RIVER MAINTENANCE MANAGEMENT PLAN (MMP)

for the proposed

DASBERG DAM

ON PORTION 5 OF FARM VAN DER WATTSKRAAL NO.399, SWELLENDAM WESTERN CAPE

DEADP reference number: 16/3/3/2/E3/10/1003/17

MARCH 2018

Compiled by: ***EnviroAfrica cc***

P.O. Box 5367
Helderberg, 7135
Tel: (021) 851 1616
Fax: (086) 5120154

email: admin@enviroafrica.co.za

Unit 7 Pastorie Park
Somerset West
7130
CK 97 46008/23

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 EMP. 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.

RELEVANT QUALITFICATIONS & EXPERIENCE OF THE EAP

This River Maintenance and Management Plan was prepared by Ms Inge Erasmus who has a BA Honours in Geography and Environmental Studies from Stellenbosch University. Before completing her honours degree Inge gained practical experience as a junior environmental consultant at Hatch Goba in Johannesburg from 2014 until 2015. Inge acted as an environmental control officer on a variety of projects in the Northern Cape, conducting environmental compliance audits, as well as being part of a project team working on a major resettlement project for Kumba Iron ore. Inge joined Enviro Africa in February 2017, generally performing duties as an environmental assessment practitioner with regards to NEMA EIA applications.

The whole process and report was supervised by Peet Botes who has more than 10 years' experience in environmental management and environmental impact assessments. Mr. Peet Botes holds a who holds a BSc. (Hons.) degree in Plant Ecology from the University of Stellenbosch (with Nature Conservation III & IV as extra subjects). Since qualifying with his degree, he has been employed for more than 20 years in the environmental management field, first at the Overberg Test Range (a Division of Denel), between Arniston and the De Hoop Nature Reserve, managing the environmental department of OTB and being responsible for developing and implementing an ISO 14001 environmental management system, ensuring environmental compliance, performing environmental risk assessments with regards to missile tests and planning the management of the 26 000 ha of natural veld and adjacent coastline, working closely with CapeNature (De Hoop Nature Reserve). In 2005 he joined Enviroscientific, an independent environmental consultancy specializing in wastewater management, botanical assessments and developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits. He was also responsible for the development of biodiversity section of the Farming for the Future audit system implemented by Woolworths. During his time with Enviroscientific he performed more than 400 botanical and environmental legal compliance audits. During 2010 he joined EnviroAfrica in order to move back to the biodiversity aspects of environmental management. Experience with EnviroAfrica includes NEMA EIA applications, project management, biodiversity- and botanical assessments, environmental compliance audits and environmental control work.

Mr. Botes is also a registered Professional Environmental and Ecological Scientists, since 2005, at SACNASP (South African Council for Natural Scientific Professions) as required in terms of Section 18(1)(a) of the Natural Scientific Professions Act, 2003, since 2005.

TABLE OF CONTENTS

LIST OF APPENDIXES

1. EXECUTIVE SUMMARY

The applicant, Dasberg Boerdery (PTY LTD) proposes to construct a farm storage dam on Portion 5 of the Farm van der Wattskraal, No. 399, about 15,5km east of Riviersonderend and 45,7 km west of Swellendam. The proposed dam wall will be 19,5 m high and will have a capacity of approximately 625 000 cubic meters. The area to be inundated will be approximately 8,8 ha. Water will be used for the irrigation of proposed 105ha of citrus orchards. The citrus orchards will be developed on previously ploughed land, previously used for wheat farming.

A new pipeline, approximately 1.5 km in length and a diameter of about 250 mm will be constructed from the dam to the N2, where it will connect with an existing pipeline. The route has been chosen to avoid the stream/ wetland habitat to the west of the property (Portion 5 of Farm van der Wattskraal No. 399) and will extend through cultivated land. It is proposed the pipeline will cross the N2 within an existing sheep culvert and connect to the existing pipeline on Remainder of the Farm Wattskraal No. 399. The pipeline will be constructed on previously disturbed land and will thus not trigger any listed activities in terms of NEMA 2014, as amended. The total footprint of the dam with associated infrastructure is expected to be approximately 9.55 ha.

