³. The modelled average annual spill volume from downstream Wydekloof Dam decreased from approximately 3.31 million m³ to 3.17 million m³, while its modelled irrigation supply remained unchanged.

The proposed abstraction, storage and use of water remain subject to the WULA process.

Conclusion

The proposed development is relevant to the agricultural development and rural economic objectives addressed by the national, provincial and municipal planning frameworks discussed above. It is situated within an established agricultural landscape and is intended to improve water storage and distribution for an existing farming enterprise.

Its consistency with the applicable planning and policy frameworks must be considered alongside the identified environmental constraints, applicable land-use requirements and water-use authorisation process. The Hydrological Assessment informs consideration of the proposed dam enlargement and its modelled

downstream implications. The competent authority will determine the environmental acceptability of the proposal after considering the EIR, completed specialist findings, both assessed pipeline alternatives, public participation outcomes, proposed mitigation measures and the EMPr. The proposed water uses remain subject to the separate WULA process.

2.2 NEED

The applicant, Sterkwater Boerdery (Pty) Ltd, operates an established commercial farming enterprise on Portion 5 of Farm Rietrivier No. 202 in the Koue Bokkeveld region near Ceres. Deciduous fruit production in the area depends on reliable irrigation water, particularly during the dry summer months. The applicant has identified a need to improve seasonal water storage and distribution to support the continued operation of the farming enterprise and the proposed conversion of approximately 45 ha of annual crops into permanent fruit orchards.

The proposed development comprises the enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), the construction of a supplementary buffer dam and the installation of an underground connecting pipeline between the two dams. The preferred Green Pipeline Route is approximately 1.7 km long, while the alternative Blue Pipeline Route is approximately 2 km long. Both alignments are considered in this EIR and **Appendix 9**.

The enlargement will increase the storage capacity of Helpmekaar Dam from approximately 390 000 m³ to approximately 800 000 m³, representing a net increase of approximately 410 000 m³. The supplementary buffer dam will provide an additional storage capacity of approximately 27 000 m³. Together, the proposed infrastructure is intended to improve the storage, transfer and distribution of irrigation water and provide greater operational flexibility within the farming enterprise.

The need for the development is linked to the seasonal nature of water availability in the Koue Bokkeveld and the applicant's intention to store winter runoff for irrigation use during the dry summer months. Additional storage capacity could reduce the farming enterprise's exposure to seasonal water shortages. The extent to which the proposed infrastructure can improve water security will, however, depend on the availability of water that may lawfully be abstracted, stored and used.

The completed Hydrological Assessment investigated water availability and the potential downstream implications of enlarging Helpmekaar Dam. It modelled the increase in Helpmekaar Dam's storage capacity from approximately 390 000 m³ to 800 000 m³, with Helpmekaar Dam and Langrug 2 Dam represented as a combined upstream storage system. For existing irrigation requirements, the modelled average annual irrigation supply from the combined upstream dams increased from approximately 1.10 million m³ to 1.26 million m³. This indicates an improvement in the ability of the modelled upstream storage system to supply existing irrigation requirements; it does not establish that the same volume will be available in every year or during drought conditions.

The assessment also considered downstream Wydekloof Dam. Under the modelled conditions, its average annual spill volume decreased from approximately 3.31 million m³ to 3.17 million m³, while its modelled irrigation supply remained unchanged. The reduction in spill volume is relevant to the consideration of downstream water availability and must be taken into account alongside the proposed agricultural benefits.

The proposed development does not, in itself, authorise the abstraction, storage or use of additional water. The proposed water uses, available volumes, downstream water-user considerations, ecological flow requirements and operational conditions must be addressed through the Water Use Licence Application (WULA) process administered by the Department of Water and Sanitation (DWS). The Hydrological Assessment informs the WULA process but does not replace a water-use authorisation or constitute a new Environmental Water Requirement or Reserve determination.

The proposed conversion of approximately 45 ha of annual crops into permanent fruit orchards may support continued agricultural production and associated employment in orchard establishment, maintenance, harvesting and related activities. These potential benefits are relevant to the applicant's motivation for the development, although their extent will depend on the implementation of the proposed agricultural activities and the availability of irrigation water.

From a planning perspective, the proposed development is associated with an existing agricultural land use and is relevant to the agricultural development and rural economic objectives discussed in Section 2.1. Its location within an established farming landscape supports the applicant's rationale for improving existing agricultural infrastructure. This land-use context does not, however, remove the need to assess the environmental effects of the additional dam inundation areas, buffer dam construction and pipeline installation.

The proposed layout makes use of the existing Helpmekaar Dam and incorporates a supplementary buffer dam and the preferred Green Pipeline Route. The Blue Pipeline Route is retained as an alternative for assessment in this EIR and Appendix 9. The relevant findings of the completed specialist investigations into the broader development area inform the consideration of both pipeline alternatives, including environmental sensitivities and measures to avoid, minimise and rehabilitate construction-related impacts.

The specialist investigations completed for the proposed development, including the Terrestrial Biodiversity Statement, provide information on potential impacts and measures to avoid, minimise or manage those impacts. Their findings must be considered together with the assessment of the Green and Blue pipeline alternatives, the No-Go Alternative, comments received during public participation and the outcome of the WULA process. Appropriate mitigation and management measures must be incorporated into the Environmental Management Programme (EMPr).

In conclusion, the identified need for the proposed development is to improve seasonal irrigation water storage and distribution in support of the applicant's existing farming operation and proposed agricultural expansion. The Hydrological Assessment indicates an improvement in the modelled supply for existing irrigation requirements following enlargement of Helpmekaar Dam. Whether the development can meet its stated need in an environmentally sustainable manner depends on the findings of the EIA, the lawful availability and use of water, and the implementation of the required mitigation and management measures.



Figure 2: Cape Winelands District Municipality¹

2.3 DESIRABILITY

The desirability of the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of a supplementary buffer dam and installation of the associated connecting pipeline is considered in relation to the existing agricultural land use, environmental constraints, engineering feasibility, water resource management requirements and applicable planning frameworks.

The proposed development would expand water storage infrastructure within an established farming enterprise. Enlarging the existing Helpmekaar Dam would make use of an existing primary storage facility, while the supplementary buffer dam and connecting pipeline are intended to improve the transfer and distribution of irrigation water. The proposed infrastructure is therefore directly associated with the existing agricultural use of the property.

The desirability of the development also depends on its potential environmental effects. The dam enlargement and construction of the buffer dam will result in additional inundation and construction disturbance. The preferred Green Pipeline Route is approximately 1.7 km long and follows disturbed agricultural areas and existing farm access corridors where practicable. The alternative Blue Pipeline Route is approximately 2 km long. Both routes are considered as alternatives in this EIR and Appendix 9. The relevant specialist findings for the broader development area inform the assessment of potential pipeline-related impacts and the identification of appropriate mitigation measures for the alternatives.

The proposed increase in storage capacity may improve seasonal irrigation management, but additional storage capacity does not establish that additional water is available for lawful abstraction or use. The completed Hydrological Assessment modelled the enlargement of Helpmekaar Dam in relation to existing

¹ <https://municipalities.co.za/>

irrigation requirements and considered potential implications for downstream Wydekloof Dam. It indicated an improvement in the modelled average annual irrigation supply from the combined upstream dam system, alongside a reduction in the modelled average annual spill volume from Wydekloof Dam. The modelled irrigation supply from Wydekloof Dam remained unchanged under the assessed conditions.

The desirability of the proposal must also be considered in conjunction with the Water Use Licence Application (WULA), including the proposed water uses, downstream water-user considerations, ecological flow requirements and applicable operational conditions.

The proposed development may support continued agricultural production and the conversion of approximately 45 ha of annual crops into permanent fruit orchards. These potential benefits must be weighed against the identified environmental impacts, the findings of the specialist investigations, comments received during public participation and the implications of the No-Go Alternative. The relevant specialist considerations include the effects of additional inundation and construction activities on freshwater habitats and watercourses, terrestrial biodiversity, agricultural land and heritage resources, as well as the hydrological implications of increased upstream storage. The completed Terrestrial Biodiversity Statement informs the assessment of impacts on natural vegetation and associated biodiversity, including the identification of appropriate avoidance, mitigation and rehabilitation measures.

The desirability of the proposed development cannot be determined solely by its location within an existing agricultural landscape or its intended agricultural benefits. It depends on whether the identified environmental impacts can be appropriately avoided, minimised or managed, whether the proposed water uses can be lawfully accommodated, and whether the development complies with the conditions of any Environmental Authorisation and Water Use Licence issued.

2.3.1 Location and Accessibility

The proposed enlargement of the existing Helpmekaar Dam (Langrug-Boonste Nr. 1 Dam), construction of the supplementary buffer dam and installation of the associated connecting pipeline have been identified as the preferred development layout following preliminary engineering investigations, site planning and the Scoping Phase. The Environmental Impact Assessment (EIA) considers the preferred layout, the Green and Blue Pipeline Route alternatives and the No-Go Alternative.

From an engineering perspective, enlarging the existing Helpmekaar Dam would make use of established water storage infrastructure and allow the proposed additional storage capacity to be integrated with the existing farm irrigation system. The suitability of the site has been considered in relation to its basin characteristics, proposed storage capacity, engineering requirements and location within the farming enterprise. The use of an existing dam may reduce the need for a separate new primary storage facility, but it does not eliminate the environmental impacts associated with the enlarged dam wall and additional inundation area.

The supplementary buffer dam is intended to improve irrigation water distribution and operational flexibility. An underground pipeline, approximately 1 m in diameter, will connect the two dams. The preferred Green Route is approximately 1.7 km long and follows disturbed agricultural land and existing farm access corridors where practicable. The alternative Blue Route is approximately 2 km long and follows an existing farm access road across previously cultivated and disturbed land. Both routes are considered as pipeline alternatives in this EIR and Appendix 9. The assessment considers their respective alignments, route lengths, construction requirements and potential environmental impacts, informed by the relevant specialist findings for the broader development area.

The suitability of the proposed layout must also be considered in relation to the findings of the completed freshwater, hydrological, agricultural, heritage and terrestrial biodiversity investigations. These studies address different aspects of the development: the Hydrological Assessment considers modelled water availability and downstream dam operation, while the Freshwater Assessment addresses effects on aquatic features and associated ecological impacts. The completed Terrestrial Biodiversity Statement identifies terrestrial biodiversity sensitivities within the development area and recommends that the connecting pipeline follow the existing farm road/firebreak across Langrug Ridge to minimise disturbance to natural vegetation. The relevant specialist findings and recommendations must inform the assessment of the pipeline alternatives and the mitigation measures incorporated into the Environmental Management Programme (EMPr).

Access to Helpmekaar Dam and the proposed supplementary buffer dam is intended to be obtained via existing farm roads. No new permanent access roads are currently proposed. Existing access routes may, however, require temporary construction-related use or localised works to accommodate machinery, materials and personnel. Any such works must remain within the assessed development footprint or be assessed and authorised as required. Access for operation and maintenance will be provided through the existing farm road network.

2.3.2 Compatibility with the Surrounding Area

The proposed Helpmekaar Dam enlargement, supplementary buffer dam and connecting pipeline are located within an established agricultural landscape characterised by cultivated orchards, annual crop fields, farm dams, irrigation infrastructure and farm access roads. The proposed infrastructure is directly associated with the existing agricultural use of the property and is not expected to introduce a fundamentally different land-use activity.

Enlarging Helpmekaar Dam would alter the extent of the existing reservoir and dam infrastructure, while construction of the supplementary buffer dam would introduce an additional permanent water storage feature. The connecting pipeline would be installed underground, with its principal visible effects expected during construction and rehabilitation of the disturbed corridor. Although the proposed development is functionally compatible with the surrounding agricultural activities, its additional inundation areas and construction footprint will result in physical changes to the site that require environmental assessment.

The environmental compatibility of the proposed infrastructure must be considered in relation to the freshwater features, terrestrial biodiversity, agricultural land and any heritage resources affected by its footprint. The existing agricultural use of the surrounding area does not establish that all areas within the proposed development footprint are environmentally disturbed or of low sensitivity. The findings and mitigation measures of the relevant specialist investigations, including the completed Terrestrial Biodiversity Statement, must inform the assessment.

Compatibility with the surrounding area also extends to the shared water resource. The Hydrological Assessment modelled a reduction in the average annual spill volume from downstream Wydekloof Dam following the proposed enlargement of Helpmekaar Dam, although Wydekloof Dam's modelled irrigation supply remained unchanged under the assessed conditions. These findings must be considered in conjunction with the Freshwater Assessment, downstream water-user considerations and the WULA process.

The existing agricultural character of the surrounding area is relevant when considering the potential visual effects of the proposal. The enlarged dam and supplementary buffer dam would form part of a landscape that already contains agricultural water storage infrastructure. The underground pipeline is not expected to remain a prominent visual feature following construction and successful rehabilitation, although associated above-ground infrastructure, if required, must be considered in the final design.

Based on the nature of the proposed infrastructure and its location within an established agricultural landscape, a separate specialist Visual Impact Assessment has not been identified as necessary at this stage. This position should be reconsidered if the final design, site information or comments received during public participation identify potentially significant visual effects that have not been adequately addressed in the EIR.

Overall, the proposed development is associated with the existing agricultural use of the property and would extend established water storage and irrigation infrastructure. The preferred Green Pipeline Route and alternative Blue Pipeline Route are considered in the EIR and Appendix 9, with the relevant specialist findings for the broader development area informing the assessment of their potential environmental effects. The development's compatibility with the surrounding land use must nevertheless be considered separately from its environmental acceptability, which remains subject to the assessment of biodiversity, freshwater, hydrological, agricultural and heritage impacts, the findings of the completed specialist investigations, proposed mitigation measures and the outcome of the applicable authorisation processes.

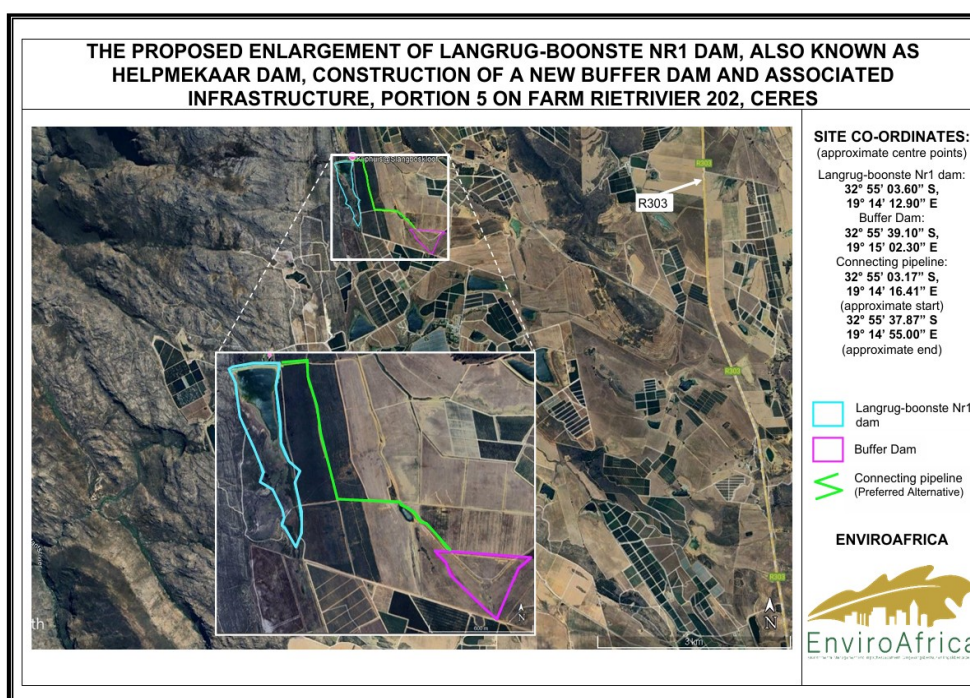


Figure 3: Proposed development site – Development footprint

The proposed development is located within an established agricultural landscape and is not expected to introduce a fundamentally different land use. During operation, the enlarged Helpmekaar Dam, supplementary buffer dam and underground connecting pipeline will function as agricultural water storage and transfer infrastructure. Significant operational noise, odour or air-emission impacts are not anticipated. Construction activities may, however, generate temporary noise, dust, vehicle movements and disturbance associated with earthworks. These impacts must be managed through the measures specified in the Environmental Management Programme (EMPr).

The surrounding area is characterised by cultivated lands, orchards, farm roads, irrigation infrastructure and existing water storage facilities. The proposed development is therefore functionally compatible with the existing agricultural use of the property. This compatibility does not eliminate the potential environmental impacts of the additional dam inundation areas, buffer dam construction or pipeline installation, which are assessed separately in the EIR. These include potential effects on freshwater features, terrestrial biodiversity, agricultural land and heritage resources, as well as the implications of increased upstream water storage for downstream water availability.

The proposed layout has been considered and refined through engineering investigations, the Scoping Phase and the EIA process, taking account of the completed specialist findings and comments received from authorities and Interested and Affected Parties (I&APs). The preferred Green Pipeline Route, approximately 1.7 km long, follows disturbed agricultural areas and existing farm access corridors where practicable. The alternative Blue Pipeline Route, approximately 2 km long, is also considered in the EIR and Appendix 9. The relevant specialist findings for the broader development area inform the assessment of both pipeline alternatives, including identified environmental sensitivities and applicable mitigation measures. The completed Terrestrial Biodiversity Statement identifies terrestrial biodiversity sensitivities and recommends that the connecting pipeline follow the existing farm road/firebreak across Langrug Ridge to minimise disturbance to natural vegetation. Its findings and recommendations must inform the assessment and the mitigation measures incorporated into the EMP.

The completed Hydrological Assessment informs the consideration of water availability and the potential downstream implications of enlarging Helpmekaar Dam under the modelled conditions. The lawful abstraction, storage and use of water remain subject to the separate Water Use Licence Application (WULA) process.

The proposed dams will introduce permanent changes to the local landscape, while the connecting pipeline will be installed underground and its construction corridor will require rehabilitation. Given the established agricultural character of the area, significant adverse visual impacts are not anticipated on the basis of the information assessed to date. A separate specialist Visual Impact Assessment has not been identified as necessary at this stage; however, this position should be reconsidered if the final design, site information or comments received during public participation identify potentially significant visual effects that have not been adequately addressed.

Overall, the proposed infrastructure is associated with the existing agricultural use and character of the property. Its environmental acceptability remains subject to the integrated EIA findings, including the completed terrestrial biodiversity, freshwater, hydrological, agricultural and heritage assessments; consideration of the Green and Blue Pipeline Route alternatives and the No-Go Alternative; public participation comments; and the implementation of appropriate mitigation measures. The proposed water uses are also subject to the separate Water Use Licence Application process.

3. LEGAL REQUIREMENTS

This Environmental Impact Assessment (EIA) is being undertaken in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), read together with the Environmental Impact Assessment Regulations, 2014 (as amended), and the applicable Listed Activity Notices promulgated under NEMA.

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary buffer dam and installation of the associated connecting pipeline may also require authorisations or compliance measures under other legislation. These requirements are considered alongside the findings of the completed specialist investigations and the outcomes of the public participation process.

The specialist investigations relevant to the proposed development address different statutory and environmental considerations, including freshwater ecosystems, hydrological conditions and downstream water availability, agricultural land, heritage resources and terrestrial biodiversity. Their findings inform the EIA but do not replace any separate statutory authorisation or approval.

The key legislation relevant to the proposed development is outlined below. Environmental Authorisation under NEMA does not replace any separate authorisation, licence, permit or approval required under other applicable legislation. In particular, the proposed water uses are subject to the separate Water Use Licence Application (WULA) process administered by the Department of Water and Sanitation (DWS).

3.1.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

Section 24 of the Constitution of the Republic of South Africa, 1996, provides that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The proposed development must be assessed in accordance with these principles, taking account of its potential environmental impacts, intended agricultural benefits and implications for water resources and downstream users. This includes consideration of the potential effects of additional dam inundation and construction activities on freshwater features, terrestrial biodiversity, agricultural land and heritage resources, together with the implications of increased upstream water storage for downstream water availability.

The completed Hydrological Assessment informs the consideration of water availability and downstream effects under the modelled conditions. The lawful abstraction, storage and use of water must be addressed through the separate Water Use Licence Application (WULA) process.

3.1.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998)

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended, provides the legislative framework for cooperative environmental governance and establishes environmental management principles to guide decision-making. These principles include the consideration of environmental, social and economic impacts and the avoidance, minimisation and management of adverse environmental effects.

Section 24 of NEMA provides for the identification and assessment of activities that may significantly affect the environment. In terms of Section 24F of NEMA, a person may not commence a listed activity without the required Environmental Authorisation.

The Environmental Impact Assessment Regulations, 2014 (as amended), prescribe the procedures for applying for Environmental Authorisation. The listed activities are identified in the following notices:

- Listing Notice 1: Government Notice R. 983 of 4 December 2014, as amended by Government Notice R. 327 of 7 April 2017;
- Listing Notice 2: Government Notice R. 984 of 4 December 2014, as amended by Government Notice R. 325 of 7 April 2017; and
- Listing Notice 3: Government Notice R. 985 of 4 December 2014, as amended by Government Notice R. 324 of 7 April 2017.

Activities listed in Listing Notices 1 and 3 generally require a Basic Assessment process, while activities listed in Listing Notice 2 require a Scoping and Environmental Impact Reporting (S&EIR) process. Where a proposed development triggers activities requiring both processes, the applicable S&EIR process is followed for the combined application.

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary buffer dam and installation of the associated connecting pipeline have been identified as triggering listed activities under Listing Notices 1, 2 and 3. The application is therefore being undertaken through a Scoping and Environmental Impact Reporting (S&EIR) process in terms of the EIA Regulations, 2014 (as amended).

The EIR assesses the proposed development footprint, including the enlarged dam and supplementary buffer dam, together with the preferred Green Pipeline Route, the alternative Blue Pipeline Route and the No-Go Alternative. Both pipeline routes are considered as alternatives in this EIR and Appendix 9. The relevant specialist findings for the broader development area inform the assessment of the pipeline alternatives where applicable to their respective alignments.

The assessment of the proposed development must integrate the findings of the relevant specialist investigations, including the completed Hydrological Assessment, Freshwater Assessment, Agricultural Compliance Statement, heritage investigations and Terrestrial Biodiversity Statement. The Hydrological Assessment addresses modelled water availability and downstream dam operation; it does not replace the assessment of freshwater ecological impacts or the water-use authorisation process under the National Water Act.

The applicable listed activities and their relevance to the proposed development are set out in Table 1 below. Environmental Authorisation must be obtained before any of the authorised listed activities may commence. Any water uses requiring separate authorisation under the National Water Act may only commence once the applicable water-use authorisation has also been obtained.

Table 1: Summary of potentially applicable listed activities under the 2014 EIA Listing Notices (as amended)

No.	Listed Activities as per Listing Notice 1, 2 and 3 (GN R327, R325 and R324)	Applicability to the Development
Government Notice R327 (Listing Notice 1)		
9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or stormwater— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more.	The proposed underground connecting pipeline will transfer water between the enlarged Helpmekaar Dam and the supplementary buffer dam. The preferred Green Route is approximately 1.7 km long and the alternative Blue Route is approximately 2 km long. Both exceed the 1 000 m length threshold and are considered in this EIR and Appendix 9. The preliminary design indicates a pipeline diameter of approximately 1 m; the internal diameter must be confirmed against the final engineering specifications.
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 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.	The proposed Buffer Dam will be constructed within an affected watercourse/wetland area. It will have an inundation area of approximately 2.1 ha and a storage capacity of approximately 27 000 m ³ , exceeding the applicable footprint threshold. Associated structures and any qualifying pipeline works within the regulated watercourse area are also included for assessment. The Freshwater Assessment identifies permanent inundation and construction-related disturbance of the affected freshwater feature.
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...	The enlargement of the existing Helpmekaar Dam and construction of the Buffer Dam will involve excavation, embankment construction, placement of fill and movement of material within the affected watercourse areas. Relevant pipeline crossings and associated works are also included where they involve qualifying material movement within a watercourse. These are construction activities associated with the proposed development rather than routine maintenance. The detailed engineering design and construction method must confirm the quantities of material moved within watercourses.
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.	The dam enlargement, buffer dam construction and connecting pipeline may require clearance of indigenous vegetation within their combined construction and permanent footprints. The completed Terrestrial Biodiversity Statement identifies Kouebokkeveld Alluvium Fynbos and Kouebokkeveld Shale Fynbos in the project area. Approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos is expected to be affected by the Helpmekaar Dam enlargement alone; this estimate does not represent the total indigenous vegetation clearance for all project components. This activity is retained in the application to cover the potential combined clearance, with the final area to be

		confirmed against the completed terrestrial biodiversity findings and the development footprints.
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...	The proposal includes the expansion of the existing instream Helpmekaar Dam. Its storage capacity will increase from approximately 390 000 m ³ to 800 000 m ³ , and its proposed full-supply inundation area will be approximately 16.3 ha. The expansion will increase the dam's physical and inundation footprint within the affected watercourse area. The relevant threshold is the increase in footprint or water surface area, rather than the increase in storage volume alone; the existing and proposed footprints must therefore be shown clearly on the engineering plans.
66	The expansion of a dam where (i) its wall was originally 5 m or higher and the wall height will be increased by 2.5 m or more; or (ii) its high-water mark will be increased by 10 ha or more.	This activity is included to cover the proposed enlargement of the existing Helpmekaar Dam, rather than the construction of the new Buffer Dam. The enlarged dam will have a proposed maximum wall height of approximately 13.9 m and a proposed inundation area of approximately 16.3 ha. The final wall height and inundation area do not, on their own, establish that Activity 66 is triggered. The existing wall height, proposed increase in wall height, existing high-water mark area and proposed increase in high-water mark area must be compared against the two thresholds in the activity.
Government Notice R325 (Listing Notice 2)		
16	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.	The proposed new Buffer Dam will have a wall height of approximately 5.4 m and an inundation area of approximately 2.1 ha. Its proposed wall height independently meets the 5 m threshold. The application also assesses the enlargement of the existing Helpmekaar Dam, which will have a proposed maximum wall height of approximately 13.9 m and a full-supply inundation area of approximately 16.3 ha. The enlargement of the existing dam is addressed specifically under the applicable expansion activities. As Activity 16 is included for the new Buffer Dam, the application follows a Scoping and Environmental Impact Reporting process.
Government Notice R324 (Listing Notice 3)		
12	The clearance of an area of 300 square metres or more of indigenous vegetation, except where such clearance is required for maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed dam enlargement, buffer dam and pipeline works may require clearance of indigenous vegetation within sensitive portions of the project area. The completed Terrestrial Biodiversity Statement identifies Critically Endangered Kouebokkeveld

		Alluvium Fynbos and Kouebokkeveld Shale Fynbos, including good-condition vegetation on the south-eastern portion of Langrug Ridge. The specialist recommends that this ridge area be treated as CBA 1 and that the pipeline follow the existing farm road/firebreak to minimise disturbance. This activity is retained to cover qualifying indigenous vegetation clearance within the applicable Western Cape geographical areas. The relevant clearance areas and applicable geographical criteria must be identified using the completed terrestrial biodiversity findings and the development footprint plans.
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 within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, in the sensitive geographical areas identified in this Listing Notice.	The proposed Buffer Dam, with an inundation area of approximately 2.1 ha, will be constructed within an affected watercourse/wetland area. The activity is retained to cover the dam and associated qualifying infrastructure, including relevant pipeline works where they occur within the regulated watercourse area. The Freshwater Assessment identifies the affected freshwater features, while the biodiversity information identifies mapped sensitive areas within the project area. The specific Western Cape geographical criterion applicable to each qualifying component must be stated and shown on the relevant sensitivity map; the presence of a mapped ESA alone should not be used as a substitute for identifying that criterion.

The Scoping phase has been completed in accordance with the EIA Regulations, 2014 (as amended), and this Environmental Impact Assessment Report is submitted to WCDEADP for consideration as part of the Scoping and Environmental Impact Assessment process.

The environmental management principles contained in Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), have informed the assessment of the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline. These principles provide a framework for integrating environmental, social and economic considerations into decision-making and have been considered throughout the Environmental Impact Assessment (EIA) process.

The key principles relevant to the proposed development are discussed below.

People and Their Needs

Environmental management must place people and their needs at the forefront of decision-making while serving their physical, psychological, developmental, cultural and social interests equitably.

The proposed development is intended to improve agricultural water storage and supply reliability, supporting the continued operation of the farming enterprise and its proposed transition from approximately 45 ha of annual crops to permanent fruit orchards. Potential benefits include support for agricultural production and associated economic activity. These benefits must be considered alongside potential effects on surrounding communities, downstream water users and the environment. The proposed agricultural benefits depend, in part, on the availability of water that may lawfully be stored and used.

Sustainable Development

Sustainable development requires the integration of social, economic and environmental considerations into the planning, assessment and implementation of a proposed activity.

The EIA considers the potential effects of the dam enlargement, buffer dam and connecting pipeline on terrestrial biodiversity, freshwater ecosystems, hydrological functioning, agricultural land, heritage resources and socio-economic conditions. The assessment also considers development alternatives and identifies measures to avoid, minimise, rehabilitate or manage adverse impacts. The findings of the completed specialist investigations, including the Terrestrial Biodiversity Statement, inform the assessment of terrestrial biodiversity impacts and the identification of appropriate mitigation measures. The relevant measures are incorporated into the Environmental Management Programme (EMPr), with their effectiveness and the significance of residual impacts considered as part of the EIA.

Waste Management and Pollution Prevention

Waste generation and pollution must be avoided where practicable and, where they cannot be avoided, minimised and responsibly managed.

Construction activities may generate spoil, general waste, dust, sediment-laden runoff and a risk of contamination from fuels, oils and other substances. The EMPr specifies measures for waste handling, pollution prevention, erosion and sediment control, management of construction materials and rehabilitation of disturbed areas. Particular attention must be given to preventing sedimentation and contamination of affected watercourses and freshwater features during dam and pipeline construction. These measures must be implemented during construction and, where relevant, during operation and maintenance.

Responsible and Equitable Resource Use

Natural resources must be used responsibly, taking account of the needs of present and future generations and the interests of other resource users.

The Natural resources must be used responsibly, taking account of the needs of present and future generations and the interests of other resource users.

The proposed development is intended to increase the storage of winter runoff for agricultural irrigation during the drier summer months. The completed Hydrological Assessment modelled the proposed enlargement of Helpmekaar Dam in relation to existing irrigation requirements, with Helpmekaar Dam and Langrug 2 Dam represented as a combined upstream storage system. Under the modelled conditions, the average annual irrigation supply from the combined upstream dams increased from approximately 1.10 million m³ to 1.26 million m³. The modelled average annual spill volume from downstream Wydekloof Dam decreased from approximately 3.31 million m³ to 3.17 million m³, while its modelled irrigation supply remained unchanged. These average annual results do not establish that the same volumes will be available in every year or during drought conditions.

The Hydrological Assessment did not simulate a proportionate increase in irrigated area. It therefore does not confirm that sufficient water is available for the additional irrigation demand associated with the proposed conversion of approximately 45 ha of annual cropland to permanent fruit orchards. The assessment considered applicable Environmental Water Requirements in its modelling but does not constitute a new Environmental Water Requirement or Reserve determination.

The availability and lawful use of water, potential effects on downstream users and freshwater ecosystems, and any applicable ecological flow requirements must be addressed through consideration of the hydrological and freshwater specialist findings and the separate Water Use Licence Application (WULA) process. Environmental Authorisation under NEMA would not, on its own, authorise additional water abstraction, storage or use. The development and its operation must comply with any water-use authorisation issued by the Department of Water and Sanitation (DWS).

Anticipation and Mitigation of Environmental Impacts

Potential adverse environmental impacts must be anticipated and prevented where practicable. Where they cannot be prevented, they must be minimised, rehabilitated or otherwise managed.

The EIA assesses impacts associated with additional inundation, disturbance of watercourses and vegetation, construction earthworks, pipeline installation and the operation of the proposed water storage infrastructure. The assessment draws on the completed specialist findings and identifies mitigation, rehabilitation and monitoring measures for inclusion in the EMP. The assessment considers both hydrological effects on water availability and downstream dam operation and ecological effects on freshwater habitats and watercourses. It also considers impacts on terrestrial biodiversity, agricultural land and heritage resources in accordance with the relevant specialist findings. The completed Terrestrial Biodiversity Statement informs the assessment of vegetation-related impacts and the identification of avoidance, mitigation and rehabilitation measures. The significance of residual impacts must be reported after mitigation; it should not be assumed that all impacts can be reduced to an acceptable level.

Public Participation

Environmental management must promote the participation of Interested and Affected Parties (I&APs), and their interests, needs and values must be considered in decision-making.

The EIA incorporates a Public Participation Process (PPP) in accordance with the EIA Regulations, 2014 (as amended). Registered I&APs, relevant organs of state, surrounding landowners and other potentially affected parties, including downstream water users, are provided with opportunities to review project information and submit comments. Comments received, and the responses to them, must be considered in the assessment and documented in the Comments and Responses Report. Comments concerning water availability, downstream water use and freshwater impacts must be considered alongside the relevant specialist findings and addressed through the EIA and, where applicable, the WULA process.

Integrated Environmental Management

Environmental, social, technical and economic considerations must be assessed together when evaluating a proposed development and its alternatives.

The EIA considers the proposed dam enlargement and buffer dam together with the associated connecting pipeline, rather than assessing each component in isolation. Two pipeline alignments are considered as alternatives in this EIR and Appendix 9: the preferred Green Pipeline Route, approximately 1.7 km long, and the alternative Blue Pipeline Route, approximately 2 km long. The assessment of the pipeline alternatives draws on the relevant specialist findings for the broader development area, the available route information, and the differences in pipeline length and construction footprint. The No-Go Alternative is also considered to establish the implications of not proceeding with the proposed development.

The assessment integrates the relevant terrestrial biodiversity, freshwater, hydrological, agricultural and heritage findings from the completed specialist investigations. Each specialist investigation addresses its respective field of expertise. The identification of the preferred development layout and the consideration of alternatives must take account of the integrated assessment findings and comments received during public participation.

Holistic Consideration of Environmental Effects

Environmental decision-making must consider the potential effects of an activity on the environment as a whole, including the interrelationships between environmental systems and the potential cumulative consequences of development.

The Hydrological Assessment informs the consideration of increased upstream storage and its modelled implications for downstream Wydekloof Dam. These findings must be considered alongside the freshwater assessment of ecological impacts and the WULA process, which addresses the lawful abstraction, storage and use of water. The EIA also considers the combined environmental effects of the Helpmekaar Dam enlargement, supplementary buffer dam and connecting pipeline, including their construction footprints, permanent inundation areas and associated mitigation requirements.

The application of these principles provides a basis for assessing the proposed development and the No-Go Alternative. The competent authority will determine whether Environmental Authorisation should be granted, having regard to the EIA findings, completed specialist investigations, public participation outcomes and applicable legal requirements.

3.1.3 NATIONAL HERITAGE RESOURCES ACT

The protection and management of South Africa's heritage resources are governed by the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). The Act provides for the identification, assessment and protection of heritage resources that may be affected by development.

Section 38(1) of the NHRA requires the relevant heritage resources authority to be notified of certain categories of development. Those relevant to the proposed development include:

- The construction of a pipeline or other similar form of linear development exceeding 300 m in length; and
- Development or another activity that will change the character of a site exceeding 5 000 m² in extent.

The proposed connecting pipeline will extend approximately 1.7 km along the preferred Green Route or 2 km along the alternative Blue Route. The proposed dam enlargement and construction of the supplementary

Buffer Dam will also involve development footprints exceeding 5 000 m². The proposed development therefore meets the above thresholds for consideration under Section 38 of the NHRA.

Section 38(8) of the NHRA provides for heritage impacts to be assessed as part of an environmental assessment process undertaken in terms of other legislation, including NEMA. Where heritage impacts are assessed through the NEMA process, the relevant heritage assessment and the comments and recommendations of Heritage Western Cape (HWC) must be considered as part of the environmental decision-making process.

The NHRA also provides specific protection for certain heritage resources. In particular:

- Section 34(1) prohibits the alteration or demolition of a structure or part of a structure older than 60 years without a permit issued by the relevant heritage resources authority.
- Section 35(4) regulates activities that may destroy, damage, excavate, alter, remove or otherwise affect protected archaeological or palaeontological material and objects without the required permit.
- Section 36(3) regulates the disturbance of protected graves and burial grounds, including certain graves older than 60 years situated outside formal cemeteries administered by a local authority.

A Heritage Impact Assessment (HIA), including archaeological and palaeontological components, has been undertaken as part of the EIA process. Its findings and recommendations are considered in this Environmental Impact Report (EIR), and the applicable mitigation and management measures are incorporated into the Environmental Management Programme (EMPr).

A Chance Finds Procedure will be implemented during construction. Should previously unidentified archaeological or palaeontological material, graves or other potential heritage resources be encountered, work in the affected area must cease, the find must be protected from further disturbance, and the relevant heritage authority must be notified. Work may resume in the affected area only once the necessary heritage requirements have been addressed.

Any heritage permits required under Sections 34, 35 or 36 of the NHRA must be obtained before the relevant protected resources are altered, disturbed or removed. Environmental Authorisation under NEMA does not replace these permits.

3.1.4 EIA GUIDELINE AND INFORMATION DOCUMENT SERIES

The Environmental Impact Assessment (EIA) process for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline has been informed by relevant national and provincial environmental assessment guidelines and information documents.

The following guidance documents and regulatory requirements have been considered, where applicable:

- Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) EIA Guideline and Information Document Series, including guidance on:
 - *Transitional arrangements;*
 - *Terms of reference for Environmental Assessment Practitioners and project schedules;*
 - *Assessment of alternatives;*
 - *Public participation;*
 - *Appeals; and*
 - *Need and desirability.*
- Department of Environmental Affairs and Tourism (DEAT) Integrated Environmental Management (IEM) Information Series, including relevant guidance on environmental assessment, public participation, alternatives, impact assessment and sustainable development.

- Environmental Impact Assessment Regulations, 2014 (as amended), promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998), which prescribe the applicable assessment and public participation procedures.
- Applicable DEA&DP procedures and requirements relating to the Scoping and Environmental Impact Reporting (S&EIR) process.
- Applicable environmental assessment protocols and requirements for site sensitivity verification and specialist assessments published under NEMA, insofar as they are relevant to the proposed development.

These documents have informed the approach to the assessment of alternatives, identification and evaluation of potential impacts, the completed specialist investigations, public participation and preparation of this Environmental Impact Report (EIR) and the associated Environmental Management Programme (EMPr).

The EIA Regulations and applicable statutory assessment protocols take precedence over non-binding guidance documents where their requirements differ.

3.1.5 NATIONAL WATER ACT

In addition to the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the proposed development is subject to the provisions of the National Water Act, 1998 (Act No. 36 of 1998) (NWA).

The NWA provides for the protection, use, development, conservation, management and control of South Africa's water resources. It regulates water uses that may affect water availability, watercourses, aquatic ecosystems, ecological functioning and the rights and interests of other lawful water users.

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline involve water uses regulated under Section 21 of the NWA. The water uses identified for consideration through the Water Use Licence Application (WULA) process include:

- Section 21(a): Taking water from a water resource;
- Section 21(b): Storing water;
- Section 21(c): Impeding or diverting the flow of water in a watercourse; and
- Section 21(i): Altering the bed, banks, course or characteristics of a watercourse.

The applicability of these water uses to the individual development components, together with the proposed abstraction and storage volumes, will be addressed through the WULA process. The WULA must distinguish between the enlargement of the existing Helpmekaar Dam, the proposed supplementary buffer dam and any regulated watercourse-related works associated with the connecting pipeline, taking account of the preferred Green Route and alternative Blue Route considered in this EIR and Appendix 9.

The Department of Water and Sanitation (DWS) is a commenting authority in the Environmental Impact Assessment (EIA) process and is responsible for considering the required water use authorisation under the NWA. The freshwater and hydrological assessments provide information relevant to both processes, including the potential effects of the proposed development on freshwater ecosystems, water availability, downstream flows and other water users. The freshwater and hydrological assessments address different aspects of the proposal: the freshwater assessment considers effects on aquatic features and their ecological functioning, while the Hydrological Assessment considers modelled water supply and downstream dam operation.

The proposed development is intended to improve the storage of winter runoff for agricultural irrigation. The Hydrological Assessment modelled the proposed enlargement of Helpmekaar Dam as part of a combined upstream storage system with Langrug 2 Dam, using existing irrigation requirements. The implications of the proposed water uses for downstream users and freshwater resources must be considered through the WULA process, taking account of the relevant specialist findings and applicable water-resource requirements.

The granting of Environmental Authorisation under NEMA would not, on its own, authorise additional water abstraction, storage or other regulated water uses. The relevant water uses may commence only once the necessary authorisation under the NWA has been obtained and any applicable conditions have been met.

The construction and operation of the proposed development must comply with the water use authorisation issued by DWS, including any conditions relating to abstraction volumes, storage capacity, downstream flows, monitoring and protection of freshwater resources. The final design and operating arrangements must be consistent with the water uses and infrastructure authorised by DWS.

3.1.6 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA), as amended, provides for the management and conservation of South Africa's biodiversity, the protection of species and ecosystems that warrant national conservation attention, and the sustainable use of indigenous biological resources.

Chapter 4 of NEMBA provides for the listing and protection of threatened or protected ecosystems and species. In terms of Section 52, ecosystems may be listed as Critically Endangered, Endangered, Vulnerable or Protected. The presence of a listed ecosystem is an important consideration in environmental assessment and decision-making. The listing of an ecosystem does not, in itself, constitute a blanket prohibition on development; the applicable environmental authorisation requirements and potential impacts must be assessed.

The proposed development area includes indigenous vegetation and biodiversity features identified through desktop information, the DFFE Screening Tool, the Site Sensitivity Verification Report and terrestrial biodiversity specialist investigations. The completed Terrestrial Biodiversity Statement identifies Kouebokkeveld Alluvium Fynbos and Kouebokkeveld Shale Fynbos, both classified as Critically Endangered ecosystems, within the broader affected area. The extent, condition and conservation significance of vegetation affected by the proposed development are considered with reference to the completed specialist findings, applicable biodiversity information and the development footprint plans.

The terrestrial biodiversity specialist has identified that approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos is expected to be affected by the proposed enlargement of Helpmekaar Dam. The specialist has also identified good-condition Kouebokkeveld Shale Fynbos on the south-eastern portion of Langrug Ridge and recommends that the connecting pipeline follow the existing farm road/firebreak across the ridge to minimise disturbance of natural vegetation. This recommendation must inform the detailed pipeline alignment, construction corridor and associated avoidance and rehabilitation measures.

The biodiversity assessment findings have informed the identification of potential impacts, the consideration of the preferred Green Pipeline Route and alternative Blue Pipeline Route, and the development of avoidance, mitigation and rehabilitation measures for inclusion in the Environmental Management Programme (EMPr). Both pipeline routes are considered as alternatives in this EIR and Appendix 9. The relevant specialist findings for the broader development area inform the assessment of both alternatives where applicable to their respective alignments. The assessment must distinguish between the mapped extent of a vegetation type, the condition of vegetation confirmed on site and the area of indigenous vegetation that will actually be cleared or inundated by the proposed works. The completed Terrestrial

Biodiversity Statement informs the assessment of vegetation-related impacts and the mitigation and rehabilitation requirements for the proposed development.

The requirements of NEMBA, the applicable national list of threatened ecosystems and the Western Cape Biodiversity Spatial Plan have been considered in the EIA. The national threatened-ecosystem listing and the Western Cape Biodiversity Spatial Plan serve different purposes: the former identifies ecosystems of national conservation concern, while the latter identifies spatial biodiversity priorities, including Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). The EIR must identify the applicable ecosystem classification and mapped biodiversity priority for each affected component without treating the two mapping systems as interchangeable.

4. ALTERNATIVES

In accordance with the Environmental Impact Assessment Regulations, 2014 (as amended), reasonable and feasible alternatives to the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary buffer dam and installation of the associated connecting pipeline have been considered as part of the Environmental Impact Assessment (EIA) process.

The consideration of alternatives includes development and layout alternatives, the preferred Green Pipeline Route, the alternative Blue Pipeline Route, potential sources of construction material, operational considerations and the No-Go Alternative. These alternatives have been identified and refined through engineering investigations, site planning, the completed specialist investigations and the Scoping and EIA processes, including consideration of comments received during public participation. Both pipeline routes are considered as alternatives in this EIR and Appendix 9.

The proposed development and the No-Go Alternative are assessed in terms of their technical and operational feasibility and their potential environmental and socio-economic impacts. Particular consideration is given to the additional inundation associated with the proposed dams, disturbance of freshwater features and indigenous vegetation, construction impacts, and the potential effects of water storage and use on downstream resources and users. The assessment draws on the relevant freshwater, hydrological, terrestrial biodiversity, agricultural and heritage specialist findings. The completed Terrestrial Biodiversity Statement informs the assessment of vegetation-related impacts and the identification of appropriate avoidance, mitigation and rehabilitation measures.

The proposed development alternative comprises the enlargement of Helpmekaar Dam, construction of the supplementary buffer dam and installation of the connecting pipeline along the preferred Green Route, approximately 1.7 km long. The Blue Route, approximately 2 km long, is retained as an alternative and is considered in the EIR and Appendix 9. The assessment of the pipeline alternatives draws on the relevant specialist findings for the broader development area, the available route information, and differences in pipeline length and construction footprint. The No-Go Alternative provides a basis for considering the implications of not proceeding with the proposed development.

The identification of a proposed development alternative does not predetermine its environmental acceptability. The final assessment must take account of the completed specialist findings, the assessment of alternatives, mitigation requirements, public participation outcomes and the separate water-use authorisation process. The lawful abstraction, storage and use of water remain subject to the applicable authorisation under the National Water Act.

LOCATION / SITE ALTERNATIVES

The identification of suitable locations for the proposed additional water storage infrastructure was guided by the opportunity to enlarge an existing dam, the availability of suitable topography, engineering and operational requirements, and the potential to avoid or minimise additional environmental disturbance.

The proposed site is located on Portion 5 of Farm Rietrivier No. 202, where the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam) is established. The proposal seeks to increase the storage capacity of this existing facility rather than construct a new primary storage dam elsewhere on the property. The existing dam basin and associated agricultural infrastructure provide an opportunity to consolidate water storage at an established location.

The enlargement of an existing dam offers potential advantages over developing a new primary dam at an undeveloped site, including the use of existing infrastructure and the avoidance of a separate dam location. However, the proposed enlargement will extend the inundation area beyond the existing dam footprint and

affect freshwater habitat and indigenous vegetation. These impacts are assessed in the EIA and cannot be assumed to be less significant solely because the proposal involves an existing dam. The assessment must also consider the relevant agricultural, heritage and hydrological findings, together with the findings of the completed Terrestrial Biodiversity Statement, where applicable to the proposed development footprint.

A supplementary buffer dam is proposed as part of the integrated water storage and irrigation system. Its location has been identified with reference to topographical suitability, engineering feasibility and the operational requirements of the proposed system. Although the surrounding landscape includes cultivated and previously modified areas, the proposed buffer dam will affect a freshwater feature, and its potential impacts are considered in the Freshwater Assessment.

The Helpmekaar Dam and buffer dam locations were retained during the consideration of pipeline alignments at the initial planning stage. Two connecting pipeline alignments are considered as alternatives in this EIR and Appendix 9: the preferred Green Pipeline Route, approximately 1.7 km long, and the alternative Blue Pipeline Route, approximately 2 km long. Both routes connect the proposed dam locations. Their respective alignments, construction requirements and potential environmental impacts are considered with reference to the available route information and relevant specialist findings for the broader development area.

No separate, feasible location alternative for a new primary storage dam has been taken forward for detailed assessment. The proposed development is specifically intended to increase storage at the existing Helpmekaar Dam and integrate it with the supplementary buffer dam. The No-Go Alternative is assessed as the option under which neither the proposed dam works nor the connecting pipeline would proceed.

Accordingly, the proposed site arrangement comprises the enlargement of the existing Helpmekaar Dam and construction of the supplementary buffer dam at the proposed locations, with the Green and Blue Pipeline Routes considered as connecting alignment alternatives, subject to the findings of the EIA and the necessary environmental and water-use authorisations.

ACTIVITY ALTERNATIVES

The purpose of the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of a supplementary buffer dam and installation of the associated connecting pipeline is to improve long-term irrigation water security through the storage, transfer and management of winter runoff. The additional storage is intended to support the proposed conversion of approximately 45 ha of annual crops to permanent fruit orchards.

Alternative approaches to meeting the farming operation's irrigation requirements were considered during project planning. These included continued reliance on the existing dam, increased groundwater abstraction, direct abstraction from the watercourse during the irrigation season, construction of a new off-channel storage dam and development of several smaller, decentralised storage facilities.

Continued reliance on the existing Helpmekaar Dam: Retaining the existing storage capacity of approximately 390 000 m³ would avoid the construction-related and additional inundation impacts associated with the proposed enlargement. However, this option would not provide the additional storage sought to support the proposed conversion to permanent fruit orchards. It is considered further under the No-Go Alternative.

Increased groundwater abstraction: Groundwater could potentially supplement irrigation supply. However, its ability to meet the proposed additional water demand has not been established through a site-specific assessment of sustainable groundwater yield and availability. Increased abstraction could also require

separate water-use authorisation. Groundwater abstraction has therefore not been taken forward as the principal alternative to the proposed storage infrastructure.

Direct abstraction during the irrigation season: This approach would reduce the need for additional stored water but would depend on the availability of water during the period of greatest irrigation demand. Its feasibility would be subject to seasonal streamflow, the availability of water for lawful use, downstream requirements and the necessary water-use authorisation. It has not been taken forward as the preferred means of achieving the project's winter-storage objective.

Construction of a new off-channel storage dam: A new dam at a separate location could potentially provide additional storage but would require a suitable site and associated water conveyance infrastructure. Its feasibility, cost and environmental impacts would depend on the location and design selected. The applicant has instead proposed enlarging the existing Helpmekaar Dam to make use of an established storage facility, with the supplementary buffer dam forming part of the integrated irrigation system.

Development of smaller, decentralised storage facilities: Several smaller dams could potentially distribute storage across the farming operation. However, this approach would require multiple suitable locations and associated infrastructure to achieve the intended combined storage capacity. It has not been taken forward as the preferred configuration, given the proposal to consolidate the principal additional storage at the existing Helpmekaar Dam.

Following consideration of these approaches, the proposed activity alternative comprises the enlargement of Helpmekaar Dam from approximately 390 000 m³ to 800 000 m³, construction of a supplementary buffer dam with a storage capacity of approximately 27 000 m³, and installation of an underground connecting pipeline along the preferred Green Route, approximately 1.7 km long. The alternative Blue Route, approximately 2 km long, is also considered in this EIR and Appendix 9. The pipeline diameter and final design specifications are subject to confirmation in the detailed engineering design.

The proposed activity would provide additional storage and operational flexibility but would also result in permanent inundation of additional land and freshwater habitat, disturbance of indigenous vegetation and potential changes to downstream flows. Its environmental acceptability is therefore assessed in the EIA, taking account of the completed freshwater, hydrological, terrestrial biodiversity, agricultural and heritage specialist findings, the assessment of alternatives, proposed mitigation measures and the outcome of the separate Water Use Licence Application process.

LAYOUT ALTERNATIVES

The proposed development layout comprises the enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of a supplementary Buffer Dam and installation of an underground connecting pipeline on Portion 5 of Farm Rietrivier No. 202.

The layout has been developed through engineering investigations, site planning and consideration of the environmental constraints identified during the Scoping and Environmental Impact Assessment (EIA) processes. The proposed enlargement makes use of the existing Helpmekaar Dam and its associated infrastructure, while the supplementary buffer dam forms part of the proposed water storage and irrigation distribution system.

The locations of the two dams were retained during the initial consideration of pipeline alignments. The principal layout consideration was therefore the alignment of the underground pipeline connecting the dams. Two pipeline routes are considered as layout alternatives in this EIR and Appendix 9: the Blue Route and the preferred Green Route.

Alternative 1 – Blue Route: This alignment is approximately 2 km long and generally follows an existing farm access road and previously disturbed agricultural areas. Its use of an established access corridor was considered during project planning as a potential means of limiting new disturbance. The Blue Route is retained as an alternative in the EIR and Appendix 9. Its potential impacts are considered with reference to the available route information, its construction requirements and the relevant specialist findings for the broader development area.

Alternative 2 – Green Route (Proposed Alignment): This alignment is approximately 1.7 km long and provides a shorter connection between the two dams. It follows previously disturbed agricultural land and existing farm infrastructure where practicable. The shorter route offers potential engineering and operational advantages, including reduced pipeline length and associated construction requirements. Its alignment must nevertheless be assessed against the site-specific biodiversity and freshwater constraints and refined where necessary to avoid or minimise disturbance.

The Western Cape Biodiversity Spatial Plan identifies Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) within the broader project area. Terrestrial biodiversity specialist investigations have also identified indigenous vegetation of conservation concern, including Kouebokkeveld Alluvium Fynbos and Kouebokkeveld Shale Fynbos. Accordingly, the presence of previously cultivated or disturbed land along portions of the proposed Green Route does not establish that the entire alignment is of low biodiversity sensitivity.

The terrestrial biodiversity specialist has identified good-condition Kouebokkeveld Shale Fynbos on the south-eastern portion of Langrug Ridge and recommends that the pipeline follow the existing farm road/firebreak across the ridge to minimise disturbance of natural vegetation. This recommendation, together with the findings of the other completed specialist assessments, must inform the detailed pipeline alignment and any necessary micro-siting within the assessed development footprint. The completed Terrestrial Biodiversity Statement also informs the vegetation-related impact assessment and the avoidance, mitigation and rehabilitation measures applicable to the proposed development.

The Green Route is the preferred pipeline alignment on the basis of its shorter length and identified engineering and operational considerations, subject to the findings of the environmental assessment and implementation of the required avoidance and mitigation measures. The Blue Route remains an alternative considered in this EIR and Appendix 9. The assessment of the two routes takes account of their respective alignments, pipeline lengths, construction footprints and relevant environmental constraints.

The proposed overall layout therefore comprises the enlargement of the existing Helpmekaar Dam, construction of the supplementary buffer dam and installation of the connecting pipeline along the preferred Green Route, with the Blue Route retained as an alternative. Any final layout refinements must remain consistent with the assessed development footprint and take account of the specialist recommendations; comments received during public participation and the requirements of the competent authorities.

No-Go ALTERNATIVES

The No-Go Alternative represents the scenario in which the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline do not proceed. Under this alternative, the existing water storage infrastructure would remain unchanged, and no additional storage capacity would be created through the proposed development.

The No-Go Alternative would avoid the direct environmental impacts associated with the proposed works, including additional inundation of freshwater habitat and indigenous vegetation, disturbance of watercourses, earthworks and temporary construction-related impacts such as dust, noise and increased vehicle

movements. It would also avoid the potential changes to downstream flows associated with the proposed additional storage and water use.

However, the No-Go Alternative would not achieve the applicant's objective of increasing on-farm storage of winter runoff to improve irrigation water security and operational flexibility. The existing Helpmekaar Dam has a storage capacity of approximately 390 000 m³. Without the proposed additional storage, the farming operation would remain reliant on its existing water storage and supply arrangements, which may constrain the proposed conversion of approximately 45 ha of annual crops to permanent fruit orchards.

The proposed development could provide additional water storage and greater flexibility in managing irrigation supply. It may also support orchard establishment and associated agricultural activities. The proposed infrastructure would remain subject to the applicable water-use authorisation and its conditions, including requirements relating to abstraction, storage and downstream flows. The proposed infrastructure would not, in itself, guarantee an adequate water supply during prolonged drought or periods of reduced winter runoff.

Under the No-Go Alternative, the additional storage and operational benefits sought by the applicant would not be realised. Existing agricultural activities could continue, subject to the availability of water and compliance with applicable authorisations, while any future changes to the farming operation would need to be considered within those constraints.

The No-Go Alternative is retained as a basis for comparing the environmental and socio-economic implications of proceeding with the proposed development against those of maintaining the existing situation. It avoids the additional impacts of construction and inundation but does not meet the project's stated water storage objectives. The comparative assessment of the No-Go and development alternatives informs the EIA's conclusions regarding the proposed development, which remains subject to the required Environmental Authorisation and water use authorisation.

CONCLUSION

During project planning and the Scoping Phase, alternatives relating to the development activity, site arrangement, layout and connecting pipeline alignment were considered. These alternatives were informed by engineering investigations, agricultural and operational requirements, desktop environmental information, site sensitivity verification and specialist input. Two connecting pipeline alignments are considered in this EIR and Appendix 9: the preferred Green Pipeline Route and the alternative Blue Pipeline Route.

The proposed development alternative comprises the enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary buffer dam and installation of the connecting pipeline along the preferred Green Route, approximately 1.7 km long. The alternative Blue Route is approximately 2 km long and is retained for consideration in the assessment of pipeline alternatives. This configuration makes use of the existing primary storage facility and provides a shorter pipeline connection than the Blue Route. The Green Route remains subject to the avoidance, micro-siting and mitigation measures identified through the environmental assessment. The assessment of the pipeline alternatives takes account of their respective alignments, pipeline lengths, construction footprints, available route information and relevant specialist findings for the broader development area.

The EIA assesses the potential impacts of the proposed development, including additional inundation of freshwater habitat and indigenous vegetation, disturbance associated with construction, and potential effects on downstream water resources and users. The completed specialist findings inform the assessment of the proposed development against the No-Go Alternative, refinement of the proposed layout and development of measures for inclusion in the Environmental Management Programme (EMPr). The completed Terrestrial

Biodiversity Statement informs the assessment of vegetation-related impacts and associated avoidance, mitigation and rehabilitation measures.

The No-Go Alternative is retained for comparison. It would avoid the additional environmental impacts associated with the proposed works but would not provide the increased water storage capacity sought by the applicant to support the proposed agricultural development.

The proposed development alternative identified during Scoping is therefore carried forward for assessment in the EIA, together with the Green and Blue Pipeline Route alternatives and the No-Go Alternative. Its environmental acceptability must be considered in light of the specialist findings, comments received from authorities and Interested and Affected Parties (I&APs), the application of the mitigation hierarchy and the requirements of the competent authorities. The proposed development remains subject to the necessary Environmental Authorisation and separate water-use authorisation.

5. SITE DESCRIPTION

5.1 LOCATION

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary buffer dam and installation of the associated underground connecting pipeline are located on Portion 5 of Farm Rietrivier No. 202, near Ceres, within the Witzenberg Local Municipality, Cape Winelands District Municipality, Western Cape Province.

The property is situated in the Koue Bokkeveld region and forms part of an agricultural landscape comprising cultivated land, existing farm infrastructure, freshwater features and areas of indigenous vegetation. The existing Helpmekaar Dam is situated on a tributary of the Leeu River.

The proposed development involves enlarging the existing Helpmekaar Dam and constructing a supplementary buffer dam to form part of an integrated water storage and irrigation system. The two dams will be connected by an underground pipeline. Two connecting pipeline alignments are considered as alternatives in this EIR and Appendix 9: the preferred Green Pipeline Route, approximately 1.7 km long, and the alternative Blue Pipeline Route, approximately 2 km long. Both routes connect the same proposed dam locations.

Access to the development area will be obtained through the existing farm access and internal road network. Existing roads and previously disturbed agricultural areas will be used for construction access and pipeline installation where practicable, subject to the final layout and applicable environmental mitigation measures. Where the proposed Green Route crosses Langrug Ridge, the final alignment and construction corridor must take account of the terrestrial biodiversity specialist's recommendation to follow the existing farm road/firebreak to minimise disturbance of natural vegetation.

The proposed dam footprints and connecting pipeline alternatives traverse previously modified agricultural areas as well as areas containing freshwater features and indigenous vegetation of conservation concern. The site-specific environmental sensitivities, including the condition of affected vegetation and freshwater habitat, are addressed in the relevant specialist assessments and considered in the evaluation of the proposed development against the No-Go Alternative. The completed Terrestrial Biodiversity Statement informs the assessment of vegetation-related impacts and the associated avoidance, mitigation and rehabilitation measures. The relevant specialist findings for the broader development area also inform the assessment of both pipeline alternatives where applicable to their respective alignments.

The locality of the proposed development, the existing and proposed dam footprints, and the preferred Green and alternative Blue Pipeline Routes are illustrated in Figure 1 and Appendix 1. The pipeline alternatives are also considered in Appendix 9.

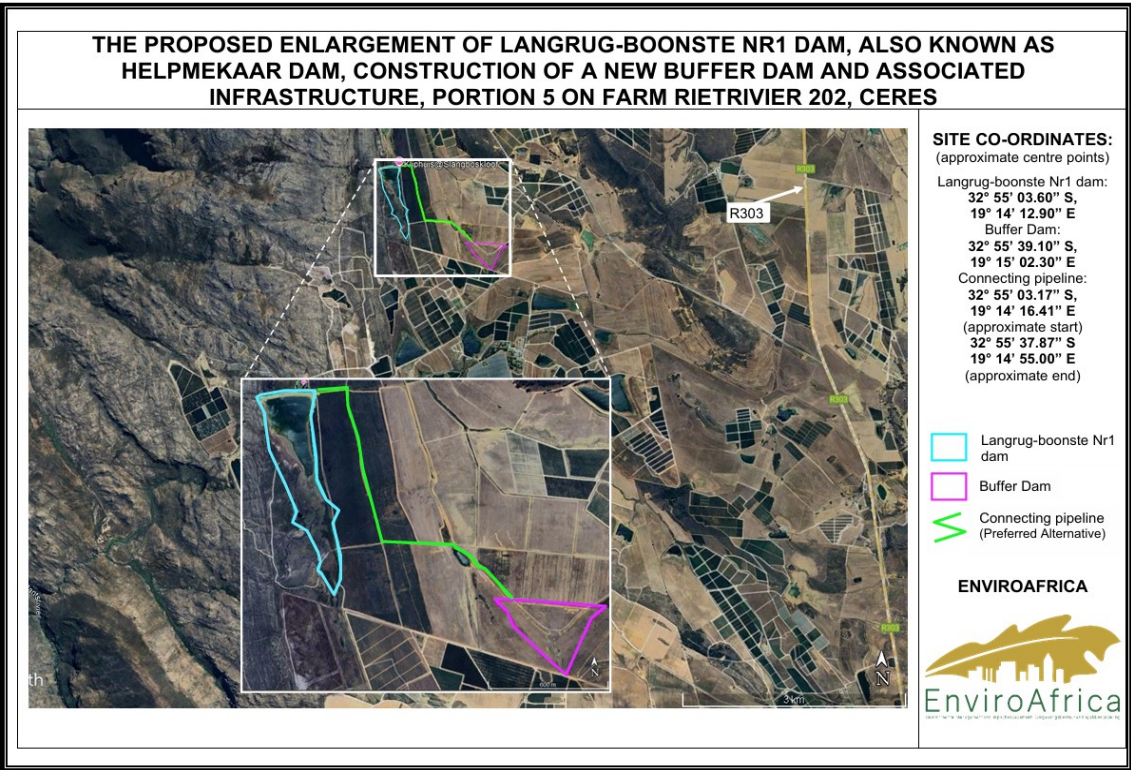


Figure 4: Proposed development site – Development footprint



Figure 5: Route for the connecting pipeline follows existing farm. View facing southwest



Figure 6: Proposed buffer dam. View facing northwest. Klein Tafelberg can be seen in the distance.