The existing road will be used for access.

Botanically the greater part of the property can be described as transformed in terms of intensive agriculture; mainly cereal farming and livestock production. Very little Central Rûens Shale Renosterveld remains and what remains has significant conservation value. These areas must generally be avoided with no further disturbance permitted. However, there is no other logical place for a dam except in the in-stream location, as suggested here, where the remnant renosterveld vegetation will be lost to the construction of the proposed dam. It is unfortunate to lose any more renosterveld notwithstanding that the area has a relatively 'low' classification (ESA2) but a positive outcome is that this dam project has stimulated the intention of the landowner to set aside an area of intact Central Rûens Shale Renosterveld for protection. The botanical specialist suggests that this would successfully compensate for the localized loss of the renosterveld at the Dasberg Dam site. The proposed Dasberg Dam would have a Low negative impact after mitigation, and given positive actions, both the conservation easement and 'Search & Rescue' as mitigation, the development of the dam is supported from a botanical perspective.

In terms of freshwater systems, watercourses within the region in which the dam is located have been impacted as a result of past and present agricultural and anthropogenic activities. The development of the dam within the unchanneled valley bottom wetland will result in additional transformation of the critically endangered East Coast Shale Renosterveld wetland vegetation type within the region. However, the transformation of 1,5 ha of already disturbed wetland habitat is not likely to result in a significant cumulative impact to critically endangered wetland habitat within the region, if the correct mitigation measures are implemented.

Additionally, the area selected for the dam development falls within a Category 2 ESA. These areas are not essential for meeting biodiversity targets but play and important role in supporting the functioning of Critical Biodiversity Areas (CBAs) or protected areas and are often vital for delivery ecosystem services. The management objectives for Category 2 ESAs is to restore or manage the features to minimize impacts on ecological processes and ecological infrastructure functioning, especially soil and water related services, and to allow for faunal movement. Although the development of the dam will result in unavoidable impact of the ESA, it is not considered detrimental for meeting regional biodiversity targets.

1.1 PURPOSE OF THE MMP

The main purpose of this river maintenance and management plan is to guide the applicant and landowner, Mr. Schalk W Viljoen, which actions to follow to prevent avoidable damage to the wetland habitat associated with construction and operations of the proposed Dasberg dam and to enhance the positive benefits of the project. It should be noted that this MMP with its Method Statements (Appendix D1 – D6) should be read in conjunction with the Environmental Management Programme (EMPr) (Appendix 12 of the EIR). It should be noted that these method statements are merely guidelines and must be refined once the applicable contractors are appointed. The department must be informed of any changes to the method statements and MMP.

2. DEFINITIONS AND ABBREVIATIONS:

2.1 DEFINITIONS

Applicant: the person or responsible person from an organization who applied for the proposed activity described in the ROD.

Bund: enclosure under / around a storage facility to contain spillage.

Construction: means the construction period of the project during which the actual works are carried out, deemed to include site establishment, site preparation, the works, maintenance period and decommissioning and is defined as from commencement of site establishment until site handover (practical completion).

Construction site: means the area influenced and affected by the construction activities or under the control of the Contractor often referred to as "the Site".

Construction Supervisor: The person responsible (appointed by the Applicant) to ensure that the construction is carried out to completion on time, within budged and that the Contractor fulfils his obligations in terms of the EMP.

Contaminated water: means water contaminated by the Contractor's activities, *e.g.* concrete water and runoff from plant/ personnel wash areas.

Contractor: the principal persons / company and all other sub-contractors involved in the construction of the project.

Declaration of understanding: Form that is signed by all contractors involved in the construction works of their understanding and acceptance of the EMP and site-specific additions to the EMP.

Development site: boundary and extent of development works and infrastructure.