5.2 VEGETATION

Vegetation mapping obtained from CapeFarmMapper and the Western Cape Biodiversity Spatial Plan indicates that the broader project area includes Kouebokkeveld Alluvium Fynbos, Kouebokkeveld Shale Fynbos and Winterhoek Sandstone Fynbos. Kouebokkeveld Alluvium Fynbos and Kouebokkeveld Shale Fynbos are classified as Critically Endangered ecosystems.

The proposed development is situated within an agricultural landscape that has been subject to historical cultivation and other farming activities. However, the extent of past disturbance varies across the development area, and previously cultivated land cannot be assumed to have no remaining biodiversity value.

The completed Terrestrial Biodiversity Statement has identified indigenous vegetation within and near the proposed development footprint. Approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos is expected to be affected by the proposed enlargement of Helpmekaar Dam. This estimate relates to the dam enlargement and should not be interpreted as the total area of indigenous vegetation that may be affected by all components of the proposed development.

Good-condition Kouebokkeveld Shale Fynbos has also been identified on the south-eastern portion of Langrug Ridge. The terrestrial biodiversity specialist recommends that the connecting pipeline follow the existing farm road/firebreak across the ridge to minimise disturbance of this vegetation. The detailed pipeline alignment and construction corridor must take account of this recommendation and the applicable avoidance, mitigation and rehabilitation measures.

The proposed enlargement of Helpmekaar Dam will result in permanent inundation beyond the existing dam footprint. Construction of the supplementary buffer dam and installation of the connecting pipeline may also result in vegetation disturbance. The extent and significance of these impacts are assessed with reference to the vegetation types present, their verified condition, the area affected by each development component and the proposed avoidance, mitigation and rehabilitation measures.

The biodiversity assessment findings have informed the consideration of development and pipeline alternatives and the preparation of the Environmental Management Programme (EMPr). The preferred Green Pipeline Route and alternative Blue Pipeline Route are considered in this EIR and Appendix 9,

drawing on the relevant specialist findings for the broader development area where applicable to their respective alignments. Where practicable, the final layout and construction methods must prioritise the avoidance of intact indigenous vegetation, minimise the width of the pipeline construction corridor and provide for the rehabilitation of temporarily disturbed areas.

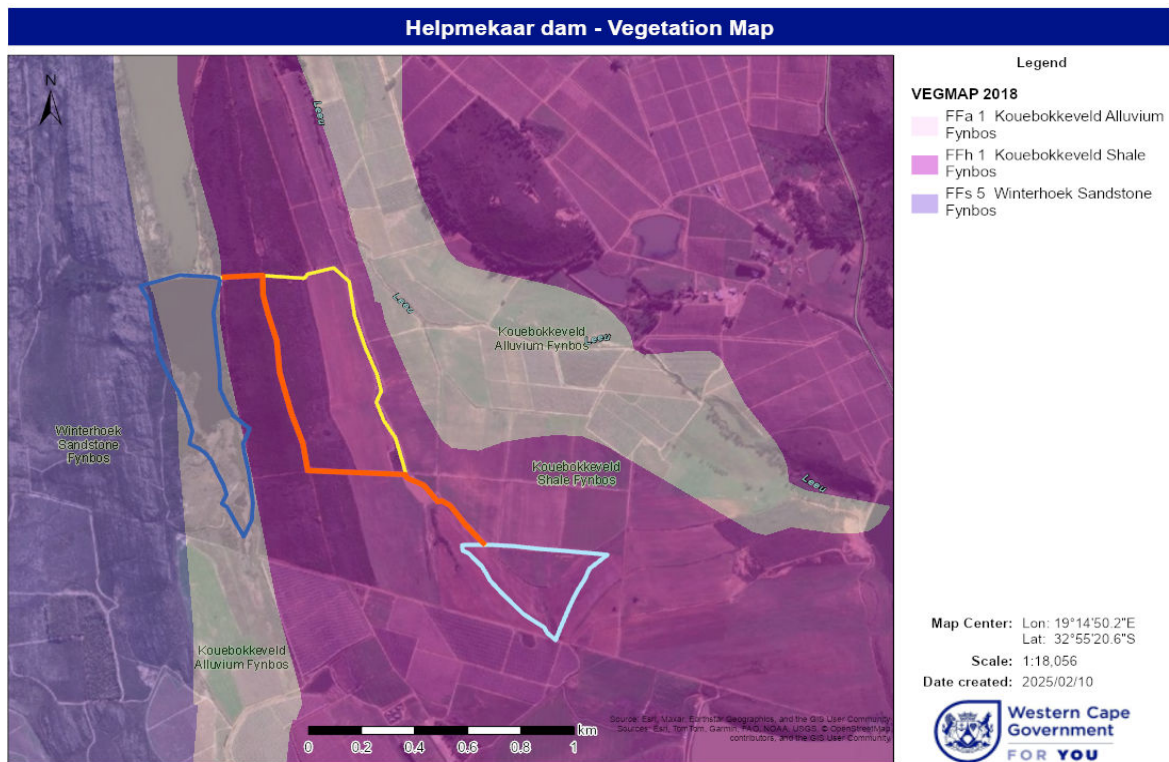


Figure 7: Vegetation map of the proposed Helpmekaar Dam development, showing the existing Helpmekaar Dam, proposed Buffer Dam and connecting pipeline alignment in relation to the mapped Kouebokkeveld Alluvium Fynbos, Kouebokkeveld Shale Fynbos and Winterhoek Sandstone Fynbos vegetation types on Portion 5 of Farm Rietrivier No. 202, Ceres, Western Cape.

5.3.1 Critical Biodiversity Areas and Ecological Support Areas

Spatial data obtained from CapeFarmMapper and the Western Cape Biodiversity Spatial Plan (2023) identify Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) within the broader Helpmekaar Dam project area. These areas are important for maintaining biodiversity, ecological connectivity and the ecological processes that support the surrounding landscape.

The proposed development comprises the enlargement of the existing Helpmekaar Dam, construction of the supplementary buffer dam and installation of an underground connecting pipeline. Although portions of the project area have been modified by historical agricultural activities, the development footprint and surrounding landscape also contain indigenous vegetation and freshwater features of conservation importance.

The completed Terrestrial Biodiversity Statement has identified Kouebokkeveld Alluvium Fynbos and Kouebokkeveld Shale Fynbos, both classified as Critically Endangered ecosystems, within the broader affected area. Approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos is expected to be affected by the enlargement of Helpmekaar Dam. Good-condition Kouebokkeveld Shale Fynbos has also been identified on

the south-eastern portion of Langrug Ridge, which the specialist recommends be treated as CBA1 for the purposes of assessing and managing potential impacts.

The mapped CBA and ESA designations must be considered alongside the site-verified condition of the affected habitat. Historical cultivation may have reduced the ecological condition of some areas, but it does not automatically remove their biodiversity value or the ecological functions for which they have been identified in the Western Cape Biodiversity Spatial Plan. Similarly, the presence of disturbed land within parts of the development footprint does not establish that all proposed works will occur in areas of low biodiversity sensitivity.

The terrestrial biodiversity specialist recommends that the connecting pipeline follow the existing farm road/firebreak across Langrug Ridge to minimise disturbance of the good-condition Kouebokkeveld Shale Fynbos. This recommendation must inform the detailed pipeline alignment and construction corridor, together with the applicable avoidance, mitigation and rehabilitation measures.

The preferred Green Pipeline Route and alternative Blue Pipeline Route are considered in this EIR and Appendix 9. The relevant specialist findings for the broader development area inform the assessment of both alternatives where applicable to their respective alignments, including the consideration of mapped CBAs, ESAs and indigenous vegetation.

The proposed dam works will also affect freshwater features, including habitat that will be permanently inundated. The potential implications for aquatic biodiversity and associated ecological functions are addressed in the freshwater assessment.

The significance of the proposed development's impacts on CBAs, ESAs and other biodiversity features is assessed with reference to the mapped biodiversity priorities, verified habitat condition, extent and nature of disturbance, and specialist recommendations. Measures to avoid and minimise impacts, rehabilitate temporarily disturbed areas and monitor implementation are incorporated into the Environmental Management Programme (EMPr).

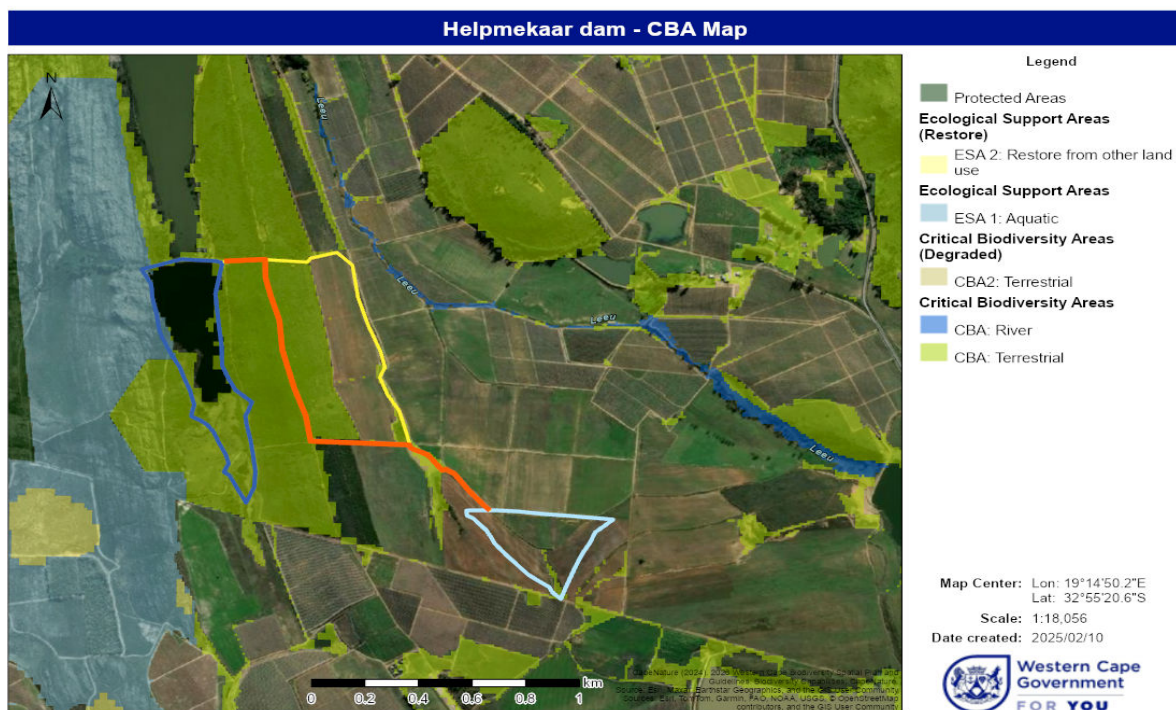


Figure 8: Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) associated with the proposed Helpmekaar Dam development, showing the existing Helpmekaar Dam, proposed Buffer Dam and

connecting pipeline alignment in relation to mapped terrestrial and riverine CBAs, aquatic ESAs, degraded biodiversity areas and the surrounding agricultural landscape on Portion 5 of Farm Rietrivier No. 202, Ceres, Western Cape.

A Botanical assessment was conducted (**Appendix 8D**), and findings are discussed in Section 10 of the EIR.

5.4 FRESHWATER

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline are located within the Koue Bokkeveld region, near Ceres. The existing Helpmekaar Dam is situated on a tributary of the Leeu River. The proposed development will interact with freshwater features through additional inundation, construction activities and the proposed storage and transfer of water for irrigation.

The existing Helpmekaar Dam is an instream storage facility with a capacity of approximately 390 000 m³. The proposed enlargement would increase its capacity to approximately 800 000 m³, providing an additional 410 000 m³ of storage. The supplementary Buffer Dam would provide approximately 27 000 m³ of storage and would be connected to Helpmekaar Dam by an underground pipeline.

The Freshwater Impact Assessment undertaken by WATSAN Africa (October 2025) identifies the existing Helpmekaar Dam as an instream impoundment associated with a tributary of the Leeu River. The proposed enlargement will extend inundation beyond the existing dam footprint and affect an already modified wetland system. Although the freshwater environment has been influenced by existing agricultural activities and water storage infrastructure, the additional inundation will result in further loss and alteration of freshwater habitat.

The proposed Buffer Dam will affect a separate wetland feature within the agricultural landscape. The freshwater specialist identified this feature as having limited ecological and resource-related value in its present condition. Nevertheless, construction of the Buffer Dam will result in permanent inundation and modification of the affected feature, and these impacts must be considered as part of the overall freshwater assessment.

Potential freshwater impacts associated with the proposed development include:

- Permanent inundation and alteration of wetland and associated aquatic habitat;
- Modification of local drainage patterns and the timing and distribution of downstream flows;
- Disturbance of watercourse beds and banks during construction;
- Sediment mobilisation, erosion and deterioration of water quality arising from earthworks and exposed soils; and
- Cumulative effects associated with existing and proposed water storage and agricultural water use within the catchment.

The Hydrological Assessment considers the proposed enlargement of Helpmekaar Dam as part of the combined upstream storage system with Langrug 2 Dam. It addresses modelled irrigation supply and downstream dam operation, while the Freshwater Impact Assessment addresses impacts on aquatic features and their ecological functioning. The implications of the proposed water uses for downstream flows, other water users and freshwater resources are also considered through the separate Water Use Licence Application (WULA) process.

The Freshwater Impact Assessment informs the avoidance, mitigation and rehabilitation measures required during construction and operation. Relevant measures include minimising disturbance outside the authorised development footprint, implementing erosion and sediment controls, managing construction activities near freshwater features, rehabilitating temporarily disturbed areas and complying with any operational, flow-management and monitoring requirements imposed through the water-use authorisation process.

The preferred Green Pipeline Route, approximately 1.7 km long, and the alternative Blue Pipeline Route, approximately 2 km long, are considered in this EIR and **Appendix 9**. The assessment of the pipeline alternatives takes account of the available route information and relevant specialist findings for the broader development area, including freshwater constraints where applicable to their respective alignments.

The proposed development may involve water uses regulated under Sections 21(a), 21(b), 21(c) and 21(i) of the National Water Act, 1998 (Act No. 36 of 1998). The applicability of these water uses, together with the proposed abstraction and storage volumes, must be confirmed through the WULA process. Regulated water uses may not commence before the necessary authorisation has been obtained from the Department of Water and Sanitation.

The findings and recommendations of the Freshwater Impact Assessment have been considered in the EIA and inform the mitigation and monitoring requirements included in the Environmental Management Programme (EMPr).

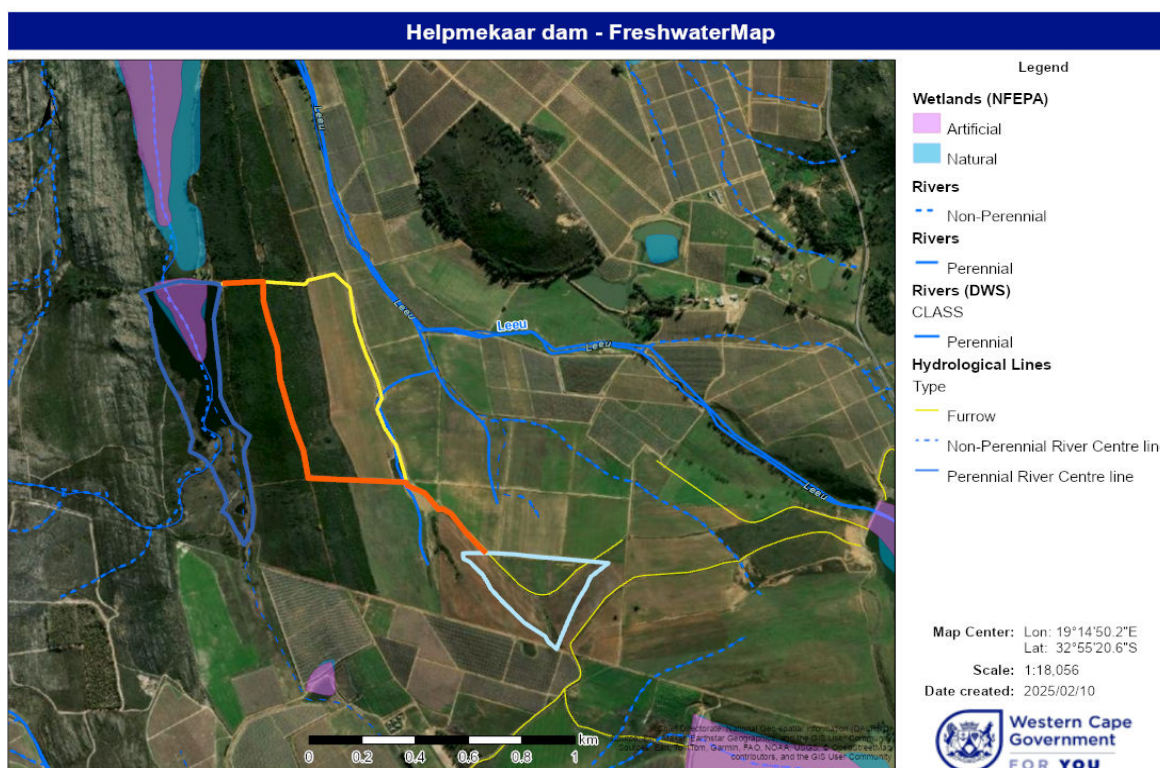


Figure 9: Freshwater Resources Map of the proposed Helpmekaar Dam development, showing the existing Helpmekaar Dam, proposed Buffer Dam and connecting pipeline alignment in relation to the mapped perennial and non-perennial watercourses, natural and artificial wetlands, and surrounding agricultural landscape on Portion 5 of Farm Rietrivier No. 202, Ceres, Western Cape.

A Freshwater Impact Assessment has been undertaken (**Appendix 8C**), and the findings are discussed in Section 10 of the EIR.

5.5 AGRICULTURE

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary buffer dam and installation of the associated connecting pipeline are located on Portion 5 of Farm Rietrivier No. 202, within an established agricultural landscape in the Koue Bokkeveld region.

The property is used for agricultural production and includes cultivated land, existing irrigation and water storage infrastructure, internal farm roads and areas of indigenous vegetation. The proposed development is

intended to improve the storage and management of winter runoff for irrigation purposes and to support the applicant's proposed conversion of approximately 45 ha of annual crops to permanent fruit orchards.

The existing Helpmekaar Dam has a storage capacity of approximately 390 000 m³. The proposed enlargement would increase its capacity to approximately 800 000 m³, while the supplementary buffer dam would provide approximately 27 000 m³ of storage. The dams would be connected by an underground pipeline to facilitate water transfer within the proposed irrigation system. The proposed abstraction, storage and use of water remain subject to the separate Water Use Licence Application (WULA) process.

The proposed dam works and pipeline installation will affect land within the existing farming operation. Although portions of the development area have been historically cultivated or otherwise disturbed, the proposed works will also affect freshwater features and indigenous vegetation. The agricultural use of the surrounding land must therefore be considered alongside the site-specific environmental sensitivities identified through the specialist assessments.

Two pipeline alignments are considered as alternatives in this EIR and Appendix 9. The approximately 2 km Blue Route generally follows an existing farm access road and previously disturbed agricultural areas. The approximately 1.7 km Green Route, which is the preferred alignment, provides a shorter connection between the dams and follows disturbed agricultural land and existing farm infrastructure where practicable. The detailed pipeline alignment and construction corridor must take account of both agricultural operations and the biodiversity constraints identified within the broader development area and along the respective routes.

Potential impacts on agricultural activities during construction include temporary restrictions on access, disturbance of cultivated land, soil compaction, disruption of existing farm infrastructure and interference with farming operations. Where pipeline installation affects agricultural land, topsoil should be managed appropriately, excavated areas should be backfilled and stabilised, and temporarily disturbed land should be rehabilitated to a condition suitable for its intended use, where practicable.

The proposed development may provide greater operational flexibility in managing irrigation water and support the planned establishment of permanent fruit orchards. However, the additional storage infrastructure does not guarantee water availability during periods of reduced winter runoff. The proposed agricultural development must remain consistent with the water volumes and operating conditions authorised by the Department of Water and Sanitation.

The agricultural considerations associated with the proposed development, together with the findings and recommendations of the Agricultural Compliance Statement, inform the assessment of alternatives, finalisation of the development layout and preparation of the Environmental Management Programme (EMPr).

5.6 HYDROLOGY

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary buffer dam and installation of the associated connecting pipeline are situated within the Koue Bokkeveld region, near Ceres. The existing Helpmekaar Dam is an instream storage facility located on a tributary of the Leeu River. The surrounding agricultural landscape includes existing dams, irrigation infrastructure, cultivated land and freshwater features associated with the local drainage system.

The farming operation relies on the storage and management of water for irrigation. Winter runoff contributes to the water stored in the existing dam system for use during the irrigation season. The proposed development is intended to increase on-farm storage capacity and improve the management and transfer of irrigation water within this system.

The existing Helpmekaar Dam has a storage capacity of approximately 390 000 m³. The proposed enlargement would increase its capacity to approximately 800 000 m³, providing an additional 410 000 m³ of storage. The proposed supplementary buffer dam would provide approximately 27 000 m³ of storage. An underground connecting pipeline would facilitate water transfer between the two dams.

The Hydrological Assessment considers the proposed enlargement of Helpmekaar Dam as part of a combined upstream storage system with the existing Langrug 2 Dam. It examines the operation of this system in relation to irrigation supply and downstream dam flows. The assessment also considers the applicable gazetted Ecological Water Requirements in evaluating the proposed storage arrangements.

The downstream hydrological setting includes Wydekloof Dam and other water users within the catchment. Changes to the storage and operation of the upstream dam system may influence the timing and volume of water passing downstream. The Hydrological Assessment provides the basis for considering these potential changes, while the Freshwater Impact Assessment addresses the ecological implications for affected aquatic features.

Two underground connecting pipeline alignments are considered in this EIR and Appendix 9: the preferred Green Pipeline Route, approximately 1.7 km long, and the alternative Blue Pipeline Route, approximately 2 km long. The pipeline forms part of the proposed irrigation water transfer infrastructure, and its construction must take account of freshwater features and drainage patterns along the selected alignment.

The proposed abstraction, storage and use of water are subject to the separate Water Use Licence Application (WULA) process administered by the Department of Water and Sanitation. The hydrological findings inform the assessment of the proposed development and the consideration of applicable water-use authorisation requirements. The detailed hydrological assessment findings and associated impact considerations are discussed in Section 10 of this EIR.

5.7 HERITAGE

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary buffer dam and installation of the associated underground connecting pipeline are located on Portion 5 of Farm Rietrivier No. 202, within an established agricultural landscape in the Koue Bokkeveld region.

The development area includes an existing dam, cultivated land, farm roads and associated agricultural infrastructure. The proposed works will extend beyond the existing dam footprint and involve earthworks for the supplementary buffer dam and connecting pipeline. The heritage implications of these activities are considered in the completed heritage and palaeontological assessments.

The proposed enlargement of Helpmekaar Dam will result in additional inundation, while construction of the supplementary buffer dam and installation of the underground pipeline will involve excavation and other ground-disturbing activities. These activities have the potential to affect heritage resources, including archaeological material or palaeontological remains that may be encountered during construction.

The preferred Green Pipeline Route, approximately 1.7 km long, and the alternative Blue Pipeline Route, approximately 2 km long, are considered in this EIR and Appendix 9. The heritage assessment findings inform the consideration of the proposed development and its alternatives, where relevant to their respective footprints.

The findings and recommendations of the completed heritage and palaeontological assessments inform the identification of heritage-related impacts and the measures included in the Environmental Management Programme (EMPr). Should previously unidentified archaeological material, human remains or potential fossils be encountered during construction, work in the affected area must cease pending assessment by an appropriately qualified specialist and compliance with the applicable heritage requirements.

The proposed development is subject to the applicable provisions of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), and the relevant requirements and recommendations of Heritage Western Cape. The detailed heritage and palaeontological assessment findings and associated mitigation measures are discussed in Section 10 of this EIR.

5.8 CLIMATE

The proposed Helpmekaar Dam enlargement, supplementary Buffer Dam and associated connecting pipeline are located in the Koue Bokkeveld region near Ceres. The area experiences a Mediterranean-type climate characterised by cool, wet winters and warm, dry summers. Rainfall occurs predominantly during the winter months, when frontal weather systems contribute to runoff and the replenishment of surface water resources.

Regional climate data for the nearby Op-die-Berg area indicate an average annual temperature of approximately 13.5°C and average annual rainfall of approximately 432 mm. January is typically the warmest and driest month, with an average temperature of approximately 19.8°C and average rainfall of approximately 6 mm. July is generally the coldest month, with an average temperature of approximately 7.6°C, while May records average monthly rainfall of approximately 79 mm. These figures are indicative of regional conditions and may differ from those experienced at the project site.

Rainfall and runoff in the Koue Bokkeveld vary between seasons and years. Periods of reduced winter rainfall and prolonged drought can affect the availability of water for agricultural use, particularly during the dry summer irrigation season. The proposed development is intended to increase the storage of available winter runoff for subsequent irrigation use and to provide greater flexibility in managing the farming operation's water supply.

The proposal involves increasing the capacity of the existing Helpmekaar Dam from approximately 390 000 m³ to 800 000 m³, together with the construction of a supplementary Buffer Dam with a capacity of approximately 27 000 m³. The additional storage may improve the applicant's ability to manage seasonal variations in water availability. However, storage capacity does not guarantee that sufficient water will be available to fill the dams during periods of low runoff.

Potential climate-related considerations include reduced inflows during dry years, evaporation losses from the enlarged water surface, and the effects of changing rainfall patterns on irrigation demand and downstream water availability. The implications of the proposed storage and water use must therefore be considered in conjunction with the hydrological investigations and the separate Water Use Licence Application (WULA) process.

The design and operation of the proposed infrastructure must account for climatic variability and comply with any abstraction, storage, flow-management and monitoring requirements imposed through the water use authorisation process.

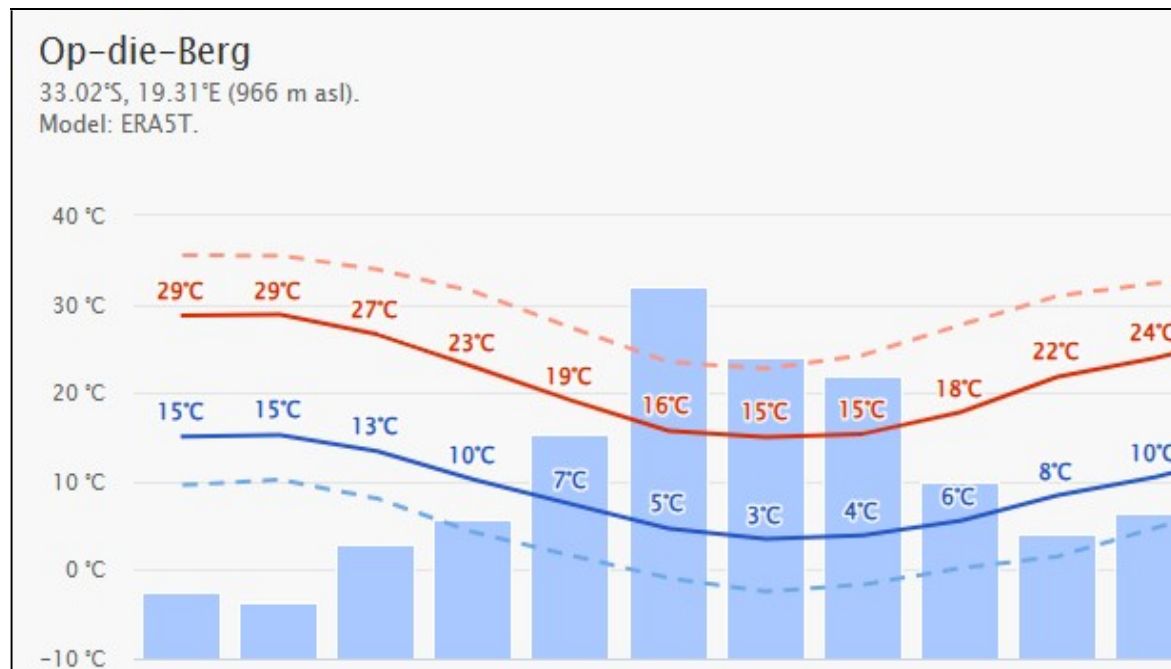


Figure 10: Meteoblue² - Simulated historical climate & weather data for the Op-die-Berg area

5.9 SOCIO-ECONOMIC CONTEXT

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline are located within the Witzenberg Local Municipality, Cape Winelands District Municipality, Western Cape Province. Agriculture is an important economic activity in the region, particularly fruit production and associated packing, processing, transport and agricultural support services.

The Koue Bokkeveld is an established agricultural production area in which irrigation water availability influences crop selection, production planning and the management of farming operations. Seasonal rainfall variability and periods of reduced runoff can constrain the availability of water during the summer irrigation season.

The proposed development by Sterkwater Boerdery (Pty) Ltd is intended to increase on-farm storage of winter runoff and improve the management of irrigation water. The additional storage would support the applicant's proposed conversion of approximately 45 ha of annual crops to permanent fruit orchards, subject to the necessary environmental and water-use authorisations.

Potential socio-economic benefits associated with the proposed development include:

- Improved flexibility in the storage and management of irrigation water;
- Support for the establishment and ongoing management of the proposed fruit orchards;
- Temporary employment and procurement opportunities during construction;
- Potential ongoing employment associated with orchard establishment, maintenance and harvesting; and
- Continued demand for agricultural goods, services and associated support activities.

The extent of these benefits will depend on the implementation of the proposed agricultural activities, water availability and the operational requirements of the farming enterprise. The proposed development should

² https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/frere_south-africa_1003654

not be assumed to result in a particular number of additional jobs or a quantified economic contribution unless these outcomes are supported by a project-specific socio-economic assessment.

Potential adverse socio-economic effects must also be considered. Construction activities may temporarily affect farm access and operations through increased vehicle movements, noise, dust and the use of working areas. The proposed additional storage and associated water use may also have implications for downstream water availability and lawful water users. These matters are addressed through the EIA, the relevant specialist investigations and the separate Water Use Licence Application (WULA) process.

The socio-economic assessment of the proposed development therefore considers both its potential contribution to the applicant's agricultural operations and the need to protect surrounding environmental resources and other water users. The No-Go Alternative would avoid the construction-related impacts and additional water storage associated with the proposal but would not provide the increased storage capacity sought to support the proposed conversion to permanent fruit orchards.

5.10 HERITAGE FEATURES

In terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), heritage resources may include archaeological, palaeontological, cultural, historical and landscape features of heritage significance. Due to the nature and scale of the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline, potential impacts on heritage resources were considered as part of the Environmental Impact Assessment (EIA) process.

A Heritage Impact Assessment (HIA) was undertaken by ACRM (Kaplan, January 2026) for the proposed development on Portion 5 of Farm Rietrivier No. 202, near Ceres, Western Cape. The assessment considered the archaeological, palaeontological and broader heritage implications of the proposed development. The Heritage Western Cape (HWC) case reference for the project is 25111407.

The archaeological assessment included the proposed Helpmekaar Dam enlargement footprint, the supplementary Buffer Dam footprint and the assessed connecting pipeline alignment. No archaeological resources were identified within the proposed Helpmekaar Dam enlargement footprint or along the assessed pipeline alignment.

Two isolated Earlier Stone Age (ESA) flaked stone artefacts were recorded within the proposed Buffer Dam footprint. The artefacts occur within a historically transformed agricultural landscape and were assessed by the specialist as having no conservation value. The HIA concluded that the recorded artefacts do not warrant archaeological mitigation before construction.

Based on these findings, the specialist concluded that the proposed development is not expected to result in significant impacts on identified archaeological heritage resources. No archaeological mitigation or routine archaeological monitoring was recommended. Appropriate chance-find procedures must nevertheless be implemented should previously unidentified archaeological material be encountered during construction.

The palaeontological assessment undertaken by Bamford considered the geological formations underlying the proposed development area and their potential to contain fossil material. The assessment identified Quaternary fluvial sediments and the underlying Voorstehoek Formation within the project area. The Quaternary fluvial sediments are considered to have low palaeontological sensitivity, while the Voorstehoek Formation may have very high palaeontological sensitivity.

Although portions of the development area have been disturbed by historical and ongoing agricultural activities, the possibility of encountering previously unidentified fossil material during excavation and other

subsurface construction activities cannot be excluded. The palaeontological assessment therefore recommends implementation of a Fossil Chance Find Procedure during construction.

Should suspected fossil material be encountered, work in the affected area must cease, the find must be protected from further disturbance, and a suitably qualified palaeontologist must be consulted to assess the material and determine the appropriate action. The Fossil Chance Find Procedure is included in the Environmental Management Programme (EMPr) and must be communicated to relevant construction personnel before earthworks commence.

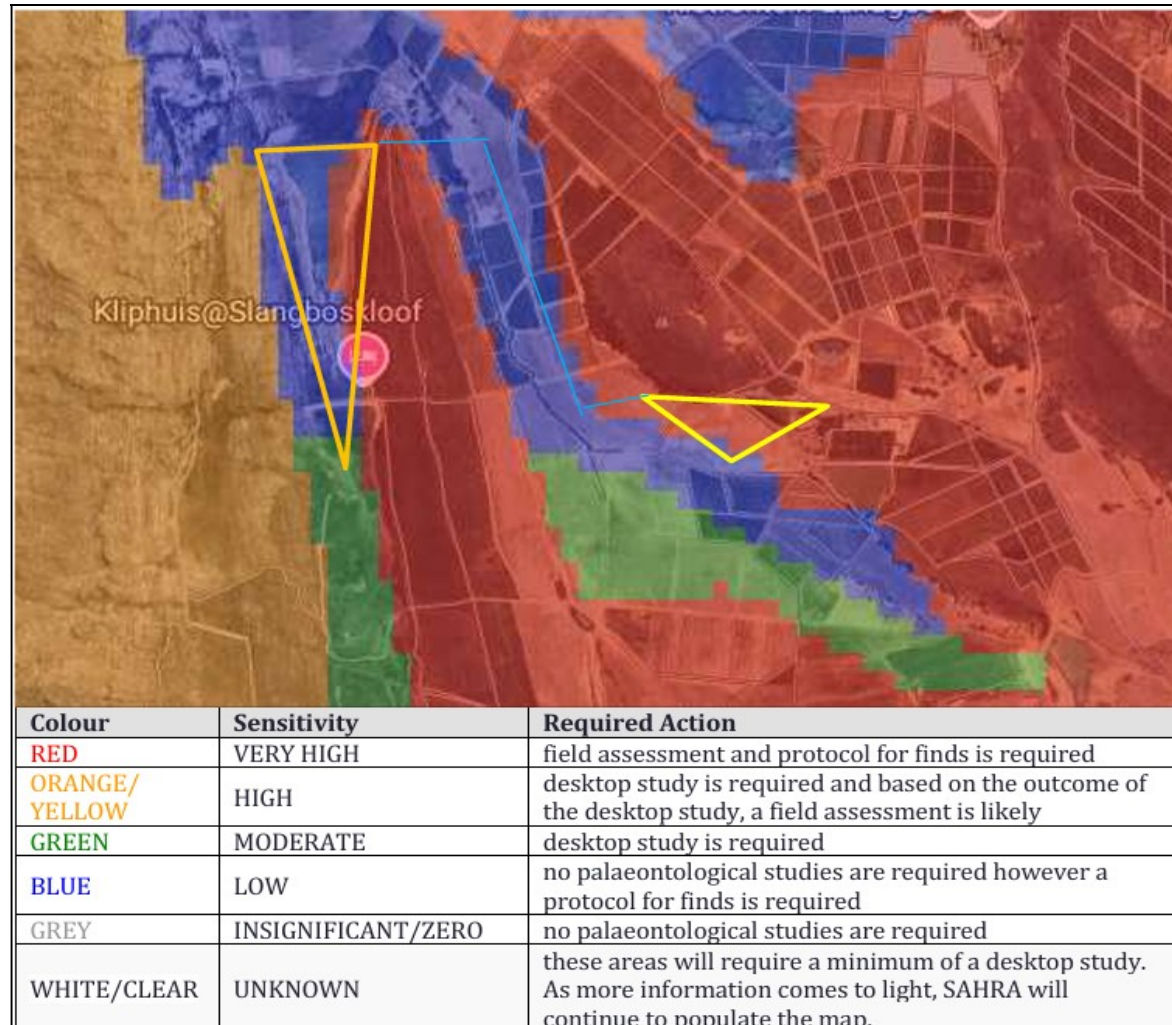


Figure 11: SAHRIS palaeosensitivity map for the site for the two proposed dam sites on Farm Rietfontein 202 shown within the orange (Dam 1) and yellow outlines (Dam 2).

No graves or formal burial grounds were identified within the assessed development footprints. Should graves, unmarked human remains or suspected burial sites be encountered during construction, work in the immediate vicinity must cease, the affected area must be protected, and the relevant heritage authority and a suitably qualified specialist must be notified. No remains or associated material may be disturbed or removed without the necessary investigation and authorisation.

The HIA did not identify any buildings or structures of built heritage significance within the proposed development footprint that would be adversely affected by the proposed works. The broader landscape is characterised by established agricultural activities, existing farm dams, cultivated land, orchards, farm roads, irrigation infrastructure and associated farm buildings.

The proposed development involves the enlargement of an existing agricultural dam and the construction of supplementary water storage and transfer infrastructure within this established farming landscape. The HIA rated the visual impact of the proposed development as Low and concluded that it is not expected to result in a significant adverse impact on the cultural landscape or broader rural character of the area.

The HIA concluded that the proposed Helpmekaar Dam enlargement, supplementary buffer dam and assessed connecting pipeline alignment are not expected to result in significant adverse impacts on the identified heritage resources, subject to the implementation of the recommended chance-find procedures and any applicable requirements issued by HWC. The preferred Green Pipeline Route and alternative Blue Pipeline Route are considered in this EIR and Appendix 9, with the relevant heritage findings informing the assessment of the alternatives where applicable. The relevant heritage management measures have been incorporated into the EMPr.

6. PROCESS TO DATE

This section outlines the Environmental Impact Assessment (EIA) process undertaken to date for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres, Western Cape.

It provides a summary of the activities undertaken during the Scoping and EIA phases, the specialist investigations conducted, the project team involved in the assessment, and the Public Participation Process undertaken in accordance with the Environmental Impact Assessment Regulations, 2014 (as amended).

6.1 TASKS UNDERTAKEN TO DATE

Table 2: Tasks undertaken in the EIA to date.

DATE	TASK
SCOPING PHASE	
18 September 2025 - 23 October 2025	Initial public participation, including newspaper advertisements, posters, letter drops and notification letters to identified Interested and Affected Parties.
28 October 2025	Submit Notice of Intent to WCDEADP.
16 January 2026 - 20 February 2026.	Availability of the Pre-Application Scoping Report for public review and comment.
05 May 2026	Submission of NEMA Application and Draft Scoping Report.
12 May 2026	Acknowledgement of Receipt of the NEMA Application and Draft Scoping Report from WCDEADP.
11 May 2026	Distribution of notifications for the availability of the Post-Application Draft Scoping Report to Registered Interested and Affected Parties, and a 30-day comment period.
12 June 2026	30-day comment period ends.
19 June 2026	Submit Final Scoping Report to WCDEADP.
30 July 2026	Acceptance of Scoping Report and Plan of Study for EIA (Appendix 7A).
ENVIRONMENTAL IMPACT ASSESSMENT REPORT PHASE (THIS PHASE)	
September 2026	Compilation of the Draft Environmental Impact Report, incorporating the completed specialist investigations and the assessment of development alternatives.
September 2026 – October 2026	Proposed public review and comment period for the Draft Environmental Impact Report (this report), including notification of registered I&APs and relevant authorities. The actual commencement and closing dates must be confirmed in the public participation records.

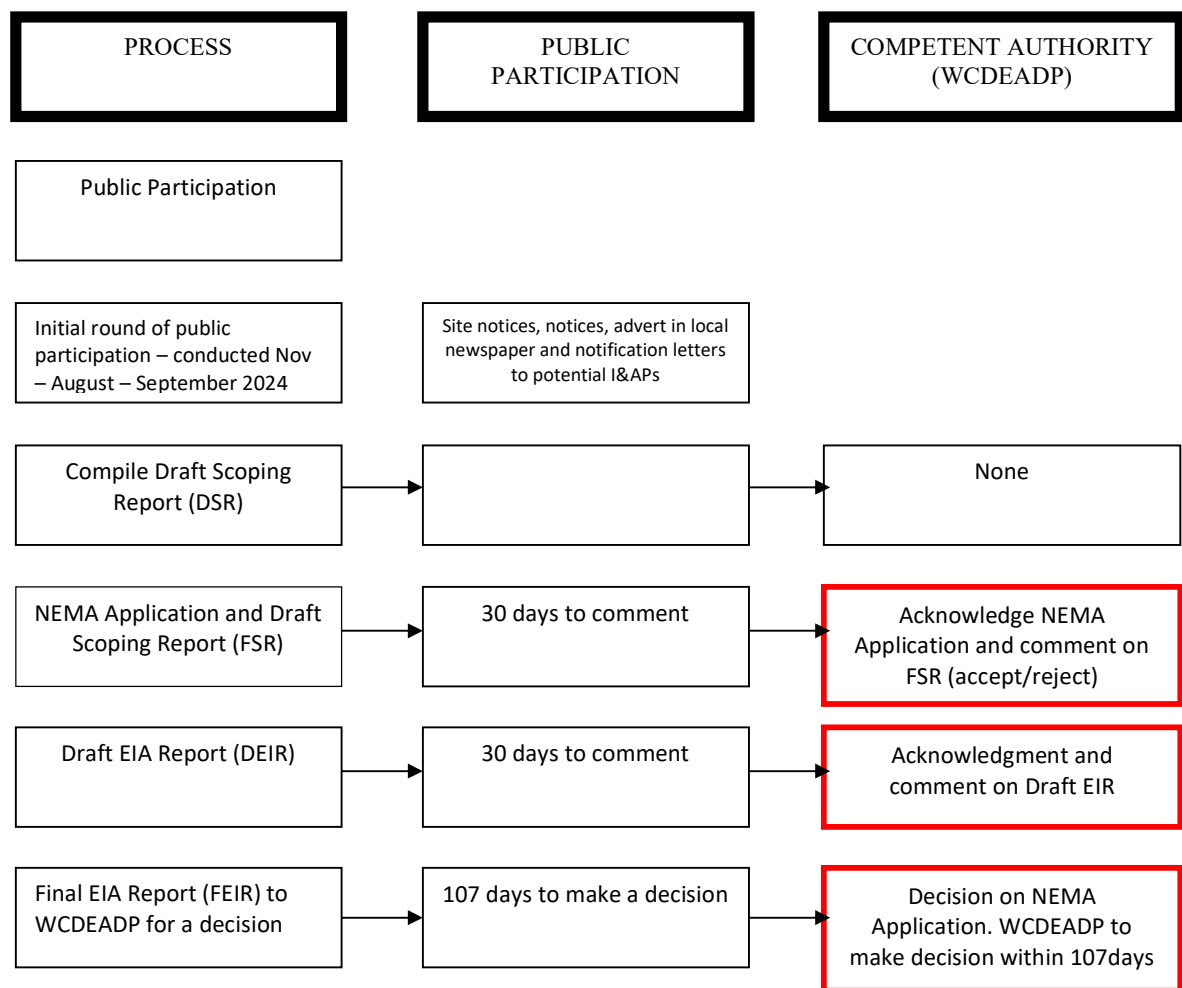


Figure 12. Summary of the EIA process and public participation process. The red indicates the stages where the competent authority will be consulted during the process.

6.2 TASKS TO BE UNDERTAKEN DURING THE EIA PHASE

Following WCDEADP's acceptance of the Final Scoping Report on 30 July 2026, the project proceeded to the Environmental Impact Assessment (EIA) phase. The following tasks form part of this phase:

- Compilation of the Draft Environmental Impact Report (EIR) (this document), incorporating the findings of the completed specialist assessments, the assessment of alternatives and the proposed mitigation measures;
- Compilation of the Draft Environmental Management Programme (EMPr);
- Submission of the Draft EIR and EMPr to WCDEADP and circulation to relevant State Departments and Organs of State for review and comment during the prescribed 30-day comment period;
- Notification of registered Interested and Affected Parties (I&APs) of the availability of the Draft EIR and EMPr, including publication of a newspaper advertisement identifying the public comment period;
- Receipt, consideration and recording of comments submitted by I&APs, commenting authorities and Organs of State;
- Preparation of a Comments and Responses Report (CRR), documenting the comments received and the EAP's responses;
- Revision of the Draft EIR and EMPr, where necessary, to address comments received and any additional information arising during the assessment;

- Inclusion of the specialist reports, relevant correspondence, proof of public participation and other required supporting information in the Final EIR; and
- Submission of the Final EIR, EMPr and associated appendices to WCDEADP for consideration and decision-making.

Registered I&APs, WCDEADP and relevant State Departments and Organs of State will be afforded an opportunity to review and comment on the Draft EIR and EMPr during the prescribed public participation period. In accordance with WCDEADP's acceptance letter, a newspaper advertisement must be placed during the EIA phase to notify the public of the availability of the Draft EIR and the applicable comment period.

Where necessary, further engagement with I&APs, specialists and commenting authorities will be undertaken to clarify or address matters raised during the review period. All comments received will be considered and recorded, together with the EAP's responses, in the CRR. The Draft EIR and EMPr will be revised where necessary before submission of the Final EIR for decision-making.

The Final EIR must also address the specific requirements identified in WCDEADP's acceptance letter, including the submission of the Water Use Licence Application decision during the EIA phase and the inclusion of georeferenced maps and point coordinates for both dam footprints and the connecting pipeline in the Draft EIR. The maps must clearly identify the preferred Green Pipeline Route and the alternative Blue Pipeline Route considered in the EIR and Appendix 9.

WCDEADP's acceptance letter specifies that the Final EIR and EMPr must be submitted for decision within 106 days of 30 July 2026. Where significant changes or significant new information necessitate a revised report, the prescribed additional 50-day period may apply, subject to the notification and further public participation requirements set out in the acceptance letter.

6.3 PROFESSIONAL TEAM

The following professionals are part of the project team.

Table 3: Members of the professional team

DISCIPLINE	SPECIALIST	ORGANISATION
Environmental Assessment Practitioner	Bianca Gilfillan	EnviroAfrica cc
Dam Engineering and Design	Lizbé Bester	Sarel Bester Ingenieurs BK
Water Use Licence Application	Lizbé Bester	Sarel Bester Ingenieurs BK
Terrestrial Biodiversity / Botanical Assessment	Dr David McDonald	Bergwind Botanical Surveys and Tours
Archaeological and Heritage Assessment	Jonathan Kaplan	Agency for Cultural Resource Management (ACRM)
Palaeontological Assessment	Marion Bamford	Palaeontological Specialist
Freshwater Assessment	Dirk van Driel	WATSAN Africa
Hydrological Assessment	Howard Hydrology	Howard Consulting
Ecological Water Requirements / Reserve Determination	Department of Water and Sanitation	Department of Water and Sanitation

The findings and recommendations of the relevant specialist assessments have informed the evaluation of potential impacts, consideration of alternatives and development of mitigation and monitoring measures for inclusion in the Environmental Management Programme (EMPr).

6.4 PUBLIC PARTICIPATION

A Public Participation Process (PPP) has been undertaken for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres. The process has been conducted in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), and the Environmental Impact Assessment Regulations, 2014 (as amended).

Potential Interested and Affected Parties (I&APs) were identified and notified during the Scoping Phase. The stakeholder database includes adjacent landowners, relevant Organs of State, conservation organisations, municipal representatives and other parties who registered an interest in the proposed development. The register of I&APs is included in **Appendix 4D**.

Initial public participation was undertaken from 18 September to 23 October 2025 and included newspaper advertisements, posters, letter drops and notification letters to identified I&APs. The Notice of Intent was submitted to WCDEADP on 28 October 2025.

The Pre-Application Scoping Report was made available for public review from 16 January to 20 February 2026. The NEMA Application and Draft Scoping Report were submitted to WCDEADP on 5 May 2026, and acknowledgement of receipt was issued on 12 May 2026.

Notifications regarding the availability of the Post-Application Draft Scoping Report were distributed to registered I&APs on 11 May 2026. The public comment period closed on 12 June 2026. Comments received during the Scoping Phase were considered in the preparation of the Final Scoping Report.

The Final Scoping Report was submitted to WCDEADP on 19 June 2026. WCDEADP accepted the Final Scoping Report and Plan of Study for EIA on 30 July 2026, subject to the requirements specified in its acceptance letter, included in **Appendix 4H**.

During its review of the Draft Scoping Report, WCDEADP noted that the initial newspaper advertisement and associated comment period had taken place before submission of the Notice of Intent. The Department therefore required a further newspaper advertisement during the EIA phase to notify I&APs of the availability of the Draft Environmental Impact Report (EIR) and the applicable public comment period.

The Draft EIR was compiled during September 2026. The availability of the Draft EIR and Environmental Management Programme (EMPr) was advertised on 24 September 2026, and the reports will be available for public review and comment until 30 October 2026. Registered I&APs, WCDEADP and relevant State Departments and Organs of State will be notified of the availability of the reports and afforded an opportunity to submit comments during this period.

All comments received during the EIA-phase review period will be considered and recorded, together with the EAP's responses, in the Comments and Responses Report (CRR). The Draft EIR and EMPr will be revised where necessary to address the comments received. The CRR and relevant public participation records will be included in the Final EIR submitted to WCDEADP for consideration and decision-making.

The PPP remains ongoing during the EIA phase to provide I&APs and relevant authorities with an opportunity to review the assessment findings and comment on the proposed development before a decision is made.

Table 4: Summary of the public participation process

REGULATION	REQUIREMENT	COMPLIANCE
R41(2)(a)(i)	Site notices and posters	An A2 site notice was placed at the entrance to the farm from the R303. Additional A3 posters were placed at Prince Alfred Public Library, the community notice board at SPAR in Prince Alfred Hamlet, the community notice board at KaapAgri in Op-die-Berg, and the community notice board at SPAR in Op-die-Berg. Please refer to Appendix 4B for proof of posters and site notices.
R41(2)(a)(ii)	Alternative sites	Not applicable. No alternative development site was assessed. Two alternative alignments for the connecting pipeline were, however, considered as part of the assessment of alternatives.
R41(2)(b)(iii)	Notification of ward councillor	Notification letters were distributed to the relevant Ward Councillor within the Witzenberg Local Municipality. Please refer to Appendix 4C for proof of initial notifications.
R41(2)(b)(iv)	Notification of local and district municipalities	Notification letters were distributed to the Cape Winelands District Municipality and Witzenberg Local Municipality. Please refer to Appendix 4C for proof of initial notifications.
R41(2)(b)(v)	Notification of organs of state	Notification letters were distributed to relevant Organs of State, including the Department of Water and Sanitation (DWS), CapeNature, Heritage Western Cape (HWC) and the Department of Agriculture. The Draft EIR and EMPr will also be circulated to relevant State Departments and Organs of State during the EIA phase. Please refer to Appendix 4C for proof of initial notifications, Appendix 4G for the Pre-Application Scoping Report notification letter, and Appendices 4I and 4J for proof of circulation and the notification letter relating to the Draft Scoping Report.
R41(2)(b)(vi)	Notification of adjacent landowners	Notification letters and/or emails were distributed to neighbouring landowners and registered Interested and Affected Parties (I&APs). Registered I&APs will also be notified of the availability of the Draft EIR and EMPr for review and comment. Please refer to Appendix 4C for proof of initial notifications and Appendices 4G, 4I and 4J for subsequent Scoping Phase notifications.
R41(2)(c)(i)	Newspaper advertisement	An advertisement notifying I&APs of the proposed development and initial public participation process was published in the Witzenberg Herald on 19 September 2025. In accordance with WCDEADP's instruction, a further newspaper advertisement is scheduled for publication on 24 September 2026 to notify I&APs of the availability of the Draft EIR and EMPr for public review and comment until 30 October 2026. Please refer to Appendix 4A for the newspaper advertisement and proof of publication. Proof of the EIA-phase advertisement must be added to this appendix following publication.
R42 & R44	Register of Interested and Affected Parties	A register of I&APs was opened and maintained throughout the Public Participation Process and will continue to be updated during the EIA phase. Please refer to Appendix 4D for the I&AP Register and proof of public participation (POP).
R43(1)	Comment period	I&APs were afforded an initial comment period from 18 September to 23 October 2025. The Pre-Application Scoping Report was available for review from 16 January to 20 February 2026, followed by the Post-Application Draft Scoping Report comment period from 11 May to 12 June 2026. The Draft EIR and EMPr will be made available for public review and comment from 24 September to 30 October 2026.
R44	Recording of comments	Comments received from I&APs and commenting authorities during the

	and responses	Scoping Phase were recorded and addressed in the Comments and Responses Report (CRR). Comments received during the Draft EIR review period will also be recorded and addressed, and the CRR will be updated for inclusion in the Final EIR. Please refer to Appendix 4E for the Comments and Responses Report and Appendix 4H for copies of comments received.
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6.4.1 PUBLIC PARTICIPATION UNDERAKEN DURING THE EIA PHASE:

A number of organisations, authorities, landowners and individuals were identified as Interested and Affected Parties (I&APs) during the Public Participation Process undertaken for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres. A register of identified and registered I&APs is included in Appendix 4D.

The Draft Environmental Impact Report (EIR) and Environmental Management Programme (EMPr) will be advertised on 24 September 2026 and made available for public review and comment until 30 October 2026. Registered I&APs will be notified of the availability of the reports by means of notification letters and/or electronic correspondence. Relevant State Departments and Organs of State will also be provided with the reports for review and comment.

A newspaper advertisement will be published during the EIA phase, in accordance with WCDEADP's instruction, to inform the public of the availability of the Draft EIR and EMPr, the review period and the arrangements for submitting comments. Proof of publication will be included in Appendix 4A, while proof of the EIA-phase notifications will be included in the public participation records.

All comments received during the review period will be considered and recorded, together with the EAP's responses, in the Comments and Responses Report (CRR). The Draft EIR and EMPr will be revised, where necessary, to address comments received from I&APs and commenting authorities. The updated CRR, copies of comments received and relevant proof of public participation will be included in the Final EIR. Appendix 4E contains the CRR, and Appendix 4H contains copies of comments received.

The Final EIR and EMPr will thereafter be submitted to the Western Cape Department of Environmental Affairs and Development Planning (WCDEADP) for consideration and decision-making.

6.4.2 INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&APs) were identified and notified throughout the Public Participation Process for the proposed enlargement of Helpmekaar Dam, construction of the supplementary Buffer Dam and installation of the associated connecting pipeline. Notifications were undertaken by means of newspaper advertisements, site notices, posters, notification letters and electronic correspondence.

The Public Participation Process included notification of adjacent landowners, relevant Organs of State, the Witzenberg Local Municipality, the Cape Winelands District Municipality, conservation authorities, the relevant Ward Councillor and other identified stakeholders.

A register of I&APs has been maintained throughout the Scoping Phase and will continue to be updated during the EIA phase. Registered I&APs will be notified of the availability of the Draft Environmental Impact Report (EIR) and Environmental Management Programme (EMPr) for public review and comment from 24 September to 30 October 2026.

The I&AP Register is included in Appendix 4D. Proof of initial notifications is included in **Appendix 4C**, while the relevant Scoping Phase notification letters and proof of circulation are included in **Appendices 4F, 4G, 4I and 4J**.

7. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

7.1 BIODIVERSITY

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline are located within an agricultural landscape near Ceres. Portions of the project area have been modified by historical cultivation, farm roads and associated agricultural activities. However, the broader site also supports remnant indigenous vegetation of conservation importance, and the proposed development will result in the loss or disturbance of natural and modified habitats.

Vegetation mapping and the completed Terrestrial Biodiversity Statement (Appendix 8D) identify Kouebokkeveld Alluvium Fynbos, Kouebokkeveld Shale Fynbos and Winterhoek Sandstone Fynbos within the broader project area. The specialist's ground-truthing identified Kouebokkeveld Alluvium Fynbos and Kouebokkeveld Shale Fynbos as Critically Endangered ecosystem types. Consequently, the biodiversity sensitivity of the site cannot be determined solely from its history of agricultural disturbance.

The proposed enlargement of Helpmekaar Dam will increase its full-supply inundation area to approximately 16.3 ha. The terrestrial biodiversity specialist identified approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos that may be affected by the enlargement of the existing dam. This estimate relates specifically to the Alluvium Fynbos affected by the main dam enlargement and does not represent the total vegetation clearance or disturbance associated with the proposed development.

The supplementary buffer dam will have an inundation area of approximately 2.1 ha. Its construction will result in the permanent inundation of vegetation and habitat within its footprint, while construction of the dam wall and associated infrastructure may cause additional disturbance in adjoining areas. The nature and extent of the affected vegetation are considered with reference to the completed specialist's site-specific findings.

The connecting pipeline will require temporary excavation and construction access along the selected alignment. Two pipeline route alternatives are considered in this EIR and Appendix 9: the preferred Green Route, approximately 1.7 km long, and the alternative Blue Route, approximately 2 km long. Although portions of the routes follow existing farm roads or previously disturbed agricultural land, the presence of disturbed land does not eliminate the potential for impacts on remnant indigenous vegetation or biodiversity priority areas. The assessment of these alternatives draws on the available route information and relevant specialist findings for the broader development area, where applicable to their respective alignments.

Of particular importance is Langrug Ridge to the south-east of the project area, where the terrestrial biodiversity specialist identified Kouebokkeveld Shale Fynbos in good ecological condition. The specialist recommended that this area be treated as Critical Biodiversity Area 1 (CBA1) and that the pipeline be routed along the existing farm road or firebreak to avoid unnecessary disturbance to the natural vegetation on the ridge. The detailed pipeline alignment and construction footprint must therefore be clearly demarcated and managed in accordance with the specialist's recommendations.

Potential biodiversity impacts associated with the proposed development include:

- Permanent loss of indigenous vegetation and associated habitat through dam enlargement, construction and inundation;
- Disturbance of remnant vegetation during pipeline installation and construction of associated infrastructure;
- Impacts on Critically Endangered ecosystem types and biodiversity priority areas;
- Fragmentation of habitat and disturbance of ecological connectivity;
- Introduction or spread of alien invasive plant species within disturbed areas;
- Soil erosion and sedimentation resulting from vegetation clearance, excavation and construction

activities; and

- Cumulative biodiversity impacts arising from further transformation of natural habitat within the surrounding agricultural landscape.

Mitigation must prioritise avoidance of sensitive natural vegetation wherever practicable, particularly the good-condition Kouebokkeveld Shale Fynbos on Langrug Ridge. Construction activities must be restricted to the approved and demarcated development footprint. The selected pipeline alignment should follow existing disturbed corridors, including the farm road or firebreak identified by the terrestrial biodiversity specialist, where this is consistent with the approved design and specialist recommendations.

Additional measures include minimising unnecessary vegetation clearance, preventing construction-related disturbance beyond the approved footprint, controlling alien invasive plants, implementing appropriate erosion and sediment-control measures, and rehabilitating temporarily disturbed areas with suitable indigenous vegetation where feasible. These measures must be incorporated into the Environmental Management Programme (EMPr) and implemented during construction.

The permanent loss of vegetation within the dam inundation areas cannot be reversed through rehabilitation. The assessment of residual biodiversity impacts must therefore distinguish between permanent habitat loss associated with the dams and temporary disturbance associated with pipeline construction and other construction activities.

7.2 FRESHWATER

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline are located within the Leeu River catchment, near Ceres. The existing Helpmekaar Dam is an instream dam situated on a tributary of the Leeu River. The proposed development will interact directly with the freshwater environment through the enlargement of the existing dam, construction of the new Buffer Dam and installation of associated infrastructure.

The Freshwater Impact Assessment undertaken by WATSAN Africa (October 2025) identified freshwater features within the proposed development area that have been modified to varying degrees by historical agricultural activities and existing water infrastructure. The enlargement of Helpmekaar Dam will affect a modified wetland associated with the existing instream dam. The proposed Buffer Dam will affect a separate wetland feature situated within the agricultural landscape. Although the freshwater specialist identified limited existing ecological and resource value within the area affected by the Buffer Dam, its construction will result in the permanent inundation of the affected wetland footprint.

The proposed enlargement of Helpmekaar Dam will increase its storage capacity from approximately 390,000 m³ to 800,000 m³, representing a net increase of approximately 410,000 m³. The supplementary Buffer Dam will provide approximately 27,000 m³ of additional storage. These changes may alter the timing, retention and release of water within the affected drainage system and must be considered in relation to downstream ecological functioning and existing lawful water uses.

The connecting pipeline will link Helpmekaar Dam and the Buffer Dam. Its installation may result in temporary disturbance where the selected alignment intersects or approaches freshwater features. Two pipeline alignments are considered in this EIR and Appendix 9: the preferred Green Pipeline Route and the alternative Blue Pipeline Route. The assessment of these alternatives draws on the relevant specialist findings for the broader development area and the available route information, where applicable to their respective alignments. The selected pipeline alignment, construction methods and any required crossing measures must be consistent with the freshwater specialist's recommendations and the applicable water-use authorisation requirements.

Potential freshwater impacts associated with the proposed development include:

- Permanent inundation and modification of freshwater habitat within the enlarged Helpmekaar Dam and proposed Buffer Dam footprints;
- Changes to local flow patterns, water retention and downstream flow conditions;
- Potential effects on downstream aquatic ecosystems and lawful water users;
- Temporary disturbance of freshwater features during construction of the connecting pipeline and associated infrastructure;
- Soil erosion, sediment mobilisation and increased turbidity during excavation, earthworks and dam construction;
- Potential deterioration of water quality resulting from construction activities, accidental spills and inappropriate management of materials;
- Changes to local runoff and drainage patterns associated with the proposed infrastructure; and
- Cumulative effects of existing and proposed water storage and abstraction within the broader catchment.

The proposed development is also subject to a separate Water Use Licence Application (WULA). The hydrological assessment considers the proposed additional storage and its implications for the upstream dam system and downstream water availability. The protection of downstream lawful water users and any applicable ecological flow requirements is also addressed through the water-use authorisation process. Environmental Authorisation under NEMA does not, on its own, authorise water uses regulated under the National Water Act, 1998 (Act No. 36 of 1998).

In its acceptance of the Final Scoping Report dated 30 July 2026, WCDEADP required that the decision on the Water Use Licence Application submitted to the Breede-Olifants Catchment Management Agency be provided during the EIA phase. The status and outcome of the WULA must therefore be reported to WCDEADP in accordance with the requirements of its acceptance letter.

Recommended freshwater mitigation and management measures include:

- Restricting construction activities to the approved and clearly demarcated development footprints;
- Avoiding unnecessary disturbance to freshwater features and their adjoining vegetation;
- Implementing appropriate erosion, sediment and stormwater management measures during construction;
- Preventing contamination of surface water through suitable storage, handling and disposal of fuels, chemicals, construction materials and waste;
- Rehabilitating temporarily disturbed areas following completion of construction;
- Implementing any applicable water-use authorisation conditions, including requirements relating to abstraction, storage, flow management and monitoring; and
- Monitoring dam operation and downstream conditions where required by the applicable authorisations and approved management measures.

Permanent inundation of freshwater habitat within the dam footprints cannot be reversed through post-construction rehabilitation. The assessment of residual freshwater impacts must therefore distinguish between permanent habitat loss and hydrological modification associated with the dams, and temporary construction-related impacts that may be reduced through mitigation and rehabilitation.

The detailed findings and recommendations of the Freshwater Impact Assessment are included in **Appendix 8C** and have informed the impact assessment and Environmental Management Programme (EMPr).

7.3 AGRICULTURE

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline are located within an established agricultural landscape near Ceres. The surrounding land is used for agricultural production, and the proposed development is intended to improve the storage and management of irrigation water for the existing farming operation.

The proposed enlargement of Helpmekaar Dam will increase its storage capacity from approximately 390,000 m³ to 800,000 m³, providing an additional 410,000 m³ of storage. The supplementary Buffer Dam will provide approximately 27,000 m³ of additional storage and assist with the regulation and distribution of irrigation water. The proposed development is intended to facilitate the conversion of approximately 45 ha of existing annual cropland to permanent fruit orchards, subject to the necessary environmental and water-use authorisations.

The proposed dam enlargement and construction of the Buffer Dam will result in the permanent inundation of land within their respective footprints. The enlargement of Helpmekaar Dam will increase its full-supply inundation area to approximately 16.3 ha, while the Buffer Dam will have an inundation area of approximately 2.1 ha. The agricultural impact assessment distinguishes between land already occupied by the existing Helpmekaar Dam and the additional land that will be inundated as a result of its enlargement.

Construction of the connecting pipeline will result in temporary disturbance along the selected alignment. Two pipeline alignments are considered in this EIR and Appendix 9: the preferred Green Pipeline Route and the alternative Blue Pipeline Route. Where the pipeline traverses cultivated land, construction may temporarily interrupt farming activities, disturb soils and affect access or irrigation infrastructure. Following installation, the pipeline trench and other temporarily disturbed agricultural areas should be reinstated, where practicable, to allow agricultural activities to resume.

Potential agricultural impacts associated with the proposed development include:

- Permanent loss of agricultural land within the additional dam inundation areas and associated infrastructure footprints;
- Temporary loss of access to, or use of, cultivated land during pipeline installation and construction;
- Disturbance, compaction and mixing of agricultural soils during excavation, earthworks and vehicle movement;
- Potential erosion and reduced soil productivity where disturbed areas are not appropriately reinstated;
- Temporary disruption of existing farm roads, irrigation infrastructure and farming operations; and
- Potential benefits to agricultural production arising from increased water storage capacity and improved management of irrigation supply, provided that sufficient water is available and the necessary water uses are authorised, subject to the necessary water-use authorisations.

The proposed development has been designed to support the existing agricultural operation rather than establish a separate farming enterprise. Nevertheless, the permanent loss of land beneath the dam footprints must be considered alongside the intended agricultural benefits of increased water storage. The proposed water uses remain subject to the separate Water Use Licence Application (WULA) process and its outcome.

Recommended agricultural mitigation measures include restricting construction activities to the approved development footprint, using existing farm roads and disturbed areas where practicable, minimising disturbance to cultivated land, and protecting existing irrigation infrastructure and farm access routes. Topsoil should be stripped, stored separately and reinstated where appropriate, while compacted soils and temporarily disturbed agricultural areas should be rehabilitated following construction.

The Environmental Management Programme (EMPr) must include measures to manage construction-related soil disturbance, erosion, access restrictions and the reinstatement of temporarily affected agricultural land. Land permanently inundated by the enlarged Helpmekaar Dam and the Buffer Dam will not be available for subsequent agricultural use, and this permanent land-use change must be taken into account when evaluating the overall agricultural impacts of the proposed development.

7.4 HERITAGE

Potential impacts on heritage resources were identified as an environmental issue associated with the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres.

A Heritage Impact Assessment (HIA) was undertaken by Jonathan Kaplan of the Agency for Cultural Resource Management (ACRM) in January 2026 as part of the environmental assessment process. The heritage assessment was undertaken in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), with Heritage Western Cape (HWC) case reference 25111407. A palaeontological assessment was also undertaken by Marion Bamford to consider the potential impacts of the proposed development on fossil heritage resources.

The archaeological assessment did not identify archaeological resources within the assessed Helpmekaar Dam enlargement footprint or along the pipeline alignment assessed in the HIA. Two isolated Earlier Stone Age flaked stone artefacts were recorded within the proposed Buffer Dam footprint. These artefacts were assessed as having no conservation value, and the heritage specialist did not recommend archaeological mitigation or routine archaeological monitoring in relation to these finds.

No graves or built heritage resources were identified within the assessed development footprint. The HIA assessed the anticipated visual impact of the proposed development as Low.

The palaeontological assessment identified differences in sensitivity between the geological formations underlying the project area. Quaternary fluvial sediments were assessed as having low palaeontological sensitivity, while the Voorstehoek Formation was identified as potentially having very high palaeontological sensitivity. Excavation and earthworks could therefore expose previously unknown fossil material, particularly where construction extends into sensitive geological formations.

Potential heritage impacts associated with the proposed development include:

- Accidental disturbance or destruction of previously unidentified archaeological resources during excavation and earthworks;
- Damage to or loss of fossil material exposed during dam construction, pipeline trenching or other subsurface excavation; and
- Changes to the visual character of the surrounding agricultural landscape associated with the enlarged dam, supplementary Buffer Dam and associated infrastructure.

The heritage assessment did not identify archaeological resources requiring avoidance or mitigation within the assessed development footprints. The preferred Green Pipeline Route and alternative Blue Pipeline Route are considered in this EIR and Appendix 9. The relevant heritage findings inform the assessment of the pipeline alternatives where applicable to their respective alignments.

A Fossil Chance Find Procedure must be incorporated into the Environmental Management Programme (EMPr) and implemented during construction. If suspected fossils, archaeological material or human remains are uncovered, work in the immediate vicinity of the find must cease, the area must be protected from further disturbance, and HWC and an appropriately qualified heritage or palaeontological specialist, as relevant to

the nature of the find, must be notified so that the required course of action can be determined. Suspected human remains must not be disturbed or removed without the necessary investigation and authorisation.

Subject to implementation of the applicable chance-find procedures and any requirements issued by HWC, the heritage findings do not indicate a need for routine archaeological monitoring of the assessed development footprint.

7.5 VISUAL IMPACT

Potential visual and landscape impacts associated with the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline were considered as part of the Environmental Impact Assessment process.

The surrounding landscape is characterised by agricultural land uses, including cultivated fields, orchards, farm roads, irrigation infrastructure and existing farm dams. The proposed development will therefore introduce additional water-storage infrastructure into an established agricultural setting.

The enlargement of Helpmekaar Dam will increase its full-supply inundation area to approximately 16.3 ha, with a proposed dam wall height of approximately 13.9 m and a crest length of approximately 320 m. The supplementary Buffer Dam will have an inundation area of approximately 2.1 ha, a wall height of approximately 5.4 m and a crest length of approximately 392 m. The enlarged water surface, dam walls and associated earthworks will alter the appearance of the immediate landscape.

The connecting pipeline will be installed underground. Its visual impacts are expected to be associated primarily with temporary construction activities, including excavation, soil stockpiles, construction vehicles and disturbance along the selected alignment. The preferred Green Pipeline Route and alternative Blue Pipeline Route are considered in this EIR and Appendix 9. Following installation and rehabilitation, the pipeline is not expected to form a prominent permanent feature in the landscape.

Potential visual impacts associated with the proposed development include:

- Localised changes to the rural and agricultural landscape associated with the enlarged Helpmekaar Dam and new Buffer Dam;
- Visual disturbance during construction, including earthworks, exposed soil, stockpiles and construction equipment;
- Changes to the appearance of the existing dam wall and surrounding land as a result of enlargement and inundation;
- Temporary visual impacts along the connecting pipeline route; and
- Potential changes to the sense of place experienced from nearby agricultural properties and farm access routes.

The Heritage Impact Assessment undertaken by ACRM in January 2026 assessed the visual impact of the proposed development as Low. The proposed infrastructure is agricultural in function and will be situated within a landscape where farming activities and water-storage infrastructure are established features. Nevertheless, the enlargement of the existing dam and construction of the Buffer Dam will result in permanent, localised changes to the landscape.

Recommended mitigation measures include limiting construction disturbance to the approved development footprint, managing soil stockpiles and construction waste, avoiding unnecessary disturbance to surrounding vegetation, and rehabilitating temporarily disturbed areas following construction. Disturbed surfaces associated with the pipeline and other temporary construction areas should be reinstated, where practicable, to reduce their long-term visual prominence.

The anticipated visual impact is assessed as Low, consistent with the findings of the Heritage Impact Assessment. Visual impacts will be managed through the construction and rehabilitation measures included in the Environmental Management Programme (EMPr).

7.6 SAFETY

Potential safety considerations associated with the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline have been identified as part of the environmental assessment and engineering design process.

The proposed enlargement of Helpmekaar Dam will increase its storage capacity from approximately 390,000 m³ to 800,000 m³, with a proposed maximum dam wall height of approximately 13.9 m and a crest length of approximately 320 m. The supplementary Buffer Dam will have a storage capacity of approximately 27,000 m³, a wall height of approximately 5.4 m and a crest length of approximately 392 m. The engineering design of both dams must address the safety implications of their respective dimensions, storage capacities and operating conditions.

Potential safety-related impacts associated with the proposed development include:

- Risks associated with dam wall instability, failure or overtopping;
- Flood management and the adequacy of spillway and overflow arrangements;
- Construction-related risks arising from excavation, earthworks, heavy machinery and work near existing water infrastructure;
- Risks to workers and other persons accessing the construction areas or dam surroundings;
- Risks associated with pipeline installation, testing and operation; and
- Long-term requirements for inspection, maintenance, operational monitoring and emergency preparedness.

The engineering design must provide for appropriate dam wall stability, flood-handling capacity, spillway performance and structural integrity. Construction must be undertaken in accordance with the approved engineering drawings and specifications, under the supervision of appropriately qualified personnel.

Suitable construction-phase safety measures must include controlled access to active work areas, appropriate signage, safe excavation and trenching procedures, management of construction traffic and equipment, and measures to prevent unauthorised access to hazardous areas. The connecting pipeline must be installed and tested in accordance with the applicable engineering specifications before commissioning.

The enlarged Helpmekaar Dam and the proposed Buffer Dam must comply with the applicable dam safety requirements administered by the Department of Water and Sanitation (DWS). Any required dam safety classification, approvals, registration, inspection and operational requirements must be addressed in accordance with the relevant regulatory requirements.

The dams and associated infrastructure must be constructed, operated, inspected and maintained in accordance with the approved engineering design, the applicable provisions of the National Water Act, 1998 (Act No. 36 of 1998), relevant Dam Safety Regulations, and the conditions of any water-use authorisation and dam safety approvals issued by DWS. Applicable dam safety and emergency preparedness measures must also be reflected in the operational management arrangements for the development.

7.7 SOCIO-ECONOMIC IMPACT

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline are intended to support the continued agricultural operations of Sterkwater Boerdery (Pty) Ltd near Ceres.

Construction of the proposed infrastructure is expected to create temporary employment and business opportunities for contractors, construction workers, suppliers and service providers. Where suitable skills and services are available, opportunities may arise for local participation during the construction phase. The number and duration of these opportunities will depend on the final construction programme and the contractor's labour requirements.

The proposed enlargement of Helpmekaar Dam will increase its storage capacity from approximately 390,000 m³ to 800,000 m³, providing an additional 410,000 m³ of storage. The supplementary Buffer Dam will provide approximately 27,000 m³ of additional storage and assist with the management and distribution of irrigation water.

The proposed development is intended to improve irrigation water storage and support the planned conversion of approximately 45 ha of existing annual cropland to permanent fruit orchards. Subject to the necessary environmental and water-use authorisations, the development may support more consistent agricultural production and contribute to the long-term viability of the farming operation.

Potential socio-economic benefits associated with the proposed development include:

- Temporary employment and procurement opportunities during construction;
- Potential ongoing employment associated with the establishment, cultivation and maintenance of the proposed fruit orchards;
- Improved management of irrigation water storage and distribution;
- Support for agricultural production and the continued operation of the farm; and
- Potential additional economic activity for agricultural suppliers, contractors and service providers in the Ceres area.

Potential adverse socio-economic impacts are expected to be associated primarily with the construction phase and may include temporary disruption of farm access and agricultural activities, construction traffic, noise, dust and safety risks. These impacts must be managed through appropriate construction planning and implementation of the Environmental Management Programme (EMPr).

The proposed water uses remain subject to the separate Water Use Licence Application (WULA) process and its outcome. The anticipated agricultural and socio-economic benefits will depend on the implementation of the proposed agricultural activities and compliance with the applicable authorisations.

Overall, the proposed development has the potential to provide positive local socio-economic benefits through temporary construction opportunities and support for continued agricultural production. The extent of longer-term benefits will depend on the implementation of the proposed agricultural activities and the operational requirements of the farming enterprise.

7.8 HYDROLOGICAL AND DOWNSTREAM WATER-USE IMPACTS

The proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline will increase the applicant's on-farm water-storage capacity. The potential effects of the proposed development on water availability, downstream flows and existing water uses were considered in the updated Hydrological Assessment (**Appendix 8B**).

The proposed enlargement will increase the storage capacity of Helpmekaar Dam from approximately 390,000 m³ to 800,000 m³, representing an additional 410,000 m³ of storage. The supplementary Buffer Dam will provide approximately 27,000 m³ of storage and assist with the management and distribution of irrigation water. The proposed infrastructure is intended to improve the storage of winter runoff and support the applicant's agricultural operations, including the planned conversion of approximately 45 ha of annual cropland to permanent fruit orchards.

The Hydrological Assessment considered the proposed enlargement of Helpmekaar Dam within the combined upstream dam system comprising Helpmekaar Dam and Langrug 2 Dam. The modelling indicates that the average annual irrigation supply for the existing irrigation requirements of this system would increase from approximately 1.10 million m³/year to 1.26 million m³/year under the proposed development scenario.

The assessment also considered the implications of the proposed development for the downstream Wydekloof Dam. The modelled average annual spill to Wydekloof Dam decreases from approximately 3.31 million m³/year to 3.17 million m³/year, a reduction of approximately 0.14 million m³/year. The Hydrological Assessment indicates that the modelled irrigation supply to Wydekloof Dam remains unchanged under the proposed development scenario.

Potential hydrological and downstream water-use impacts associated with the proposed development include:

- Changes in the timing and volume of water retained within the enlarged Helpmekaar Dam and the supplementary Buffer Dam;
- Changes in the volume and timing of water passing downstream of the proposed storage infrastructure;
- Potential effects on downstream aquatic ecosystems and existing lawful water users;
- Changes in the management and distribution of irrigation water within the applicant's farming operation; and
- Cumulative effects associated with existing and proposed water storage and abstraction within the catchment.

The Hydrological Assessment considered the gazetted Ecological Water Requirements (EWR) in its assessment of the proposed development. The freshwater and hydrological findings must be read together when considering potential effects on downstream ecological functioning, flow conditions and water users.

The proposed development is subject to a separate Water Use Licence Application (WULA) process. The applicable water-use authorisation will determine the conditions governing the authorised storage and use of water, including any requirements relating to flow management, monitoring and the protection of downstream water users. Environmental Authorisation under the National Environmental Management Act, 1998 (Act No. 107 of 1998), does not itself authorise water uses regulated under the National Water Act, 1998 (Act No. 36 of 1998).

Hydrological mitigation and management measures must include operating the dams in accordance with the applicable water-use authorisation, implementing any prescribed flow-management and monitoring requirements, and maintaining the associated water-transfer infrastructure to prevent avoidable losses or operational failures. The relevant operational requirements must be incorporated into the Environmental Management Programme (EMPr), where applicable.

The detailed hydrological findings are presented in **Appendix 8B** and inform the assessment of the proposed development's effects on water storage, downstream flows and existing water uses.

7.9 OTHER ISSUES IDENTIFIED

In addition to the specialist themes assessed as part of the Environmental Impact Assessment process, several broader environmental, operational and planning considerations were identified in relation to the proposed enlargement of Helpmekaar Dam, construction of the supplementary Buffer Dam and installation of the associated connecting pipeline. These include:

- Cumulative impacts associated with existing and proposed water abstraction, water storage and hydrological functioning within the Leeu River catchment;
- Protection of downstream ecological functioning and the interests of lawful downstream water users;
- Management of the proposed additional water storage and irrigation use in accordance with the outcome and conditions of the separate Water Use Licence Application (WULA);
- Implementation of any applicable ecological flow requirements, abstraction limits and operational controls specified in the water-use authorisation;
- Climate variability, prolonged drought conditions and the implications for long-term agricultural water security;
- Dam safety, flood management, operational procedures and long-term inspection and maintenance of the enlarged Helpmekaar Dam and supplementary Buffer Dam;
- Compatibility of the proposed infrastructure with the surrounding agricultural landscape and existing farming activities;
- Construction-related soil disturbance, erosion, sedimentation, stormwater management and rehabilitation of temporarily disturbed areas;
- Avoidance of unnecessary disturbance to remnant indigenous vegetation and freshwater features, particularly along the selected pipeline alignment;
- Compliance with applicable environmental, water-resource, dam safety and heritage legislation; and
- Cumulative impacts associated with existing water-storage infrastructure and agricultural development within the broader catchment.

These matters have informed the engineering design, specialist investigations, consideration of alternatives, assessment of potential impacts and development of mitigation and monitoring measures for inclusion in the Environmental Management Programme (EMPr).

The proposed water uses remain subject to the separate WULA process and any applicable conditions imposed by the relevant water authority. Environmental Authorisation under NEMA does not, on its own, authorise water uses regulated under the National Water Act, 1998 (Act No. 36 of 1998).

The development must be undertaken in accordance with any Environmental Authorisation issued by WCDEADP, the applicable water-use authorisation, relevant dam safety requirements and the approved EMPr. Compliance with these requirements will be necessary during construction and operation to manage environmental impacts and protect downstream ecological functioning and lawful water users.

8. SPECIALIST STUDIES

As a result of the environmental issues and potential impacts identified during the Scoping and Environmental Impact Assessment process, specialist studies were undertaken to assess the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres.

The following completed specialist studies and compliance statements form part of the Environmental Impact Assessment process:

- Hydrological Assessment (Appendix 8B): Assessment of the proposed increase in water-storage capacity, the operation of the upstream dam system and the potential implications for downstream flows and existing water uses.
- Freshwater Impact Assessment (Appendix 8C): Assessment of the freshwater features affected by the enlargement of Helpmekaar Dam, construction of the Buffer Dam and associated infrastructure, including potential impacts on freshwater habitat and ecological functioning.
- Terrestrial Biodiversity Statement (Appendix 8D): Assessment of terrestrial biodiversity, including botanical, plant-species and animal-species considerations, the vegetation types and conservation status of affected areas, and potential impacts associated with the proposed dam footprints and connecting pipeline.
- Agricultural Compliance Statement (Appendix 8E): Assessment of the agricultural sensitivity of the proposed development footprint and the potential effects of the dams and connecting pipeline on existing agricultural land and farming activities.
- Heritage Impact Assessment: Assessment of potential impacts on archaeological resources, built heritage, the cultural landscape and other heritage resources within the assessed development footprint.
- Palaeontological Assessment: Assessment of the palaeontological sensitivity of the affected geological formations and the potential disturbance of fossil heritage resources during construction.

The findings and recommendations of these specialist studies have informed the assessment of development alternatives, identification and evaluation of potential environmental impacts, refinement of the proposed development layout, and formulation of mitigation and monitoring measures for inclusion in the Environmental Management Programme (EMPr).

Particular consideration has been given to the permanent inundation associated with the enlargement of Helpmekaar Dam and construction of the Buffer Dam, the sensitivity of affected freshwater features and remnant indigenous vegetation, the potential loss of agricultural land within the development footprints, the hydrological implications of increased water storage for downstream flows and existing water uses, and disturbance associated with installation of the connecting pipeline.

The preferred Green Pipeline Route and alternative Blue Pipeline Route are considered in this EIR and Appendix 9. The assessment of these alternatives draws on the relevant specialist findings for the broader development area and the available route information, where applicable to their respective alignments.

The findings and recommendations of the specialist studies have been incorporated into this Environmental Impact Report (EIR) and the accompanying EMPr. The relevant specialist reports and compliance statements are included in the appendices to this EIR.

8.1 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS

The impacts of the proposed activity on the various components of the receiving environment were evaluated by the respective specialists in terms of:

- nature of the impact;

- duration (time scale);
- extent (spatial scale);
- magnitude or intensity;
- probability of occurrence; and
- significance.

Impacts were assessed as either positive or negative and considered for both the construction and operational phases of the proposed development, including cumulative impacts where relevant.

The determination of impact significance represents a professional judgement by the respective specialist and is generally based on a combination of the above assessment criteria, together with consideration of mitigation measures and the sensitivity of the receiving environment.

Each specialist applied an assessment methodology appropriate to their discipline, as described in the relevant specialist reports appended to this Environmental Impact Report.

8.2 BRIEFS FOR SPECIALIST STUDIES

8.2.1 Terrestrial Biodiversity

Dr PJJ Botes was appointed to undertake the Terrestrial Biodiversity Statement (Appendix 8D) for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres. The completed statement addresses terrestrial biodiversity, including botanical, plant-species and animal-species considerations.

The terms of reference for the assessment included the following:

- Provide a baseline description of the vegetation occurring within the study area and place it within its regional and biogeographical context;
- Identify and describe the vegetation types and communities within the proposed dam footprints and broader pipeline development area, including their conservation status and ecological sensitivity;
- Identify threatened ecosystems, Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Species of Conservation Concern and other areas of elevated ecological sensitivity that may be affected by the proposed development;
- Assess the ecological condition of the affected areas, taking into account historical agricultural disturbance, existing infrastructure and remaining areas of indigenous vegetation;
- Identify, describe and assess the potential impacts of the enlargement of Helpmekaar Dam, construction of the Buffer Dam and installation of the connecting pipeline on terrestrial biodiversity, including relevant plant- and animal-species considerations;
- Consider the potential permanent loss of indigenous vegetation within the proposed inundation areas, as well as temporary and permanent disturbance associated with construction activities;
- Assess the significance of identified impacts before and after the implementation of mitigation measures;
- Provide recommendations to inform the selection and refinement of the connecting pipeline alignment, with particular consideration of sensitive indigenous vegetation and opportunities to use existing disturbed areas;
- Recommend measures to avoid, minimise and, where appropriate, rehabilitate biodiversity impacts; and
- Provide recommendations for incorporation into the Environmental Management Programme (EMPr) and the site sensitivity verification process.

The preferred Green Pipeline Route and alternative Blue Pipeline Route are considered in this EIR and Appendix 9. The relevant findings of the Terrestrial Biodiversity Statement inform the assessment of these alternatives where applicable to their respective alignments.

The specialist findings and recommendations have informed the assessment of terrestrial biodiversity impacts, consideration of development alternatives and identification of mitigation and rehabilitation measures for the proposed Helpmekaar development.

8.2.2 Freshwater Assessment

Dr Dirk van Driel of WATSAN Africa was appointed to undertake the Freshwater Impact Assessment (**Appendix 8C**) for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres.

The terms of reference for the Freshwater Impact Assessment included the following:

- Identify and delineate the watercourses, wetlands and other freshwater features potentially affected by the proposed development;
- Describe the characteristics, ecological condition and sensitivity of the freshwater features within the study area;
- Assess the potential impacts of the enlargement of Helpmekaar Dam on the affected freshwater habitat, including the implications of the proposed increase in the inundation area;
- Assess the potential impacts of the proposed Buffer Dam, including the permanent inundation of the freshwater feature within its footprint;
- Assess potential impacts associated with installation of the connecting pipeline, including disturbance to freshwater features where relevant;
- Consider potential changes to freshwater habitat and ecological functioning associated with construction and operation of the proposed infrastructure;
- Assess the significance of identified freshwater impacts before and after the implementation of mitigation measures;
- Recommend measures to avoid or minimise freshwater impacts, including appropriate construction methods, erosion and sediment control, and rehabilitation of temporarily disturbed areas; and
- Provide specialist recommendations for incorporation into the Environmental Impact Report (EIR) and Environmental Management Programme (EMPr).

The findings of the Freshwater Impact Assessment have informed the evaluation of impacts on the freshwater features affected by the proposed enlargement of Helpmekaar Dam, construction of the Buffer Dam and associated infrastructure. The specialist's mitigation and management recommendations have been incorporated into the impact assessment and EMPr.

8.2.3 Hydrological Assessment

A Hydrological Assessment, titled Investigation into Availability of Surplus Water in the Leeu Catchment, was undertaken to assess the water availability and hydrological implications of the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam) on Portion 5 of Farm Rietrivier No. 202, near Ceres. The specialist report is attached as **Appendix 8B**.

The scope of the Hydrological Assessment included the following:

- Identify the relevant catchment characteristics, hydrological monitoring points and Environmental Water Requirements (EWR) applicable to the Leeu River catchment;

- Analyse observed river flows and modelled runoff to determine the availability of surplus water within the catchment;
- Consider the applicable EWR during normal and drought conditions;
- Assess whether sufficient runoff is available to support the proposed increase in Helpmekaar Dam's storage capacity from approximately 390,000 m³ to 800,000 m³;
- Model the operation of the relevant upstream dams under existing and proposed storage conditions;
- Assess the implications of the proposed enlargement for the reliability of supply to existing irrigation activities;
- Evaluate potential changes in downstream flows and the operation of Wydekloof Dam; and
- Provide hydrological findings to inform the Environmental Impact Assessment and the separate Water Use Licence Application process.

The Hydrological Assessment concluded that surplus water is available within the Leeu River catchment and that the proposed enlargement of Helpmekaar Dam would improve its ability to supply existing irrigation requirements. The modelling of the combined upstream Helpmekaar Dam and Langrug 2 Dam system indicated an increase in average annual irrigation supply from approximately 1.10 million m³/year to 1.26 million m³/year.

The modelling also indicated a reduction in average annual spill to downstream Wydekloof Dam from approximately 3.31 million m³/year to 3.17 million m³/year, while its modelled irrigation supply remained unchanged. The report concluded that the proposed enlargement would have a limited effect on the hydrology of the Leeu River catchment.

The findings of the Hydrological Assessment have informed the evaluation of water-storage and downstream flow impacts in this EIR. The proposed water uses remain subject to the outcome of the separate WULA process and the conditions of any authorisation issued by the relevant water authority.

8.2.4 Agricultural Compliance Statement

An Agricultural Compliance Statement was prepared for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres.

The scope of the Agricultural Compliance Statement included the following:

- Describe the existing agricultural land uses and farming activities within the study area;
- Consider the agricultural sensitivity of the areas affected by the proposed dam footprints and connecting pipeline;
- Identify the agricultural land that would be permanently occupied or inundated by the proposed infrastructure;
- Consider the potential temporary disturbance of agricultural land and farming activities during construction, including disturbance associated with pipeline installation;
- Assess the implications of the proposed development for the continued agricultural use of the property;
- Consider opportunities to minimise the loss of productive agricultural land and disturbance to existing farming operations; and
- Provide recommendations for the rehabilitation of temporarily disturbed agricultural areas and for incorporation into the Environmental Management Programme (EMPr).

The Agricultural Compliance Statement informs the assessment of potential impacts on agricultural land and existing farming activities. Its findings and recommendations have been considered in the evaluation of the proposed development and the formulation of appropriate mitigation and rehabilitation measures.

8.2.5 Heritage Assessment

Jonathan Kaplan of the Agency for Cultural Resource Management (ACRM) was appointed to undertake the Heritage Impact Assessment for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres.

The Heritage Impact Assessment was undertaken as part of the Environmental Impact Assessment process in accordance with the applicable provisions of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). The Heritage Western Cape (HWC) case number for the proposed development is 25111407.

The terms of reference for the Heritage Impact Assessment included the following:

- Conduct a field assessment of the proposed development footprint and identify archaeological, built heritage and other cultural heritage resources that may be affected;
- Assess the heritage significance of any identified resources in accordance with the NHRA;
- Assess potential impacts associated with the enlargement of Helpmekaar Dam, construction of the Buffer Dam and installation of the assessed connecting pipeline alignment;
- Consider the potential visual and cultural landscape implications of the proposed development;
- Recommend appropriate mitigation and management measures where required; and
- Provide specialist findings and recommendations for incorporation into the Environmental Impact Report (EIR) and Environmental Management Programme (EMPr).

The Heritage Impact Assessment identified two isolated Earlier Stone Age flaked stone artefacts within the proposed Buffer Dam footprint. The specialist considered these artefacts to be of no conservation significance. No archaeological resources were identified within the assessed Helpmekaar Dam enlargement footprint or along the assessed pipeline alignment, and no graves or built heritage resources were identified within the assessed development footprint.

The specialist assessed the visual impact of the proposed development as Low and did not recommend routine archaeological mitigation or monitoring for the assessed footprint.

The heritage findings have been incorporated into this EIR and have informed the assessment of potential heritage impacts and the preparation of the EMPr. A heritage chance-finds procedure will be implemented should previously unidentified heritage resources be encountered during construction.

9. ENVIRONMENTAL IMPACT ASSESSMENT, SIGNIFICANCE AND MITIGATION METHODOLOGY

The following impact assessment methodology was applied by EnviroAfrica cc to assess the actual and potential environmental impacts associated with the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres.

The methodology provides a consistent framework for evaluating the significance of identified impacts before and after the implementation of recommended mitigation measures.

Positive impacts are identified and discussed qualitatively within the Environmental Impact Assessment; however, the formal significance rating system focuses primarily on negative environmental impacts and environmental risks requiring mitigation and management.

Environmental activities and associated impacts were identified based on:

- the different phases of the proposed development;
- the nature of the proposed activities; and
- the potential environmental consequences associated with these activities.

For each identified environmental aspect or activity, potential impacts were assessed according to the following criteria:

- Probability (Likelihood);
- Extent (Spatial Scale);
- Duration (Temporal Scale);
- Magnitude or Intensity (Severity); and
- Consequence to the Receiving Environment.

Each impact was assigned a rating for the above criteria. The combined ratings were then used to determine the overall significance of the impact.

Impact significance was assessed both:

- before mitigation (baseline or worst-case scenario); and
- after mitigation (residual impact significance).

The pre-mitigation significance rating reflects the likely impact under a worst-case scenario, assuming that no mitigation measures are implemented. The post-mitigation significance rating reflects the anticipated residual impact significance following the implementation of recommended mitigation and management measures.

The significance ratings were then categorised according to a standard significance scale, indicating:

- Low significance;
- Medium significance; or
- High significance.

The impact assessment methodology applied in this Environmental Impact Report allows for a comparative assessment of impacts associated with the proposed development and identified alternatives and provides a consistent framework for evaluating environmental risks and the effectiveness of mitigation measures. assessment.

Table 5: Impact Assessment Methodology						
SIGNIFICANCE CRITERIA	Very High	High	Medium	Low	Negligible (very-low)	Score
Value	16	8	4	2	1	
Probability (likelihood) (P)	Definite. Impact will definitely occur.	Highly probable. Very likely for impact to occur.	Probable. Impact may likely occur.	Improbable. Impact may occur. Distinct Possibility	Improbable. Low likelihood/unlikely for impact to occur.	
Extent (E)	Impact potentially reaches beyond national boundaries	Impact has definite provincial/potential national consequences	Impact confined to regional area/ town	Impact confined to local region and impact on neighbouring properties	Impact confined to project property / site	
Duration (D)	Permanent The impact is expected to have a permanent impact, with very little to no rehabilitation possible	Long-Term The impact is expected to last for a long time after construction with rehabilitation expected to be 15-50 years. Impact is reversible but only with long-term mitigation	Medium-term The impact is expected to last for some time after construction with rehabilitation expected to be 5 - 15 years. Impact is reversible but only with on-going mitigation	Short-term The impact is expected to last for a relatively short time with rehabilitation expected to be 2-5 years. The impact is reversible through natural process and/or some mitigation.	Very short/ temporary The impact is expected to be temporary and last for a very short time with rehabilitation expected to be less than 2 years. The impact is easily reversible through natural process and/or some mitigation.	
Magnitude (Intensity/ Severity) (M)	It is expected that the activity will have a very severe to permanent impact on the surrounding environment. Functioning irreversibly impaired. Rehabilitation often impossible or unfeasible	It is expected that the activity will have a severe impact on the surrounding environment. Functioning may be severely impaired and may be temporarily cease. Rehabilitation will be needed to restore system integrity	It is expected that the activity will have an impact on the surrounding environment, but it will maintain its function, even if moderately modified (overall integrity not compromised). Rehabilitation easily achieved	It is expected that the activity will have a perceptible impact on the surrounding environment, but it will maintain its function, even if slightly modified (overall integrity not compromised). Rehabilitation easily achieved	It is expected that the impact will have little or no effect on the integrity of the surrounding environment	
Receiving environment (Consequence): (RE)	Very sensitive, pristine area – protected site or species permanently or seasonally present	Unused area containing only indigenous fauna / flora species	Unused area containing indigenous and alien fauna / flora species	Semi-disturbed area already rehabilitated / recovered from prior impact, or with moderate alien vegetation	Disturbed area/ transformed/ heavy alien vegetation	
FINAL RATING (average score)						

ENVIRONMENTAL RATING SIGNIFICANCE KEY:

Negative Impacts

SIGNIFICANCE	RATING	Final rating score / value range
Very Significant	Very High	-11 to -16
Significant	High	-7 to <-11
Increasing Significance	Medium	-4 to <-7
Insignificant	Low	-2 to <-4
	Very Low	-1 to <-2

ENVIRONMENTAL SIGNIFICANCE RISK RATING

Please refer to **Appendix 9** for the Environmental Impact Risk Rating Matrix applied during the assessment process. The matrix was used to identify and evaluate the potential impacts of the proposed development on the receiving environment, based on desktop investigations, specialist input and site-specific information.

In addition to the assessment of identified impacts against the various significance criteria, the effectiveness of mitigation measures was also considered where applicable. In such instances, impacts were assessed both before and after mitigation to determine the anticipated residual impact significance following implementation of recommended management measures.

Mitigation measures and recommendations provided by the appointed specialists have been incorporated into the impact assessment and Environmental Management Programme (EMPr).

A more detailed assessment of the identified impacts, including specialist findings and recommended mitigation measures, is provided in Section 10 of this Environmental Impact Report.

10. ASSESSMENT OF ENVIRONMENTAL IMPACTS

The specialist studies detailed in Section 8 were undertaken to assess the potential environmental impacts associated with the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline, and to determine the significance of these impacts before and after mitigation.

The findings and recommendations of the specialist studies have informed the impact assessment contained in this Environmental Impact Report (EIR). Full copies of the specialist reports are included in **Appendix 8**.

The following specialist studies were undertaken:

- Terrestrial Biodiversity Statement, including botanical, plant-species and animal-species considerations;
- Freshwater Impact Assessment;
- Agricultural Compliance Statement;
- Hydrological Assessment, including consideration of water availability, Environmental Water Requirements and potential downstream impacts;
- Heritage Impact Assessment; and
- Palaeontological Impact Assessment.

The sections below provide a summary of the key findings, identified impacts, significance ratings and recommended mitigation measures associated with each specialist discipline undertaken:

10.1 Terrestrial Biodiversity Statement

The Terrestrial Biodiversity Statement was prepared by PJJ Botes for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres. The completed statement addresses terrestrial biodiversity, including botanical, plant-species and animal-species considerations. Please refer to Appendix 8D for the full specialist report.

10.1.1 Key findings

The Terrestrial Biodiversity Statement identified Kouebokkeveld Alluvium Fynbos, Kouebokkeveld Shale Fynbos and Winterhoek Sandstone Fynbos within the broader Helpmekaar study area. The specialist's site verification identified Kouebokkeveld Alluvium Fynbos and Kouebokkeveld Shale Fynbos as Critically Endangered ecosystems. The conservation significance and ecological condition of the vegetation must therefore be considered in relation to the specific development components and their respective footprints.

The study area comprises a combination of existing agricultural land, previously disturbed areas and remnant indigenous vegetation. Although portions of the proposed development area have been affected by historical agricultural activities and existing infrastructure, the entire development footprint cannot be regarded as transformed or of low ecological sensitivity. The terrestrial biodiversity sensitivity of the affected areas differs between the proposed dam footprints and the connecting pipeline alignment.

The terrestrial biodiversity sensitivity map below illustrates the proposed development components in relation to the remaining sensitive vegetation. It identifies the mapped areas of Kouebokkeveld Alluvium

Fynbos and Kouebokkeveld Shale Fynbos, as well as the CBA1 area associated with Kouebokkeveld Shale Fynbos on Langrug Ridge.

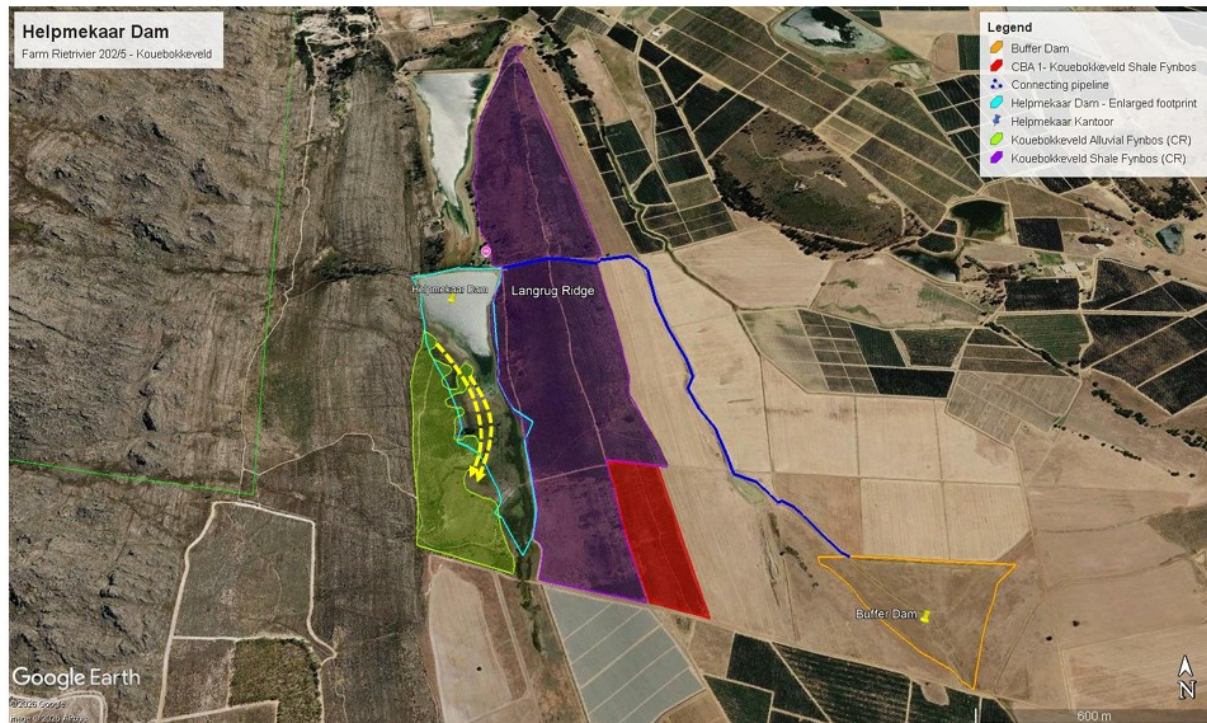


Figure 13: Terrestrial biodiversity sensitivity map showing the proposed enlarged Helpmekaar Dam footprint (light blue), supplementary Buffer Dam (orange) and connecting pipeline (dark blue) in relation to the remaining Kouebokkeveld Alluvium Fynbos (green), Kouebokkeveld Shale Fynbos (purple and red) and the CBA1 area on Langrug Ridge. Source: Terrestrial Biodiversity Statement, PJJ Botes (Appendix 8D).

The principal terrestrial biodiversity findings relevant to the proposed development are summarised below.

Helpmekaar Dam enlargement

The proposed increase in the inundation area of Helpmekaar Dam will result in the permanent loss of vegetation within the additional inundation footprint. Approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos may be affected by the enlargement of Helpmekaar Dam. This estimate relates specifically to the main dam enlargement and does not represent the total vegetation impact of the proposed development.

Supplementary Buffer Dam

The proposed Buffer Dam will result in permanent inundation within its footprint. Its potential terrestrial biodiversity impacts are considered separately from those associated with the enlargement of Helpmekaar Dam, taking into account the vegetation and existing land use within the Buffer Dam footprint.

Connecting pipeline

Installation of the connecting pipeline may result in vegetation disturbance along the selected alignment.

Two pipeline alignments are considered in this EIR and Appendix 9: the preferred Green Pipeline Route and the alternative Blue Pipeline Route. The terrestrial biodiversity sensitivity map identifies remnant indigenous vegetation in the vicinity of the pipeline route, particularly near Langrug Ridge. The specialist recommends that the pipeline follow the existing farm road or firebreak, where feasible, to avoid or minimise additional disturbance to sensitive indigenous vegetation.

Langrug Ridge and biodiversity sensitivity

The south-eastern portion of Langrug Ridge supports Kouebokkeveld Shale Fynbos in good ecological condition. The specialist recommends that this area be treated as Critical Biodiversity Area 1 (CBA1) for the purposes of assessing and managing the proposed development. The pipeline alignment and associated construction activities must therefore be planned to avoid unnecessary disturbance to this vegetation.

Overall terrestrial biodiversity findings

The Terrestrial Biodiversity Statement distinguishes between historically disturbed agricultural areas and remnant vegetation of conservation importance. Although existing disturbance is relevant when assessing ecological condition, it does not remove the potential significance of permanent vegetation loss within the dam footprints or additional disturbance to sensitive vegetation along the connecting pipeline.

The findings and recommendations of the Terrestrial Biodiversity Statement have informed the consideration of development alternatives, the assessment of terrestrial biodiversity impacts and the identification of measures to avoid, minimise and rehabilitate vegetation disturbance. The recommended pipeline alignment refinements, construction controls and rehabilitation measures must be incorporated into the Environmental Management Programme (EMPr).

10.1.2 Impact Assessment

According to the Terrestrial Biodiversity Statement (Appendix 8D), the principal terrestrial biodiversity impacts associated with the proposed Helpmekaar development relate to the permanent inundation of vegetation resulting from the enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam) and construction of the supplementary Buffer Dam, as well as vegetation disturbance associated with installation of the connecting pipeline.

The terrestrial biodiversity impacts differ across the development footprint. Although portions of the site comprise existing agricultural land and historically disturbed areas, remnant indigenous vegetation of conservation importance occurs within and adjacent to the proposed development components. The assessment therefore considers the impacts on each component separately.

Enlargement of Helpmekaar Dam

The proposed enlargement of Helpmekaar Dam will result in the permanent inundation and loss of vegetation within the additional dam basin. Approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos, identified as a Critically Endangered ecosystem, may be affected by the enlargement. This represents a permanent terrestrial biodiversity impact that cannot be reversed through rehabilitation once the enlarged dam is operational.

Construction of the supplementary Buffer Dam

Construction of the Buffer Dam will result in vegetation clearance and permanent inundation within its footprint. The terrestrial biodiversity impacts associated with this component must be assessed in relation to the vegetation and ecological condition of the affected area and must not be combined with the estimated loss of Kouebokkeveld Alluvium Fynbos associated specifically with the enlargement of Helpmekaar Dam.

Installation of the connecting pipeline

Installation of the connecting pipeline may result in temporary or permanent disturbance to indigenous vegetation along the selected alignment. Two pipeline alignments are considered in this EIR and Appendix 9: the preferred Green Pipeline Route and the alternative Blue Pipeline Route. Particular consideration is required where the pipeline approaches Langrug Ridge, which supports Kouebokkeveld Shale Fynbos in good ecological condition.

The specialist recommends that the pipeline follow the existing farm road or firebreak, where feasible, to avoid or minimise disturbance to sensitive indigenous vegetation. Construction activities, including trenching, temporary stockpiling and vehicle movement, must remain within the approved working area.

Cumulative terrestrial biodiversity impacts

The proposed development must also be considered in the context of historical agricultural transformation and the remaining extent of indigenous vegetation within the broader landscape. Further loss or fragmentation of remnant vegetation may contribute to cumulative impacts on Critically Endangered ecosystems, particularly where disturbance extends beyond the approved development footprints.

Recommended mitigation measures

The following measures must be implemented to avoid or minimise terrestrial biodiversity impacts:

- Restrict vegetation clearance, earthworks, vehicle movement and material stockpiling to the approved development and construction footprints;
- Clearly demarcate sensitive indigenous vegetation and no-go areas before construction commences;
- Align the connecting pipeline along the existing farm road or firebreak, where feasible, in accordance with the terrestrial biodiversity specialist's recommendations;
- Avoid unnecessary disturbance to the Kouebokkeveld Shale Fynbos on Langrug Ridge and other remnant indigenous vegetation outside the approved footprints;
- Minimise the width of the pipeline construction corridor and rehabilitate temporarily disturbed areas following installation;
- Implement appropriate erosion, sediment and stormwater management measures during construction;
- Control alien invasive vegetation within disturbed areas and prevent its spread during construction and rehabilitation; and
- Incorporate the Terrestrial Biodiversity Statement's site-specific mitigation, rehabilitation and monitoring requirements into the Environmental Management Programme (EMPr).

No-Go Alternative

Under the No-Go Alternative, Helpmekaar Dam would not be enlarged, the supplementary Buffer Dam would not be constructed and the connecting pipeline would not be installed. The permanent vegetation loss and construction-related terrestrial biodiversity disturbance associated with the proposed development would therefore be avoided. Existing agricultural activities and their associated effects on the receiving environment would continue.

Overall impact significance

The terrestrial biodiversity impacts must be evaluated separately for the enlargement of Helpmekaar Dam, construction of the Buffer Dam and installation of the connecting pipeline, taking into account the conservation status and ecological condition of the vegetation affected by each component. The permanent loss of Critically Endangered vegetation within the enlarged dam footprint cannot be characterised as a temporary impact or assumed to be fully reversible through rehabilitation.

10.1.3 Mitigation Measures

The following mitigation measures are recommended for the proposed enlargement of Helpmekaar Dam, construction of the supplementary Buffer Dam and installation of the associated connecting pipeline, taking into account the terrestrial biodiversity sensitivities identified in the Terrestrial Biodiversity Statement (**Appendix 8D**):

- Protection of sensitive vegetation: Restrict vegetation clearance, earthworks, vehicle movement and material stockpiling to the approved development and construction footprints. Clearly demarcate sensitive indigenous vegetation and no-go areas before construction commences.
- Protection of Langrug Ridge: Avoid unnecessary disturbance to the remnant Kouebokkeveld Shale Fynbos on Langrug Ridge, particularly the area recommended by the terrestrial biodiversity specialist for treatment as a Critical Biodiversity Area 1 (CBA1).
- Connecting pipeline alignment: Route the pipeline along the existing farm road or firebreak, where feasible, in accordance with the terrestrial biodiversity specialist's recommendations. Keep the construction corridor as narrow as practicable and prevent disturbance to adjacent indigenous vegetation.
- Minimisation of vegetation clearance: Limit vegetation removal within the dam and pipeline footprints to the extent necessary for construction and safe operation. Indigenous vegetation outside the approved footprints must not be cleared or damaged.
- Rehabilitation of disturbed areas: Stabilise and rehabilitate temporarily disturbed areas that are not required for operational purposes as soon as reasonably practicable after construction. Use locally occurring indigenous species appropriate to the affected vegetation type. Rehabilitation measures must not be presented as replacing the Critically Endangered vegetation permanently lost beneath the enlarged dam or Buffer Dam.
- Erosion and sediment control: Implement appropriate erosion, stormwater and sediment-control measures during and after construction to prevent soil loss and minimise impacts on adjacent vegetation and freshwater features.
- Alien invasive vegetation management: Prevent the introduction and spread of alien invasive plants during construction. Monitor disturbed areas and undertake appropriate control and follow-up management of alien invasive vegetation as part of the Environmental Management Programme (EMPr).
- Construction monitoring: The Environmental Control Officer (ECO) must monitor compliance with the approved development footprints, demarcated no-go areas and applicable terrestrial biodiversity mitigation measures during construction. Any unauthorised disturbance to sensitive vegetation must be reported and addressed in accordance with the EMPr.

10.1.4 Conclusion

The Terrestrial Biodiversity Statement identified potential impacts on terrestrial biodiversity associated with the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline.

Although portions of the development area comprise existing agricultural land and historically disturbed areas, the assessment identified remnant indigenous vegetation of conservation importance within the broader study area. Kouebokkeveld Alluvium Fynbos and Kouebokkeveld Shale Fynbos were identified as Critically Endangered ecosystems, and their presence must be taken into account when assessing the proposed development.

The enlargement of Helpmekaar Dam will result in the permanent inundation of vegetation within the additional dam basin, including approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos. This vegetation loss cannot be reversed through rehabilitation once the enlarged dam is operational. The proposed Buffer Dam will also result in permanent inundation within its footprint, and its terrestrial biodiversity impacts must be considered separately from those associated with the enlargement of Helpmekaar Dam.

The assessment further identified Kouebokkeveld Shale Fynbos in good ecological condition on the south-eastern portion of Langrug Ridge. The specialist recommends that this area be treated as a Critical Biodiversity Area 1 (CBA1). To minimise disturbance to this vegetation, the connecting pipeline should follow the existing farm road or firebreak, where feasible, in accordance with the specialist's recommendations.

The Terrestrial Biodiversity Statement has informed the consideration of development alternatives and the identification of measures to avoid and minimise impacts on sensitive indigenous vegetation. These measures include restricting construction activities to the approved footprints, protecting remnant vegetation outside the development areas, refining the pipeline alignment and rehabilitating temporarily disturbed areas.

The proposed development will result in permanent terrestrial biodiversity impacts within the dam inundation areas. Implementation of the recommended mitigation measures can minimise additional disturbance, but rehabilitation of temporarily disturbed areas will not replace indigenous vegetation permanently lost beneath the dams. The terrestrial biodiversity specialist's site-specific recommendations must therefore be incorporated into the Environmental Management Programme (EMPr) and implemented during construction and rehabilitation.

10.2 Freshwater Assessment

The Freshwater Impact Assessment was conducted by Dr Dirk van Driel of WATSAN Africa for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres. Please refer to **Appendix 8C** for the full specialist report.

10.2.1 Key findings

The Freshwater Impact Assessment identified freshwater features associated with the existing Helpmekaar Dam, the proposed enlargement footprint and the proposed Buffer Dam. These features occur within the Leeu River catchment and must be considered in relation to the proposed permanent inundation, construction activities and potential changes to freshwater functioning.

The existing Helpmekaar Dam is situated within a drainage system that receives runoff from its upstream sub-catchment. The proposed enlargement will increase the dam's inundation area and affect freshwater habitat associated with the existing impoundment. The specialist identified an existing modified wetland within the area affected by the enlargement. Although this feature has been altered by historical land use and the existing dam infrastructure, it retains freshwater habitat and ecological functions that will be affected by the proposed development.

The proposed Buffer Dam will affect a separate wetland feature within the agricultural landscape. Construction and operation of the Buffer Dam will result in the permanent inundation of this feature within the dam footprint. The specialist identified its existing ecological and resource value as limited; however, permanent inundation will nevertheless result in the loss or alteration of the affected freshwater habitat.

The principal freshwater findings are summarised below:

- Helpmekaar Dam enlargement: The increased inundation area will affect an existing modified wetland and result in the permanent loss or alteration of freshwater habitat within the enlarged dam footprint.
- Supplementary Buffer Dam: The proposed dam will permanently inundate a separate wetland feature situated within the existing agricultural landscape.
- Existing ecological condition: Historical agricultural activities and existing water-storage infrastructure have modified freshwater features within the study area. Their modified condition does not mean that they are devoid of freshwater habitat or ecological function.

- Connecting pipeline: Pipeline installation may cause localised soil disturbance, erosion and sedimentation. Any construction activities affecting freshwater features must be undertaken in accordance with the specialist's recommendations and the Environmental Management Programme (EMPr).
- Downstream functioning: The proposed development must be considered in relation to the drainage network and downstream freshwater environment. Potential changes to water availability and downstream flows are addressed further in the Hydrological Assessment (Appendix 8B).

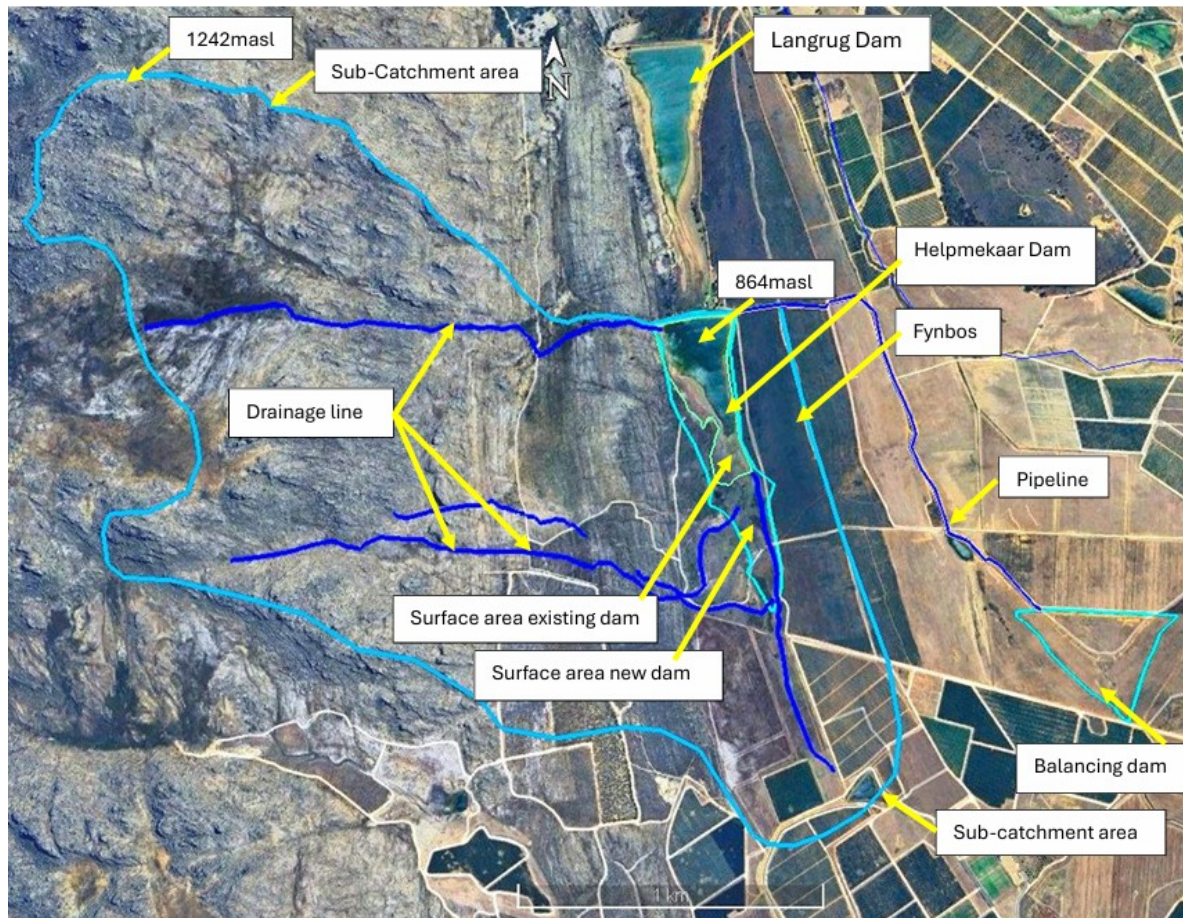


Figure 14: illustrates the existing Helpmekaar Dam, proposed enlarged dam footprint, supplementary Buffer Dam, connecting pipeline, associated drainage lines and sub-catchment areas.

The figure shows the relationship between the proposed development components and the surrounding drainage network. It provides context for the assessment of freshwater impacts associated with the increased inundation area of Helpmekaar Dam, construction of the Buffer Dam and installation of the connecting pipeline.

The Freshwater Impact Assessment therefore identifies permanent impacts on freshwater habitat within both dam footprints, notwithstanding the historically modified condition of the affected features. The specialist's findings and recommendations have informed the assessment of freshwater impacts and the mitigation and management measures included in the EMPr.

10.2.2 Impact Assessment

The Freshwater Impact Assessment (Appendix 8C) identified potential impacts associated with the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline.

The principal freshwater impacts relate to the permanent inundation and alteration of freshwater habitat within the two dam footprints, together with temporary disturbance, erosion, sedimentation and potential water-quality impacts during construction. The assessment distinguishes between the freshwater features affected by each dam and the potential impacts associated with the connecting pipeline.

Site Preparation Phase

Potential impacts associated with site preparation include:

- Disturbance of soils and vegetation within the approved dam and pipeline construction footprints;
- Increased erosion and sedimentation risks arising from vegetation clearance, earthworks and the movement of construction vehicles;
- Potential contamination of soils and surface runoff through accidental spills of fuel, oil and other construction-related substances;
- Disturbance of freshwater habitat within the areas to be cleared or prepared for construction;
- Temporary alteration of local surface runoff patterns; and
- Establishment or spread of alien invasive vegetation in disturbed areas.

Site preparation activities must be confined to the approved development footprints. Freshwater features and adjacent areas outside the authorised construction areas must be protected against unnecessary disturbance.

Construction Phase

Enlargement of Helpmekaar Dam

Construction activities associated with the enlargement of Helpmekaar Dam will affect an existing modified wetland within the proposed additional inundation area. Earthworks and associated construction activities may result in direct disturbance of freshwater habitat, increased sediment mobilisation and temporary deterioration of water quality.

Following completion of the enlargement and impoundment, freshwater habitat within the additional inundation footprint will be permanently lost or altered. Although the affected wetland has been modified by historical land use and existing dam infrastructure, its remaining freshwater habitat and ecological functions must be considered in the impact assessment.

Construction of the supplementary Buffer Dam

Construction of the Buffer Dam will affect a separate wetland feature within the existing agricultural landscape. Site clearance, excavation, embankment construction and subsequent impoundment will result in the permanent inundation and loss or alteration of freshwater habitat within the Buffer Dam footprint.

The specialist identified the affected feature as having limited existing ecological and resource value. Nevertheless, its permanent inundation constitutes a direct freshwater impact and must be assessed separately from the impacts associated with the enlargement of Helpmekaar Dam.

Installation of the connecting pipeline

Pipeline installation may result in localised soil disturbance, erosion and sedimentation along the selected alignment. Where construction activities occur near freshwater features, sediment-laden runoff, accidental contamination and disturbance of drainage patterns may affect water quality and freshwater functioning.

The construction corridor must be restricted to the approved alignment, and temporarily disturbed areas must be stabilised and rehabilitated following installation.

Operational Phase

The principal operational impacts are associated with the permanent change in freshwater habitat within the enlarged Helpmekaar Dam and Buffer Dam inundation areas.

Potential operational impacts include:

- Permanent loss or alteration of freshwater habitat within the additional Helpmekaar Dam inundation footprint;
- Permanent inundation of the separate wetland feature within the Buffer Dam footprint;
- Changes to local drainage and water-storage patterns associated with the enlarged and supplementary dams;
- Potential erosion and sediment mobilisation at spillways, outlets and other areas exposed to concentrated flows; and
- Potential changes to downstream flows associated with the increased storage capacity and operation of the proposed infrastructure.

The hydrological implications of increasing Helpmekaar Dam's storage capacity, including water availability, Environmental Water Requirements and potential effects on downstream Wydekloof Dam, are addressed in the Hydrological Assessment (**Appendix 8B**).

The proposed development remains subject to the outcome of the separate Water Use Licence Application. Any applicable abstraction limits, flow requirements, operational controls and monitoring obligations must be implemented in accordance with the conditions of the water-use authorisation issued for the Helpmekaar development.

Maintenance Phase

Potential impacts associated with maintenance activities include:

- Localised disturbance of vegetation and soils during inspection and repair of dam walls, spillways, outlets and the connecting pipeline;
- Erosion and sedimentation associated with maintenance earthworks or the removal and temporary stockpiling of accumulated sediment;
- Potential water-quality impacts arising from machinery, fuels and other materials used during maintenance; and
- Temporary disturbance of freshwater features where maintenance work is required within or adjacent to affected areas.

Maintenance activities must be planned and undertaken in accordance with the applicable authorisations and the EMPr. Disturbance must be limited to the areas necessary for the maintenance work, and affected areas must be stabilised and rehabilitated where practicable.

Cumulative Impacts

The proposed enlargement of Helpmekaar Dam and construction of the Buffer Dam must be considered in the context of existing agricultural activities, water-storage infrastructure and freshwater habitat modification within the broader Leeu River catchment.

The permanent inundation of the affected freshwater features will contribute to the cumulative loss or alteration of freshwater habitat. Potential cumulative effects on downstream flows and water availability must be considered alongside the findings of the Hydrological Assessment and the requirements of the separate water-use authorisation process.

Impact Significance and Management

The Freshwater Impact Assessment identifies permanent impacts on freshwater habitat within both dam footprints, notwithstanding the historically modified condition and limited existing ecological or resource value of the affected features. Construction-related impacts, including erosion, sedimentation and potential contamination, can be reduced through appropriate mitigation and management measures.

The following measures must be implemented, as applicable to the relevant development component:

- Restrict construction activities to the approved development footprints and clearly demarcate freshwater features and no-go areas outside those footprints;
- Minimise the extent and duration of exposed soil surfaces during construction;
- Implement appropriate erosion, sediment and stormwater control measures, including sediment traps where required;
- Prevent fuels, oils, concrete wash water and other potentially polluting substances from entering freshwater features;
- Stabilise disturbed areas and rehabilitate temporary construction areas as soon as reasonably practicable;
- Design and maintain spillways, outlets and drainage infrastructure to minimise erosion and uncontrolled sediment mobilisation; and
- Implement the freshwater specialist's site-specific recommendations and all applicable water-use authorisation conditions.

The permanent freshwater habitat loss within the dam inundation areas cannot be reversed through rehabilitation. Mitigation must therefore focus on avoiding unnecessary additional disturbance, controlling construction-related impacts and managing the dams and associated infrastructure in accordance with the applicable authorisations and EMPr.

The impact significance ratings reported in this section must correspond with those assigned to the respective Helmekaar development components in the Freshwater Impact Assessment (**Appendix 8C**).

10.2.3 Mitigation Measures

The following mitigation and management measures are applicable to the proposed enlargement of Helmekaar Dam, construction of the supplementary Buffer Dam and installation of the associated connecting pipeline. These measures address the freshwater impacts identified in the Freshwater Impact Assessment (**Appendix 8C**) and must be read together with the specialist's site-specific recommendations.

Site Preparation and Construction Phase

- Construction activities within or adjacent to freshwater features should, where practicable, be scheduled during periods of lower runoff to minimise erosion, sediment transport and disturbance to freshwater habitats.
- The approved construction footprints must be clearly demarcated before site preparation commences. Construction vehicles, machinery and personnel must not enter freshwater features or adjacent areas outside the approved working areas.
- Unnecessary crossings of drainage lines, wetlands and other freshwater features by construction vehicles and machinery must be avoided. Where a crossing is required for an approved construction activity, disturbance must be limited to the minimum area necessary.
- Contractor laydown areas, construction camps, refuelling areas and material stockpiles must be located outside freshwater features and their associated construction exclusion areas. Their locations must be approved in accordance with the Environmental Management Programme (EMPr).
- Appropriate erosion and sediment-control measures must be installed before vegetation clearing and earthworks commence, particularly where disturbed areas could drain towards freshwater

features. Measures may include silt traps, sediment barriers and temporary diversion of clean stormwater, where appropriate.

- Cleared vegetation, excavated material and construction waste must be stored in designated areas where they cannot obstruct drainage lines or be washed into freshwater features. No vegetation or construction material may be disposed of within a watercourse or wetland.
- Topsoil removed from temporarily disturbed areas must be stockpiled separately from subsoil and other excavated material, where suitable for reuse. Stockpiles must be managed to prevent erosion, sediment runoff and the spread of alien invasive vegetation.
- Exposed soils and temporarily disturbed areas must be stabilised as soon as reasonably practicable. Appropriate erosion-control materials and rehabilitation methods must be used where necessary.
- Stormwater generated within construction areas must be managed to prevent concentrated runoff, erosion and the transport of sediment into adjacent freshwater features.
- Refuelling, machinery maintenance and the storage of fuels, oils, cement and other potentially polluting substances must be managed to prevent contamination of soil and water. Spill-response materials must be readily available, and any spill must be contained and cleaned up promptly.
- Concrete wash water, contaminated runoff and other construction effluent must not be discharged into freshwater features.
- The pipeline construction corridor must be kept as narrow as practicable. Any freshwater features affected by pipeline installation must be protected and rehabilitated in accordance with the specialist's recommendations and the applicable authorisations.
- Temporarily disturbed areas that are not required for the operation of the dams or pipeline must be stabilised and rehabilitated as soon as reasonably practicable following completion of construction.

Operational and Maintenance Phase

- The enlarged Helpmekaar Dam and supplementary Buffer Dam must be operated and maintained in accordance with the approved engineering designs, the EMPr and all applicable authorisation conditions.
- Spillways, outlets and downstream drainage areas must be inspected for signs of erosion, instability and sediment accumulation. Identified problems must be addressed before they result in further disturbance to freshwater features.
- Maintenance activities, including desilting, vegetation management and repairs to dam or pipeline infrastructure, must be planned to minimise disturbance to freshwater habitats, erosion and downstream sedimentation.
- Sediment and other material removed during maintenance must be stockpiled and disposed of in a manner that prevents its return to freshwater features.
- Any seepage, leakage or erosion associated with the dam walls, outlets or connecting pipeline must be investigated and managed in accordance with the applicable engineering and operational requirements.
- Areas temporarily disturbed by maintenance or repair activities must be stabilised and rehabilitated as soon as reasonably practicable.
- The proposed development must comply with the conditions of any water-use authorisation issued for Helpmekaar, including applicable abstraction limits, downstream flow requirements and monitoring obligations.
- Water-use and downstream flow monitoring must be undertaken to the extent required by the applicable water-use authorisation and EMPr.

The permanent inundation of freshwater habitat within the enlarged Helpmekaar Dam and Buffer Dam footprints cannot be reversed through construction-phase rehabilitation. Mitigation must therefore prioritise limiting disturbance to the approved footprints, preventing avoidable impacts on adjacent freshwater features and managing construction and operational activities to protect downstream freshwater functioning.

The freshwater specialist's site-specific requirements in Appendix 8C must be incorporated into the EMPr and applied alongside any conditions imposed through the separate Water Use Licence Application process.

10.2.4 Conclusion

The Freshwater Impact Assessment identified potential impacts associated with the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline.

The assessment identified an existing modified wetland within the area affected by the enlargement of Helpmekaar Dam and a separate wetland feature within the proposed Buffer Dam footprint. Although these features have been affected by historical agricultural activities and have limited existing ecological or resource value, they retain freshwater habitat that will be permanently lost or altered through inundation.

Construction of the proposed infrastructure may also result in temporary freshwater impacts, including soil disturbance, erosion, sedimentation and potential deterioration of water quality. These impacts can be minimised through appropriate construction controls, stormwater management, pollution prevention and rehabilitation of temporarily disturbed areas.

The permanent inundation of freshwater habitat within the two dam footprints cannot be reversed through rehabilitation. Accordingly, mitigation must prioritise restricting construction and operational disturbance to the approved development footprints and protecting adjacent freshwater features from unnecessary impacts. The potential hydrological implications of the proposed increase in water-storage capacity, including water availability, Environmental Water Requirements and effects on downstream Wydekloof Dam, are addressed separately in the Hydrological Assessment (**Appendix 8B**).

The findings and recommendations of the Freshwater Impact Assessment have been incorporated into the Environmental Impact Report (EIR) and Environmental Management Programme (EMPr). The proposed development must be implemented in accordance with the freshwater specialist's recommendations, the EMPr and the conditions of any Environmental Authorisation and water-use authorisation issued for the Helpmekaar development.

The overall freshwater impact significance and the specialist's conclusion regarding the acceptability of the proposed development must be reported in accordance with the ratings and findings of the Helpmekaar Freshwater Impact Assessment (**Appendix 8C**).

10.3 Hydrological Assessment

The Hydrological Assessment, titled Investigation into Availability of Surplus Water in the Leeu Catchment, was undertaken to determine the availability of water to support the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam) and to assess the potential implications for downstream water availability.

The assessment considered the proposed increase in Helpmekaar Dam's storage capacity from approximately 390,000 m³ to 800,000 m³, representing an additional 410,000 m³ of storage. It also examined the applicable Environmental Water Requirements (EWR) for the Leeu River catchment and the potential effect of the enlargement on downstream Wydekloof Dam.

Please refer to **Appendix 8B** for the full Hydrological Assessment.

10.3.1 Key Findings

The Hydrological Assessment focused on the upper Leeu River catchment, which falls within quaternary catchment E21G. The assessment used observed flow records from Department of Water and Sanitation (DWS) gauging station E2H007, together with hydrological modelling, to investigate water availability and the potential effects of increasing the storage capacity of Helpmekaar Dam.

The assessment considered the applicable EWR for the catchment, including requirements during normal and drought conditions. The hydrological model was used to compare available runoff with these requirements and to simulate the operation of the relevant upstream dams and downstream Wydekloof Dam under existing and proposed storage conditions.

The principal findings are summarised below.

Water availability within the Leeu River catchment

The assessment found that, on average, surplus water is available within the Leeu River catchment after accounting for the EWR used in the analysis. The comparison of observed flows with the EWR indicated that surplus water occurs primarily during the winter runoff period.

The modelled analysis distinguished between normal and drought years. It indicated an average surplus of approximately 8.63 million m³ per annum during normal years. The assessment also considered drought-year flows against the corresponding drought EWR.

These findings describe water availability at the catchment scale and must be considered alongside the location, timing and conditions of the proposed water use.

Proposed enlargement of Helpmekaar Dam

The assessment modelled the proposed increase in Helpmekaar Dam's capacity from 390,000 m³ to 800,000 m³. For the reservoir simulation, Helpmekaar Dam and the nearby Langrug 2 Dam were modelled as a combined storage system.

The model indicated that increasing Helpmekaar Dam's capacity would improve the ability of the combined upstream dams to supply existing irrigation requirements. The modelled average annual irrigation supply increased from approximately 1.10 million m³ to 1.26 million m³ under the proposed storage configuration.

Potential effects on downstream Wydekloof Dam

The assessment considered whether the increased upstream storage would affect the operation of downstream Wydekloof Dam.

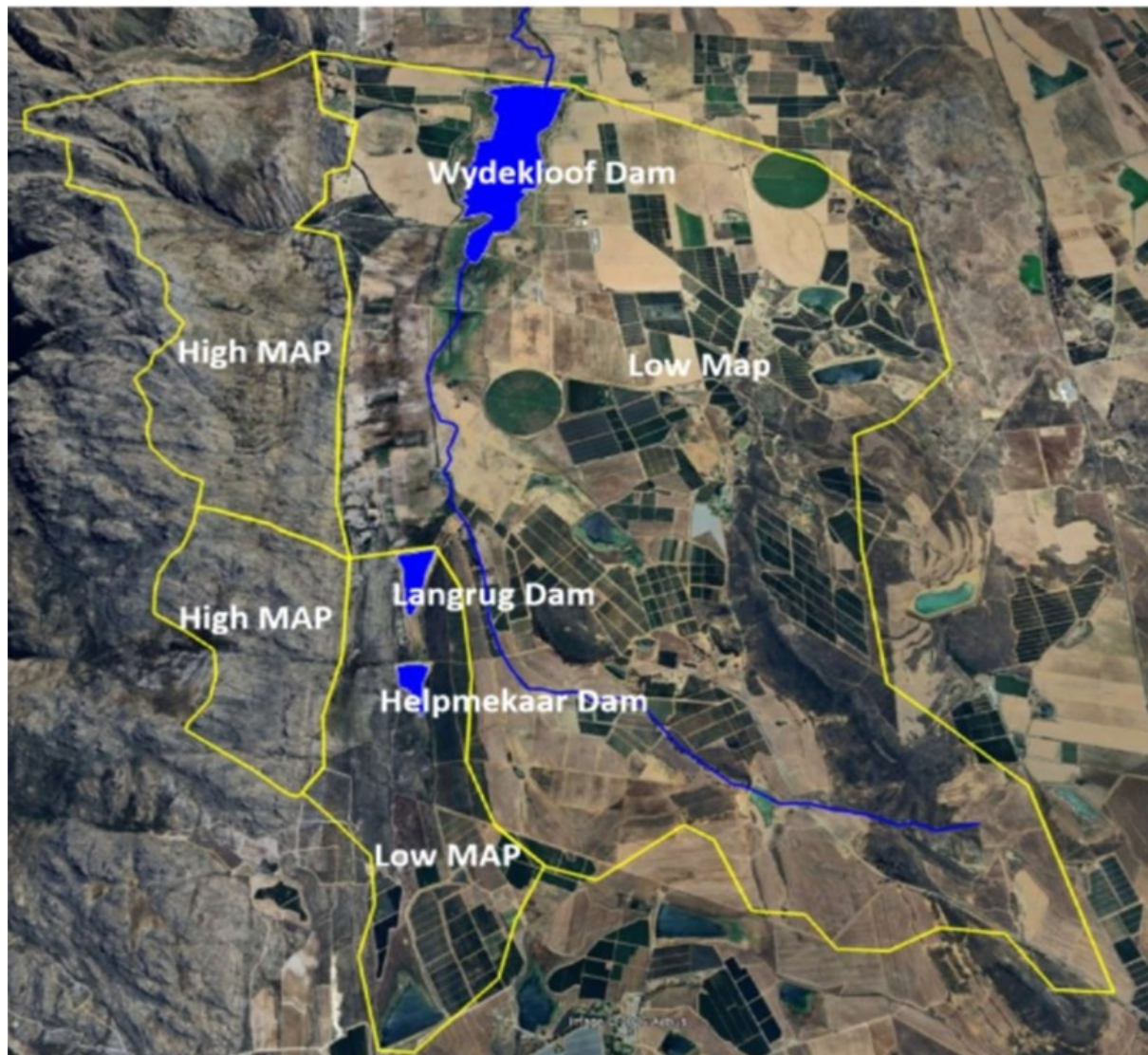


Figure 15: Location of Helpmekaar Dam, Langrug Dam and downstream Wydekloof Dam and their contributing catchment areas (Source: Hydrological Assessment, Appendix 8B, Figure 7.2).

The model indicated that the proposed enlargement would reduce the average annual spill volume from Wydekloof Dam from approximately 3.31 million m³ to 3.17 million m³, a reduction of approximately 0.14 million m³ per annum. The modelled irrigation supply from Wydekloof Dam remained unchanged.

The assessment concluded that the proposed enlargement would have a limited effect on the hydrology of the Leeu River catchment under the modelled conditions.

Scope of the hydrological modelling

The Hydrological Assessment modelled the proposed increase in Helpmekaar Dam's storage capacity as part of the combined Helpmekaar Dam and Langrug 2 Dam system, including its implications for irrigation supply and downstream Wydekloof Dam.

The assessment also considered catchment water availability and the applicable Environmental Water Requirements. The proposed development remains subject to the separate Water Use Licence Application process.

10.3.2 Impact Assessment

The principal hydrological impacts associated with the proposed enlargement of Helpmekaar Dam relate to increased upstream water storage, changes in spill volumes and the potential implications for downstream flows and water users.

Increased upstream storage

The proposed enlargement will provide an additional 410,000 m³ of storage capacity at Helpmekaar Dam. The hydrological modelling indicates that this increased capacity would improve the ability of the combined upstream dam system to meet existing irrigation requirements.

The additional storage will, however, retain water that would otherwise contribute to downstream flows or spill from the upstream dams. The effect of this change must be considered in relation to downstream water availability and the applicable EWR.

Downstream flow and water availability

The modelled reduction in average annual spill volume from Wydekloof Dam indicates that the proposed enlargement will alter the distribution of water within the catchment.

Although the model did not indicate a reduction in irrigation supply from Wydekloof Dam, the reduction in spill volume represents a change in downstream hydrological conditions. The assessment of this impact must therefore distinguish between the modelled reliability of supply to Wydekloof Dam and the potential effects of reduced spill volumes on downstream flows.

Environmental Water Requirements

The Hydrological Assessment compared observed and modelled catchment flows with the applicable EWR during normal and drought conditions. Its findings indicate the presence of surplus water under the conditions assessed.

Compliance with the applicable EWR and any site-specific downstream flow requirements must nevertheless be addressed through the water-use authorisation process and the operational conditions imposed by the relevant water authority.

Cumulative hydrological impacts

The proposed enlargement must be considered alongside existing upstream storage, irrigation demand and downstream water use within the Leeu River catchment.

The Hydrological Assessment incorporated the operation of relevant existing dams into its reservoir simulation. Its findings provide a basis for considering the incremental effect of the proposed enlargement under the modelled conditions, but do not establish the availability of water for irrigation expansion beyond the demand assessed.

10.3.3 Mitigation and Management Measures

The following hydrological management measures must be applied to the proposed development, as relevant to the final engineering design and applicable water-use authorisation:

- Operate the enlarged Helpmekaar Dam and associated water-storage infrastructure in accordance with the conditions of the water-use authorisation issued for the proposed development.
- Comply with all authorised abstraction and storage limits and any applicable restrictions on the timing or volume of water use.

- Implement the downstream flow and EWR-related conditions specified by the relevant water authority.
- Undertake water-use, storage and flow monitoring to the extent required by the water-use authorisation.
- Maintain the dam's spillway, outlet and other water-management infrastructure in accordance with the approved engineering design and operational requirements.
- Keep appropriate operational and monitoring records to demonstrate compliance with the applicable authorisation conditions.
- Review operational practices where monitoring identifies non-compliance with authorised water-use limits or downstream flow requirements.

The proposed increase in storage capacity does not, in itself, authorise additional water abstraction or irrigation use. Any additional water use must be undertaken only in accordance with the applicable water-use authorisation.

10.3.4 Conclusion

The Hydrological Assessment concluded that surplus water is available within the Leeu River catchment under the conditions assessed and that the proposed enlargement of Helpmekaar Dam would improve the ability of the combined upstream dam system to supply existing irrigation requirements.

The modelling indicated a reduction in the average annual spill volume from downstream Wydekloof Dam but no reduction in its modelled irrigation supply. On this basis, the assessment concluded that the proposed enlargement would have a limited effect on the hydrology of the Leeu River catchment under the modelled conditions.

The assessment did not simulate a proportionate increase in irrigated area. Its findings must therefore not be relied upon as confirmation of water availability for the full proposed agricultural expansion.

The proposed development remains subject to the outcome of the separate Water Use Licence Application. The dams and associated infrastructure must be operated in accordance with any authorised abstraction and storage limits, applicable downstream flow requirements, monitoring obligations and other conditions imposed by the relevant water authority.

10.4 Agricultural Assessment

An Agricultural Compliance Statement was prepared for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres.

The proposed development is intended to increase water-storage capacity for agricultural use, including the proposed conversion of approximately 45 ha of existing annual cropland to permanent fruit orchards. The Agricultural Compliance Statement considers the agricultural sensitivity of the proposed development footprints and the implications of the infrastructure for agricultural land use.

10.4.1 Key Findings

Agricultural sensitivity

The Agricultural Compliance Statement distinguishes between the agricultural sensitivity identified by the national Screening Tool and the sensitivity verified through the specialist assessment.

Figure 8 of the specialist report presents the Screening Tool sensitivity, while Figure 9 presents the verified agricultural sensitivity of the proposed development footprints. The verified sensitivity map shows differing sensitivity classifications across the assessed footprints. The specialist's verified findings, rather than the unverified Screening Tool classification alone, must inform the assessment of agricultural impacts.

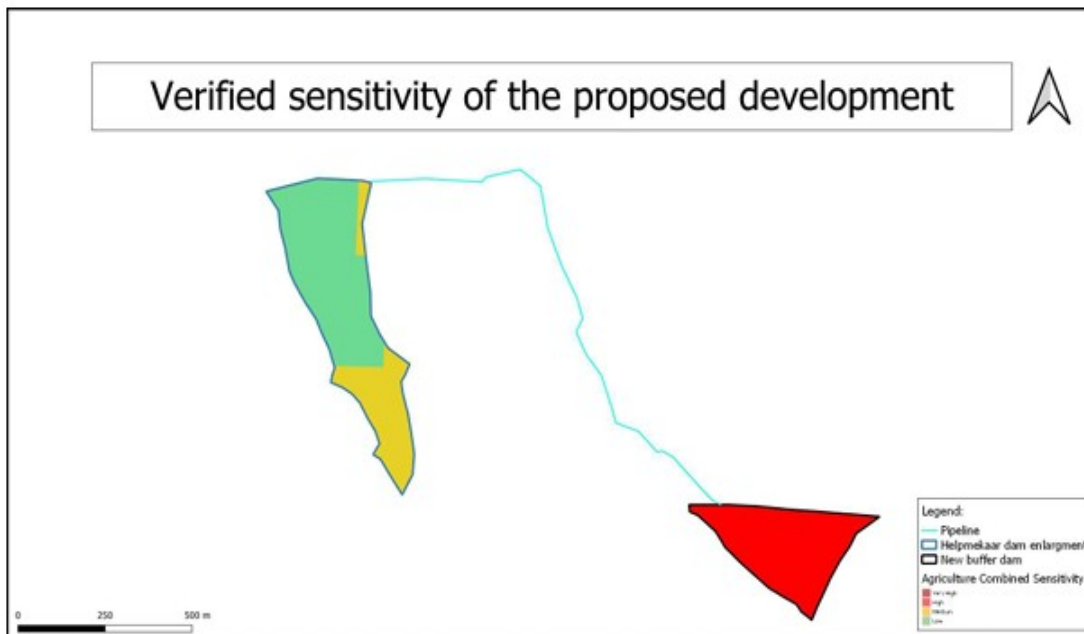


Figure 16: Verified agricultural sensitivity of the proposed Helpmekaar development footprints (Source: Agricultural Compliance Statement, Figure 9).

Agricultural land use and proposed infrastructure

The proposed development comprises the enlargement of an existing agricultural dam, construction of a supplementary Buffer Dam and installation of an underground connecting pipeline. The infrastructure is intended to support the storage and distribution of water for the farm's agricultural operations.

The enlargement of Helpmekaar Dam and construction of the Buffer Dam will result in the permanent occupation of land within the respective dam basins, embankments and associated infrastructure footprints. The agricultural implications of this land-use change must be considered in relation to the verified sensitivity and agricultural potential of the affected areas.

Installation of the underground pipeline will result in temporary disturbance along the approved construction corridor. Following construction, agricultural use of temporarily disturbed land may resume where compatible with the pipeline design, required access and applicable operational restrictions.

Proposed agricultural development

The proposed conversion of approximately 45 ha of existing annual cropland to permanent fruit orchards represents a change in the farm's agricultural production and irrigation requirements.

The proposed water-storage infrastructure is intended to support this agricultural development. Water availability and the hydrological implications of enlarging Helpmekaar Dam are addressed in the

Hydrological Assessment (Appendix 8B), while the applicable water-use requirements are addressed through the separate Water Use Licence Application process.

10.4.2 Impact Assessment

Site Preparation and Construction Phase

Site preparation and construction will disturb agricultural land within the approved dam and pipeline construction footprints. Potential impacts include topsoil removal, soil compaction, disturbance of existing agricultural access routes and temporary restrictions on farming activities near construction areas.

Construction of the enlarged Helpmekaar Dam and supplementary Buffer Dam will result in the permanent conversion of land within the dam and associated infrastructure footprints to water-storage use.

Installation of the underground connecting pipeline will result in temporary soil disturbance along the approved alignment. Where the pipeline traverses agricultural land, construction activities may temporarily restrict access or cultivation. The potential for agricultural use to resume following rehabilitation will depend on the final pipeline design and operational requirements.

Operational Phase

During operation, the enlarged Helpmekaar Dam and Buffer Dam will form part of the farm's permanent water-storage infrastructure. The land occupied by the dam basins, embankments and other permanent infrastructure will no longer be available for cultivation.

The increased storage capacity is intended to support agricultural operations by retaining winter runoff for subsequent irrigation use. The dams and associated irrigation infrastructure must be operated in accordance with the applicable water-use authorisation.

The underground pipeline will remain a permanent component of the irrigation infrastructure. Its operational footprint and any restrictions on activities above or adjacent to the pipeline must be managed in accordance with the approved engineering design.

Cumulative Impacts

The proposed development must be considered in the context of existing agricultural activities, dams, irrigation infrastructure and the proposed conversion of annual cropland to permanent fruit orchards.

The cumulative agricultural considerations include the permanent occupation of land by water-storage infrastructure, the temporary disturbance associated with pipeline construction and potential changes in irrigation demand arising from the proposed agricultural development.

The implications for catchment water availability and downstream water users are addressed separately in Section 10.3, Hydrological Assessment, and through the applicable water-use authorisation process.

10.4.3 Mitigation and Management Measures

The following measures must be implemented to minimise avoidable impacts on agricultural land and farming activities:

- Restrict vegetation clearance, earthworks, vehicle movements and material storage to the approved development footprints and designated construction areas.

- Avoid unnecessary disturbance of agricultural land outside the permanent dam and infrastructure footprints.
- Strip and stockpile suitable topsoil separately from subsoil and other excavated material where it is intended for reuse during rehabilitation.
- Protect topsoil stockpiles from erosion, contamination and unnecessary compaction.
- Manage construction vehicle movements to minimise soil compaction and disruption of existing agricultural access routes.
- Prevent fuels, oils, cement and other construction-related substances from contaminating agricultural soils.
- Rehabilitate temporarily disturbed areas, including the pipeline construction corridor, as soon as reasonably practicable following construction.
- Reinstate agricultural access routes and drainage arrangements affected by temporary construction activities, where practicable.
- Operate the proposed water-storage and irrigation infrastructure in accordance with the conditions of the applicable water-use authorisation.

The permanent occupation of land by the dam basins, embankments and associated infrastructure cannot be reversed through construction-phase rehabilitation. Mitigation must therefore prioritise avoiding unnecessary additional disturbance and restoring temporarily affected agricultural land wherever practicable.

10.4.4 Conclusion

The proposed enlargement of Helpmekaar Dam, construction of the supplementary Buffer Dam and installation of the connecting pipeline are intended to support the agricultural operations and proposed development of Portion 5 of Farm Rietrivier No. 202.

The development will result in the permanent occupation of land by water-storage infrastructure and temporary disturbance associated with construction and pipeline installation. Appropriate construction management and rehabilitation can minimise avoidable impacts on agricultural soils, access and farming activities outside the permanent infrastructure footprints.

The Agricultural Compliance Statement's verified sensitivity map (Figure 9) must be considered when evaluating the agricultural implications of the respective development footprints. The specialist's stated impact significance and conclusion on agricultural acceptability should be carried through into the final EIR without assigning a rating that has not been confirmed in the assessment.

The proposed agricultural development will be supported by the proposed water-storage and irrigation infrastructure, subject to compliance with the applicable water-use authorisation. An Environmental Authorisation issued through this EIA process will not itself authorise water use.

10.5 Heritage Impact Assessment

A Heritage Impact Assessment (HIA) was undertaken by Jonathan Kaplan of ACRM in January 2026 for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and associated infrastructure on Portion 5 of Farm Rietrivier No. 202, near Ceres. The Heritage Western Cape (HWC) case number is 25111407.

The assessment considered the potential effects of the proposed development on archaeological and other heritage resources within the areas assessed. The findings and recommendations of the HIA are summarised below.

10.5.1 Key Findings

Archaeological resources

No archaeological resources of conservation significance were identified within the assessed Helpmekaar Dam enlargement and pipeline areas.

Two isolated Earlier Stone Age flaked stone artefacts were recorded within the proposed Buffer Dam footprint. The heritage specialist considered these isolated finds to have no conservation value and did not recommend archaeological mitigation or routine archaeological monitoring in response to them.

These findings relate to the areas assessed in the HIA and do not exclude the possibility that previously unidentified heritage material could be encountered during construction.

Graves and built heritage

No graves or built heritage resources were identified within the assessed development footprints. Visual heritage considerations

The HIA assessed the visual heritage impact of the proposed development as Low.

10.5.2 Impact Assessment

Site Preparation and Construction Phase

Site preparation, excavation, dam-wall construction and pipeline trenching will involve ground disturbance within the approved development footprints. These activities have the potential to expose or disturb previously unidentified archaeological material or other heritage resources.

The two isolated Earlier Stone Age artefacts identified within the Buffer Dam footprint were assessed as having no conservation value. The HIA did not recommend archaeological mitigation or routine monitoring for these finds.

Although no graves or built heritage resources were identified within the assessed footprints, any previously unidentified heritage resources encountered during construction must be protected and managed in accordance with the applicable heritage requirements.

Operational and Maintenance Phase

Normal operation of the completed dams and underground pipeline is not expected to involve ongoing ground disturbance. The HIA assessed the visual heritage impact of the proposed development as Low.

Maintenance or repair activities involving excavation in previously undisturbed areas may expose unidentified heritage material. The chance-find procedure must therefore also apply to such activities.

10.5.3 Mitigation and Management Measures

The HIA did not recommend routine archaeological mitigation or monitoring for the finds recorded during the assessment. The following precautionary measures must nevertheless be incorporated into the Environmental Management Programme (EMPr):

- Construction and associated ground disturbance must be restricted to the approved development footprints.
- Construction personnel must be informed of the procedure to follow if potential archaeological material, human remains or other heritage resources are encountered.
- If a potential heritage resource is uncovered, work must cease in its immediate vicinity and the find must be protected from further disturbance.
- The Environmental Control Officer (ECO) must be notified, and advice must be obtained from an appropriately qualified heritage specialist and HWC, as applicable, before work resumes in the affected area.
- Suspected heritage material must not be removed, damaged or relocated without the necessary specialist advice and authorisation.
- The chance-find procedure must also be applied during maintenance or repair works involving excavation in previously undisturbed areas.

Any additional requirements contained in HWC's response to the HIA must be incorporated into the EMP.

10.5.4 Conclusion

The Heritage Impact Assessment did not identify archaeological resources of conservation significance within the assessed Helpmekaar Dam enlargement and pipeline areas. The two isolated Earlier Stone Age artefacts recorded within the Buffer Dam footprint were considered to have no conservation value, and the specialist did not recommend archaeological mitigation or routine monitoring for these finds.

No graves or built heritage resources were identified within the assessed development footprints, and the visual heritage impact was assessed as Low.

The findings of the HIA must be implemented together with a precautionary chance-find procedure and any applicable requirements imposed by HWC.

No separate map is required for Section 10.5. The palaeontological sensitivity map and the assessment of potential fossil heritage impacts are addressed separately in Section 10.6 – Palaeontological Assessment.

10.6 Palaeontological Assessment

A Palaeontological Assessment was undertaken by Marion Bamford for the proposed enlargement of the existing Langrug-Boonste Nr. 1 Dam (Helpmekaar Dam), construction of the supplementary Buffer Dam and installation of the associated connecting pipeline on Portion 5 of Farm Rietrivier No. 202, near Ceres.

The assessment considered the palaeontological sensitivity of the geological formations underlying the proposed development footprints and the potential for construction activities to expose or disturb previously unidentified fossil material.

10.6.1 Key Findings

Geological setting and palaeontological sensitivity

The palaeontological sensitivity of the development area varies according to the underlying geological formations. The assessment identifies Quaternary fluvial sediments of Low palaeontological sensitivity and the Voorstehoek Formation, which has potentially Very High palaeontological sensitivity.

The palaeontological sensitivity map illustrates the mapped sensitivity in relation to the proposed development footprints. The mapped classifications indicate the potential for fossil-bearing material to occur; they do not establish that fossils are present at a particular location.

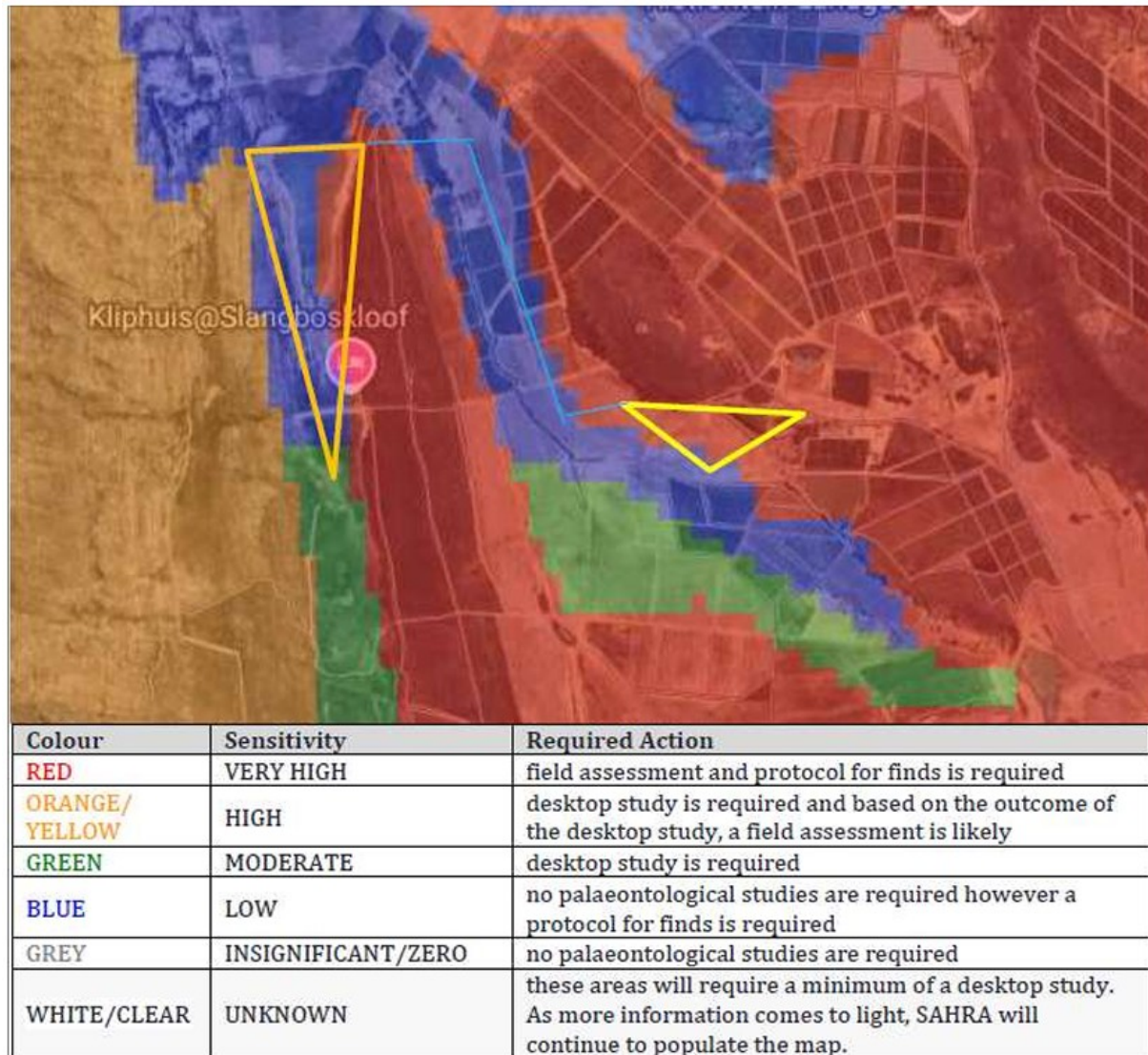


Figure 17: Palaeontological sensitivity in relation to the proposed Helpmekaar development footprints (Source: Palaeontological Assessment).

The proposed dam enlargement, Buffer Dam construction and connecting pipeline will require excavation and other ground-disturbing activities. These works may expose geological material that has not previously been visible at the surface.

The potential for fossil discoveries will depend on the formations and deposits encountered during construction. The assessment therefore provides for the implementation of a Fossil Chance Find Procedure should potential fossil material be uncovered.

10.6.2 Impact Assessment

Site Preparation and Construction Phase

The principal potential palaeontological impact is the disturbance, damage or destruction of previously unidentified fossil material during excavation and earthworks.

The enlargement of Helpmekaar Dam and construction of the supplementary Buffer Dam will involve ground disturbance within their approved footprints. Installation of the connecting pipeline will also expose subsurface material along the selected alignment.

Where excavation encounters Quaternary fluvial sediments, the mapped palaeontological sensitivity is Low. Where the works encounter the Voorstehoek Formation, the potential for fossil-bearing material requires particular attention.

The mapped sensitivity does not confirm the presence or absence of fossils within the excavation areas. The Fossil Chance Find Procedure must therefore be available for implementation during ground-disturbing works, irrespective of the sensitivity classification shown on the map.

Operational and Maintenance Phase

Normal operation of the completed dams and underground pipeline is not expected to involve ongoing excavation. Additional palaeontological impacts during this phase would primarily be associated with maintenance or repair activities that expose previously undisturbed geological material.

The Fossil Chance Find Procedure must also be applied if potential fossil material is encountered during such activities.

10.6.3 Mitigation and Management Measures

The Fossil Chance Find Procedure recommended in the Palaeontological Assessment must be incorporated into the Environmental Management Programme (EMPr). The following measures must be implemented:

- Inform the contractor and relevant site personnel of the procedure to follow if potential fossil material is encountered during excavation.
- If a suspected fossil is discovered, cease work in its immediate vicinity and protect the find from further disturbance.
- Notify the Environmental Control Officer (ECO), who must arrange for assessment by an appropriately qualified palaeontologist and notification of Heritage Western Cape (HWC), as applicable.
- Do not remove, collect or damage suspected fossil material without the necessary specialist advice and authorisation.
- Resume work in the affected area only once the find has been assessed and the necessary instructions or authorisations have been obtained.
- Apply the Fossil Chance Find Procedure during maintenance or repair activities where previously undisturbed geological material is exposed.

Any additional site-specific requirements contained in the specialist's Fossil Chance Find Procedure or imposed by HWC must also be incorporated into the EMPr.

10.6.4 Conclusion

The Palaeontological Assessment identifies varying sensitivity across the geological formations underlying the proposed development area, including Low sensitivity associated with Quaternary fluvial sediments and potentially Very High sensitivity associated with the Voorstehoek Formation.

Excavation for the proposed dams and connecting pipeline may expose previously unidentified fossil material. The principal management requirement is therefore the implementation of the specialist's Fossil Chance Find Procedure to ensure that any potential discoveries are protected, assessed and reported before construction resumes in the affected area.

The findings and recommendations of the Palaeontological Assessment must be incorporated into the EMP, together with any applicable requirements imposed by HWC.

11. SUMMARY OF IMPACTS AND CUMMULATIVE EFFECT

11.1 Summary of Impacts

The potential environmental impacts associated with the proposed enlargement of Helpmekaar Dam, construction of the supplementary Buffer Dam, installation of the connecting pipeline and associated agricultural development have been assessed for the site preparation, construction, operational and maintenance phases.

The assessment considers the findings of the Terrestrial Biodiversity Statement (including botanical, plant-species and animal-species considerations), freshwater, hydrological, agricultural, heritage and palaeontological specialist assessments, together with the Environmental Assessment Practitioner's (EAP) assessment of the proposed development.

The principal impacts include the permanent loss or alteration of vegetation and freshwater habitat within the dam footprints; temporary soil disturbance, erosion and sedimentation during construction; changes in water storage and downstream spill volumes; the occupation of agricultural land by permanent infrastructure; and the potential disturbance of previously unidentified heritage or fossil resources during excavation.

The assessment also considers the effectiveness of the proposed mitigation and management measures and the anticipated residual impacts following their implementation. Permanent impacts, including habitat loss within the dam inundation areas, remain relevant even where construction-related impacts can be reduced through mitigation.

Please refer to Appendix 9A for the detailed impact and significance rating tables applicable to the various phases of the proposed Helpmekaar development, including the recommended mitigation and management measures.

The impact assessment presented in Appendix 9A incorporates the EAP's assessment, the relevant specialist findings, the identified mitigation measures and the anticipated residual impacts following mitigation.

Table 8-12 below provides a summary of the key impacts associated with the alternatives, taking into consideration the findings of the specialist studies and the proposed mitigation measures.

Preferred Alternative – Helpmekaar Dam Enlargement, Supplementary Buffer Dam and Associated Agricultural Development

Table 6: Impact Summary (Preferred Alternative)

Aspect	Impact	Significance No Mitigation	Significance With Mitigation
Phase: Site Preparation and Construction			
Geographical / Topographical	Earthworks associated with enlargement of Helpmekaar Dam, construction of the Buffer Dam and installation of the connecting pipeline will alter the landform and disturb soils.	Low (Negative)	Very Low (Negative)
Aquatic / Freshwater	Construction at the existing instream dam and Buffer Dam, together with pipeline installation, may cause sedimentation, erosion, pollution and temporary disturbance of freshwater features. Permanent aquatic impacts are assessed separately.	Low (Negative)	Very Low (Negative)
Terrestrial Biodiversity	Vegetation clearance, inundation and earthworks will disturb terrestrial habitats and may displace	Medium (Negative)	Medium (Negative)

(Botanical and Faunal)	fauna. Enlargement of Helpmekaar Dam will permanently inundate approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos. The pipeline corridor must avoid good-condition Kouebokkeveld Shale Fynbos on Langrug Ridge.		
Visual	Temporary visual disturbance associated with dam-wall works, construction machinery, excavation, stockpiles, vehicle movements and pipeline installation within the agricultural landscape.	Very Low (Negative)	Very Low (Negative)
Socio-economic – Farming Activities	Temporary disturbance to farming operations and farm access from construction traffic, machinery, noise and excavation along the pipeline.	Very Low (Negative)	Very Low (Negative)
Socio-economic – Employment and Procurement	Temporary employment, local procurement and associated economic activity during dam enlargement, Buffer Dam construction and pipeline installation.	Medium (Positive)	Medium (Positive)
Heritage	Excavation may expose previously unidentified archaeological material, fossils or human remains. Chance-find procedures will apply during construction.	Very Low (Negative)	Very Low (Negative)
Noise	Temporary increase in noise from earthmoving machinery, dam construction, pipeline trenching and heavy construction vehicles.	Low (Negative)	Very Low (Negative)
Dust	Localised dust generation from dam earthworks, exposed soils, stockpiles, pipeline excavation and construction vehicle movements.	Low (Negative)	Very Low (Negative)
Waste	Generation of excavated spoil, construction rubble, packaging, vegetation-clearing material and other construction-related waste.	Very Low (Negative)	Very Low (Negative)
Cumulative Impacts	Incremental construction disturbance within an agricultural landscape containing existing dams, cultivated land and remnant natural habitats.	Very Low (Negative)	Very Low (Negative)

Aspect	Impact	Significance No Mitigation	Significance With Mitigation
Phase: Operational and Maintenance			
Geographical / Topographical	Permanent alteration of the local landform and inundation footprint associated with the enlarged Helpmekaar Dam and supplementary Buffer Dam. Localised erosion may occur along exposed dam banks, drainage outlets and maintenance access areas.	Medium–Low (Negative)	Medium–Low (Negative)
Freshwater / Aquatic	Permanent loss or alteration of freshwater habitat within the enlarged Helpmekaar Dam and Buffer Dam footprints, with potential additional disturbance arising from poorly managed releases, abstraction or maintenance activities.	Medium (Negative)	Medium (Negative)
Terrestrial Biodiversity (Botanical and Faunal)	Permanent inundation of approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos associated with the enlargement of Helpmekaar Dam. Operational and maintenance activities may also disturb rehabilitated vegetation and fauna along dam margins and the pipeline corridor.	Medium (Negative)	Medium (Negative)
Visual	Long-term visual impact of the enlarged Helpmekaar Dam, Buffer Dam and associated above-ground infrastructure within the agricultural landscape. The buried connecting pipeline will	Low (Negative)	Low (Negative)

	have little visual presence following rehabilitation.		
Water Security / Agricultural Productivity	Increased water-storage capacity and improved irrigation water security and operational flexibility, intended to support the proposed agricultural development, subject to the required water-use authorisation.	Medium (Positive)	Medium (Positive)
Socio-economic	Improved irrigation reliability and agricultural production may support ongoing farm employment, local procurement and associated economic activity.	Low (Positive)	Low (Positive)
Heritage	Potential disturbance of previously unidentified archaeological material, fossils or human remains during ground-disturbing maintenance or repair activities. No additional disturbance of identified heritage resources is anticipated during normal operation.	Very Low (Negative)	Very Low (Negative)
Noise	Localised noise associated with routine irrigation operations, inspections, maintenance vehicles and occasional repair activities.	Very Low (Negative)	Very Low (Negative)
Dust	Localised dust associated with occasional vehicle movements along farm access roads and ground-disturbing maintenance activities.	Very Low (Negative)	Very Low (Negative)
Waste	Limited quantities of packaging, damaged components, sediment and other waste generated during routine dam, pipeline and irrigation infrastructure maintenance.	Very Low (Negative)	Very Low (Negative)
Cumulative Impacts	Additional agricultural water-storage infrastructure within the Leeu River catchment, with potential cumulative effects on downstream water availability, freshwater habitat and permanent indigenous vegetation loss.	Medium (Negative)	Medium–Low (Negative)

Alternative Connecting Pipeline Route (Blue Route)

Table 7: Impact Summary - Alternative Blue Pipeline Route (Site Preparation and Construction Phase)

Aspect	Impact	Significance No Mitigation	Significance With Mitigation
Phase: Construction			
Geographical / Topographical	Earthworks for the Helpmekaar Dam enlargement and Buffer Dam remain unchanged. Installation of the longer Blue Pipeline Route along the existing farm access road will disturb soils and require trenching and rehabilitation over a greater linear distance.	Low (Negative)	Very Low (Negative)
Aquatic / Freshwater	Construction at the existing instream dam and Buffer Dam may cause sedimentation, erosion, pollution and temporary disturbance of freshwater features. Pipeline trenching may introduce additional localised risks where the Blue Route approaches or crosses drainage features. Permanent aquatic impacts associated with the dams are assessed separately.	Low (Negative)	Very Low (Negative)
Terrestrial Biodiversity	Enlargement of Helpmekaar Dam will permanently inundate approximately 0.6–1 ha of	High (Negative)	High (Negative)

(Botanical and Faunal)	Kouebokkeveld Alluvium Fynbos. Installation of the longer Blue Route will disturb a greater length of the existing farm-road corridor and may affect vegetation along its margins. Construction must avoid good-condition Kouebokkeveld Shale Fynbos and remain within previously disturbed areas as far as practicable.		
Visual	Temporary visual disturbance from dam-wall works, construction machinery, excavation, stockpiles and vehicle movements. Trenching along the longer Blue Route will extend the visible construction corridor along the existing farm access road.	Very Low (Negative)	Very Low (Negative)
Socio-economic – Farming Activities	Temporary disturbance to farming operations during dam construction and pipeline installation. Trenching along the existing farm access road may restrict access over a longer section and require temporary access arrangements.	Very Low (Negative)	Very Low (Negative)
Socio-economic – Employment and Procurement	Temporary employment, local procurement and associated economic activity during enlargement of Helpmekaar Dam, construction of the Buffer Dam and installation of the connecting pipeline.	Medium (Positive)	Medium (Positive)
Heritage	Excavation during dam construction and pipeline installation may expose previously unidentified archaeological material, fossils or human remains. Chance Finds Procedures will apply.	Very Low (Negative)	Very Low (Negative)
Noise	Temporary noise from dam construction, pipeline trenching, earthmoving machinery and heavy vehicles. The longer Blue Route may extend the duration and distribution of noise along the existing farm access road.	Low (Negative)	Very Low (Negative)
Dust	Dust generated by dam earthworks, exposed soils, stockpiles, pipeline excavation and construction traffic. The longer Blue Route may increase the length and duration of localised dust-generating activities.	Low (Negative)	Very Low (Negative)
Waste	Generation of excavated spoil, construction rubble, packaging, vegetation-clearing material and potentially contaminated waste. The longer pipeline may generate additional pipe offcuts and excavation material.	Very Low (Negative)	Very Low (Negative)
Cumulative Impacts	Temporary noise, dust, traffic, sedimentation risk and vegetation disturbance within an agricultural landscape containing existing dams, cultivated land and irrigation infrastructure. The longer Blue Route may extend these disturbances along the existing farm-road corridor.	Very Low (Negative)	Very Low (Negative)

Aspect	Impact	Significance No Mitigation	Significance With Mitigation
Phase: Operational and Maintenance			
Geographical / Topographical	The enlarged Helpmekaar Dam and Buffer Dam will permanently alter the local landform and inundation footprint. The Blue Route pipeline will be buried along the existing farm access road. Localised erosion may occur along dam banks, drainage outlets or sections of the rehabilitated pipeline corridor.	Medium–Low (Negative)	Medium–Low (Negative)

Aquatic / Freshwater	Operation of the enlarged instream dam and Buffer Dam will alter affected freshwater habitat and may influence downstream flows. Poorly managed releases, abstraction or maintenance could cause additional aquatic disturbance. Ground-disturbing repairs along the longer Blue Route may cause localised disturbance.	Medium (Negative)	Medium (Negative)
Terrestrial Biodiversity (Botanical and Faunal)	Enlargement of Helpmekaar Dam will permanently inundate approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos. Routine operation of the buried Blue Route pipeline is not expected to cause additional vegetation clearance, although repairs may disturb rehabilitated vegetation along its corridor.	Medium (Negative)	Medium (Negative)
Visual	The enlarged Helpmekaar Dam and Buffer Dam will form part of the long-term agricultural landscape. The buried Blue Route pipeline will have little visual presence following rehabilitation.	Low (Negative)	Low (Negative)
Water Security / Agricultural Productivity	The enlarged Helpmekaar Dam, Buffer Dam and connecting pipeline are intended to improve irrigation water security and operational flexibility. The Blue Route provides the same water-transfer function as the preferred route, although its greater length and elevation profile may increase pumping requirements and operating costs.	Medium (Positive)	Medium (Positive)
Socio-economic	Improved irrigation reliability and agricultural production may support ongoing farm employment, local procurement and associated economic activity. The proposed agricultural development remains unchanged under the Blue Route alternative.	Low (Positive)	Low (Positive)
Heritage	No additional disturbance of identified heritage resources is anticipated during normal operation. Ground-disturbing pipeline repairs or other maintenance activities may expose previously unidentified archaeological material, fossils or human remains. Chance Finds Procedures will apply.	Very Low (Negative)	Very Low (Negative)
Noise	Routine irrigation operations, inspections, maintenance vehicles and occasional repair work may generate localised noise. The buried pipeline is not expected to generate significant noise during normal operation.	Very Low (Negative)	Very Low (Negative)
Dust	Occasional maintenance vehicles and ground-disturbing pipeline repairs may generate localised dust. The buried pipeline will not generate dust during normal operation.	Very Low (Negative)	Very Low (Negative)
Waste	Routine dam, pipeline and irrigation infrastructure maintenance may generate limited quantities of packaging, damaged components, sediment and other maintenance waste.	Very Low (Negative)	Very Low (Negative)
Cumulative Impacts	The enlarged Helpmekaar Dam and Buffer Dam will add to existing agricultural water-storage infrastructure in the catchment. Potential cumulative effects include changes to downstream water availability and aquatic habitat, together with permanent vegetation loss. The Blue Route does not change the dam footprints or proposed storage capacity.	Medium (Negative)	Medium–Low (Negative)

No-Go Alternative

Table 8: Impact Summary (No-Go Alternative)

Aspect	Impact	Significance No Mitigation	Significance With Mitigation
Phase: Construction			
Geographical / Topographical	No additional earthworks, pipeline trenching or alteration of the landform associated with the proposed development.	No Impact	No Impact
Heritage	No construction-related disturbance of archaeological or other heritage resources, as the proposed earthworks would not take place.	No Impact	No Impact
Palaeontology	No construction-related disturbance of fossil-bearing material, as the proposed excavation activities would not take place.	No Impact	No Impact
Terrestrial Biodiversity (Botanical and Faunal)	No vegetation clearance or permanent inundation of indigenous vegetation associated with the proposed dam enlargement, Buffer Dam or connecting pipeline.	No Impact	No Impact
Freshwater / Aquatic	No additional construction-related disturbance of freshwater habitat, drainage features or watercourses associated with the proposed development.	No Impact	No Impact
Hydrology / EWR	No construction-related alteration of drainage patterns or downstream flows arising from the proposed development. Existing dam operations would continue.	No Impact	No Impact
Water Quality	No additional sediment mobilisation or pollution risk arising from the proposed construction activities.	No Impact	No Impact
Erosion and Stormwater	No additional soil exposure, excavation-related erosion or construction-related sedimentation associated with the proposed development.	No Impact	No Impact
Alien Invasive Vegetation	No additional vegetation disturbance or opportunities for alien invasive plant establishment arising from the proposed construction activities. Existing vegetation management requirements would remain applicable.	No Impact	No Impact
Agricultural	No construction-related occupation or disturbance of agricultural land for the proposed dam enlargement, Buffer Dam or connecting pipeline.	No Impact	No Impact
Socio-economic – Employment and Procurement	The temporary construction employment, procurement and associated economic opportunities that could arise from implementing the proposed development would not materialise.	Not separately rated in Appendix 9 for the No-Go construction phase	Not separately rated in Appendix 9 for the No-Go construction phase
Dust	No additional dust generation from the proposed earthworks, pipeline trenching or construction traffic.	No Impact	No Impact
Visual	No temporary visual disturbance associated with the proposed construction activities, machinery, excavation or stockpiles.	No Impact	No Impact
Traffic	No additional construction-related vehicle movements associated with the proposed development.	No Impact	No Impact

Noise	No additional noise from the proposed dam construction, pipeline trenching or associated construction vehicles.	No Impact	No Impact
Waste	No construction waste generated by the proposed dam enlargement, Buffer Dam or connecting pipeline.	No Impact	No Impact
Cumulative Impacts	No additional cumulative construction-related disturbance from the proposed development within the surrounding agricultural landscape and catchment.	No Impact	No Impact

Aspect	Impact	Significance No Mitigation	Significance With Mitigation
Phase: Operational			
Botanical / Terrestrial Biodiversity	Existing vegetation conditions would remain. No additional indigenous vegetation would be inundated or disturbed by the proposed dam enlargement, Buffer Dam or pipeline.	No Impact	No Impact
Freshwater	Existing freshwater conditions and dam operations would continue. No additional freshwater habitat would be inundated or altered by the proposed development.	No Impact	No Impact
Hydrology / EWR	Existing water-storage infrastructure and downstream flow conditions would remain. The proposed additional storage capacity and associated changes to downstream flows would not occur.	No Impact	No Impact
Water Quality	No additional operational water-quality impacts would arise from the proposed development. Existing water-quality conditions and management practices would continue.	No Impact	No Impact
Erosion and Stormwater	No additional operational erosion or stormwater impacts would arise from the proposed dam enlargement, Buffer Dam or pipeline. Existing conditions would continue.	No Impact	No Impact
Alien Invasive Vegetation	No additional areas would be disturbed by the proposed development. Existing alien invasive vegetation would remain subject to ongoing management.	No Impact	No Impact
Agricultural / Water Security	The proposed additional water-storage and transfer infrastructure would not be developed, and the intended improvements in irrigation water security and agricultural production would not be realised through this project. Existing farming activities would continue.	Foregone project benefits	Foregone project benefits
Visual	The proposed enlargement, Buffer Dam and pipeline would not be developed. The existing rural agricultural landscape would remain.	No Impact	No Impact
Climate Resilience	The intended improvements in agricultural water security and drought resilience associated with the proposed additional storage capacity would not be realised.	Foregone project benefits	Foregone project benefits
Socio-economic	The additional agricultural production and employment opportunities anticipated from the proposed development would not be realised. Existing farming activities would continue.	Foregone project benefits	Foregone project benefits
Cumulative Impacts	The proposed development would not add further water-storage infrastructure or	No Impact	No Impact

	associated environmental impacts to existing catchment conditions.		
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11.2 Cumulative effect

Cumulative impacts, in relation to the proposed activity, refer to the combined effects of past, existing and reasonably foreseeable future activities within the broader receiving environment, where individual impacts may be minor in isolation but may become significant when considered collectively.

The proposed enlargement of Helpmekaar Dam, construction of the supplementary Buffer Dam, installation of the connecting pipeline and associated agricultural development are located within an established agricultural landscape near Ceres in the Koue Bokkeveld region. Existing farm dams, irrigation infrastructure and cultivated agricultural areas form part of the receiving environment. The cumulative assessment therefore considers the proposed development in the context of existing agricultural water use, water-storage infrastructure and the remaining natural and freshwater habitats within the catchment.

Potential cumulative impacts associated with the proposed development relate primarily to:

- cumulative water abstraction and storage within the catchment;
- changes to downstream flow volumes and hydrological functioning;
- cumulative loss or alteration of freshwater habitat and potential impacts on water quality;
- cumulative loss and fragmentation of indigenous vegetation and associated terrestrial habitat; and
- incremental modification of the agricultural landscape through dam infrastructure, pipeline installation and associated agricultural development.

The Terrestrial Biodiversity Statement (Appendix 8D), which includes botanical, plant-species and animal-species considerations, identifies permanent vegetation loss associated with the proposed dam enlargement. Approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos would be inundated by the enlargement of Helpmekaar Dam. This loss must be considered cumulatively with existing agricultural transformation and other habitat losses in the surrounding landscape. The assessment also identifies good-condition Kouebokkeveld Shale Fynbos on Langrug Ridge, which must be avoided during pipeline installation and associated construction activities.

The Freshwater Assessment (**Appendix 8C**) identifies the permanent alteration or loss of freshwater habitat within the dam footprints as a relevant residual impact. Construction-related erosion, sedimentation and pollution risks can be reduced through the prescribed mitigation measures; however, these measures do not eliminate the permanent habitat changes associated with inundation. The cumulative assessment must therefore distinguish between manageable construction-related disturbance and permanent changes to freshwater habitat.

The updated Hydrological Assessment (**Appendix 8B**) considers the proposed increase in Helpmekaar Dam's storage capacity from approximately 390,000 m³ to 800,000 m³, together with the supplementary Buffer Dam of approximately 27,000 m³. The hydrological modelling considers Helpmekaar Dam and Langrug 2 as part of the combined upstream storage system. It indicates a change in average annual downstream spill at Wydekloof from approximately 3.31 million m³ to 3.17 million m³. This modelled change is relevant to the cumulative consideration of existing and proposed water-storage infrastructure and downstream flow conditions.

Water abstraction, storage and any applicable operational or environmental flow requirements remain subject to the water-use authorisation process administered by the Department of Water and Sanitation (DWS). Implementation of the proposed development must comply with the applicable water-use authorisation and its conditions.

The preferred Green Pipeline Route and alternative Blue Pipeline Route are both considered in this EIR and Appendix 9. The alternatives share the same proposed dam footprints and storage capacities but differ in pipeline alignment and length. The cumulative assessment of the pipeline alternatives therefore considers their respective construction corridors, associated vegetation and soil disturbance, and rehabilitation requirements, rather than attributing different dam inundation or downstream hydrological impacts to the two routes.

From a socio-economic perspective, the proposed additional water-storage and transfer infrastructure is intended to improve irrigation water security and operational flexibility and to support agricultural production and associated employment opportunities. These anticipated benefits are considered alongside the cumulative environmental impacts of the development.

Overall, the cumulative assessment recognises that construction-related impacts can be reduced through implementation of the recommended mitigation measures and the Environmental Management Programme (EMPr), while permanent terrestrial and freshwater habitat losses remain residual impacts. The proposed development must be implemented in accordance with the Environmental Authorisation, the approved EMPr and the applicable water-use authorisation.

12. CONCLUSION AND RECOMMENDATIONS

The following specialist studies were undertaken as part of the Environmental Impact Assessment for the proposed enlargement of Helpmekaar Dam, construction of the supplementary Buffer Dam, installation of the connecting pipeline and associated agricultural development:

- Terrestrial Biodiversity Statement, incorporating botanical, vegetation, plant-species and animal-species considerations (Appendix 8D);
- Freshwater Assessment (Appendix 8C);
- Hydrological Assessment (Appendix 8B);
- Agricultural Compliance Statement (Appendix 8E); and
- Heritage and palaeontological assessments.

The specialist findings and impact assessment presented in this Environmental Impact Assessment Report indicate that the proposed development can be considered for environmental authorisation, subject to the implementation of the recommended mitigation measures and management actions. The assessment recognises that certain impacts, particularly the permanent loss of terrestrial vegetation and alteration of freshwater habitat within the enlarged dam footprint, cannot be eliminated through mitigation.

The recommended mitigation and management measures have been incorporated into the Environmental Management Programme (EMPr), attached as Appendix 10, and should form part of any Environmental Authorisation issued for the proposed development.

The need for the proposed development is to increase irrigation water-storage capacity and improve operational flexibility for Sterkwater Boerdery (Pty) Ltd. The proposal entails increasing the storage capacity of the existing Helpmekaar Dam from approximately 390,000 m³ to 800,000 m³, constructing a supplementary Buffer Dam with a capacity of approximately 27,000 m³, and installing a connecting pipeline. The additional storage and transfer infrastructure is intended to improve irrigation water security and support the proposed conversion of approximately 45 ha of annual cropland to permanent fruit orchards.

The proposed development is located within an established agricultural landscape on Portion 5 of Farm Rietrivier No. 202, near Ceres in the Koue Bokkeveld region. The surrounding area is characterised by cultivated land, existing farm dams, irrigation infrastructure and areas of remaining indigenous vegetation. The enlargement of an existing dam and construction of supplementary infrastructure would take place within this established agricultural setting; however, the existing agricultural character of the area does not remove the need to address impacts on remaining terrestrial and freshwater habitats.

The preferred development comprises the enlargement of Helpmekaar Dam, construction of the Buffer Dam and installation of the approximately 1.7 km Green Pipeline Route. The alternative approximately 2 km Blue Pipeline Route was also considered in the EIR and assessed in Appendix 9. Both pipeline alternatives are associated with the same proposed dam enlargement and Buffer Dam; their principal differences relate to pipeline alignment, length and the associated construction and rehabilitation requirements.

The No-Go Alternative would avoid the additional environmental impacts associated with the proposed dam enlargement, Buffer Dam and connecting pipeline. Existing dam infrastructure and farming activities would continue, but the intended improvements in irrigation water security, agricultural production and associated employment opportunities would not be realised through this project. As reflected in Appendix 9, these are potential project benefits that would not be realised, rather than additional negative environmental impacts caused by the No-Go Alternative.

The heritage assessment identified two isolated Earlier Stone Age artefacts within the transformed Buffer Dam footprint, which were assessed as having no conservation value. The assessment did not identify heritage resources within the assessed Helpmekaar Dam enlargement footprint. Heritage Chance Finds

Procedures must be implemented during construction and any subsequent ground-disturbing activities, in accordance with the applicable heritage recommendations.

The Terrestrial Biodiversity Statement (Appendix 8D) identifies the permanent inundation of approximately 0.6–1 ha of Kouebokkeveld Alluvium Fynbos associated with the enlargement of Helpmekaar Dam. The preferred pipeline corridor must avoid or minimise disturbance of good-condition Kouebokkeveld Shale Fynbos on Langrug Ridge. Suitable topsoil conservation, control of construction disturbance and rehabilitation of temporary work areas are required. Appendix 9 rates the preferred alternative's terrestrial biodiversity impact during construction as Medium Negative before mitigation and Medium Negative after mitigation, reflecting the residual significance of permanent habitat loss.

The Freshwater Assessment (Appendix 8C) identifies potential construction-related sedimentation, erosion, pollution and disturbance of freshwater features, as well as permanent changes to freshwater habitat associated with the proposed dam infrastructure. The prescribed construction controls, rehabilitation measures and operational management requirements must be implemented to minimise avoidable impacts. Appendix 9 rates the preferred alternative's operational freshwater impact as Medium Negative before mitigation and Medium Negative after mitigation.

The Hydrological Assessment (Appendix 8B) considers the proposed increase in storage capacity within the existing agricultural water-storage system. The modelling of Helpmekaar Dam and Langrug 2 as a combined upstream system indicates an increase in average annual irrigation supply for existing irrigation requirements from approximately 1.10 million m³ to 1.26 million m³. The modelled average annual downstream spill at Wydekloof changes from approximately 3.31 million m³ to 3.17 million m³, while its modelled irrigation supply remains unchanged. The applicable Environmental Water Requirements and operational controls must be addressed through the water-use authorisation process.

The Water Use Licence Application is being undertaken with the Department of Water and Sanitation. An Environmental Authorisation issued under NEMA would not, in itself, authorise water use. Construction and operation must comply with the applicable water-use authorisation and its conditions, as well as the Environmental Authorisation and approved EMPr.

The impact assessment in Appendix 9 identifies Medium Negative residual operational impacts for freshwater and terrestrial biodiversity, and a Medium–Low Negative residual cumulative operational impact for the preferred alternative. These findings must be considered alongside the anticipated Medium Positive water-security benefit and Low Positive longer-term socio-economic benefit. The significance ratings do not imply that all environmental impacts can be reduced to Very Low or that permanent habitat losses can be reversed through rehabilitation.

Based on the findings of the specialist studies, the assessment of the development and pipeline alternatives, and the mitigation and management measures incorporated into the EMPr, Environmental Authorisation is recommended for the proposed enlargement of Helpmekaar Dam, construction of the supplementary Buffer Dam, installation of the preferred Green Pipeline Route and associated agricultural development, subject to the competent authority's consideration of the identified residual impacts.

It is recommended that any Environmental Authorisation include conditions requiring implementation of the specialist recommendations, adherence to the approved development footprints and pipeline alignment, protection of sensitive terrestrial and freshwater habitats outside the authorised disturbance areas, implementation of the Heritage Chance Finds Procedures, rehabilitation of temporary construction areas, and compliance with the approved EMPr and applicable water-use authorisation.

13. DETAILS AND EXPERTISE OF THE EAP

This Draft Environmental Impact Assessment Report (Draft EIR) has been prepared by Bianca Gilfillan of EnviroAfrica CC, an Environmental Assessment Practitioner (EAP) with experience in the compilation and management of environmental authorisation processes in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations, 2014 (as amended).

Qualifications and Experience

Bianca Gilfillan is an Environmental Scientist with professional experience in environmental management and environmental impact assessment processes across South Africa. Her experience includes the preparation and management of Basic Assessment Reports (BARs), Scoping and Environmental Impact Assessment Reports (S&EIRs), Environmental Management Programmes (EMPrs), Environmental Compliance Monitoring, Public Participation Processes, specialist study coordination and environmental regulatory compliance.

Her professional experience includes:

- Managing and compiling environmental authorisation applications in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
- Conducting and managing Public Participation Processes in accordance with the Environmental Impact Assessment Regulations, 2014 (as amended);
- Coordinating specialist studies, including botanical, freshwater, hydrological, heritage, geotechnical and other environmental specialist investigations;
- Liaising with competent authorities, commenting authorities, stakeholders and Interested and Affected Parties throughout environmental assessment processes;
- Ensuring compliance with applicable environmental legislation, policies, guidelines and environmental authorisations; and
- Preparing Environmental Management Programmes (EMPrs), Environmental Compliance Reports and associated environmental documentation.

Bianca Gilfillan has been involved in a broad range of environmental assessment projects across multiple sectors, including water resource developments, dams, pipelines, agricultural developments, renewable energy projects, residential developments and conservation-related projects.

Please refer to **Appendix 9A** for the curriculum vitae of the Environmental Assessment Practitioner.

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