Environment: means the surroundings within which humans exist and that are made up of:

- the land, water and atmosphere of the earth;
- micro-organisms, plant and animal life;
- any part of the combination of the above two bullets and the interrelationships between them;
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being

Environmental Aspect: Any element of any construction activity, product or services that can interact with the environment.

Environmental Control Officer: The ECO must be independent and suitably qualified and must have a sound knowledge of the environment in which the activity will take place.

Environmental Impact: Any change to the environment, whether adverse or beneficial, wholly or partially resulting from any construction activity, product or services.

Method statement: A statement by the Contractor, describing the scope of intended construction works step-by-step, in order for the ECO and Construction Supervisor to understand the Contractors intentions and be able to comment on, so that they could assist with devising mitigating measures should it be necessary to avoid environmental impact.

No-Go Area(s): An area of such (environmental/aesthetical) importance that no person or activity are allowed within a designated boundary surrounding this area.

Site meetings: Periodic (weekly or monthly) meetings between the ECO, Construction Supervisor and Contractor to discuss construction activities that relate to the environment or any other environmental issues that might arise.

Works: The works to be executed in accordance with a contract.

Start-up meeting: a start-up meeting held on site, before any construction has begun to discuss EMP and determine site specific additions that will be included as the basis for the EMP.

Potentially hazardous substance: is a substance, which, in the reasonable opinion of the Engineer, can have a deleterious (detrimental) effect on the environment.

Precautionary principle: means the basic principle, that when in doubt or having insufficient or unreliable information on which to base a decision, to then undertake actions that will have minimum risk.

Reasonable: means unless the context indicates otherwise, reasonable in the opinion of the Engineer/Project Leader after he has consulted with a person, not an employee of the Applicant, suitably experienced in "environmental implementation plans" and "environmental management plans", both as defined in the Environmental Management Act (Act No 107, 1998).

Solid waste: means all solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

2.2 ABBREVIATIONS

CARA	Conservation of Agricultural Resources Act no. 43 of 1983
CBA	Critical Biodiversity Area
DEA	Department Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning (Western Cape)
DWA	Department of Water Affairs
EA	Environmental Authorization (Record Of Decision) issued by relevant authority for the authorisation to commence construction under certain environmental compliances
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer - Must be a suitably qualified independent environmental consultant appointed to ensure compliance to the EMP
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
ESA	Ecological Support Area
EMP	Environmental Management Plan or Programme
FEPA	Freshwater Ecological Support Area
GPS	Global Positioning System
IHI	Index of Habitat Integrity
HWC	Heritage Western Cape
NWA	National Water Act
NEMA	National Environmental Management Act no. 107 of 1998.
NEM: AQA	National Environmental Management: Air Quality Act 39 of 2004.
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004.
NEM: PAA	National Environmental Management: Protected Areas Act 57 of 2003
NEM: WA	National Environmental Management: Waste Act 59 of 2008.
NFA	National Forest Act 84 of 1998.

NHRA	National Heritage Resources Act 25 of 1999.
NVFFA	National Veld and Forest Fire Act 101 of 1998.
NWA	National Water Act 36 of 1998
PES	Present Ecological State
Sub-WMA	Sub – Water Management Area
WMA	Water Management Area

3. LEGISLATIVE FRAMEWORK

The following specific environmental legislative is applicable to this **Maintenance Management Plan:**

- This Maintenance Management plan is to be approved in terms of the **NEMA EIA** Regulations 2014 (as amended) and only relates to **Activity 19, Listing Notice 1 (GN R.327);**
- The requirements of the **National Water Act 36 of 1998** (as amended);
- The requirements of the **National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA**) in terms of:
    - National list of ecosystems that are threatened and in need of protection (GN 1002 of 9 December 2011).
    - Alien and invasive species list 2016 (GN R. 864 of 29 July 2016).
- **Conservation of Agricultural Resources Act 43 of 1983**, as amended (CARA) in terms of:
    - Combating/preventing erosion; and
    - Combating weeds and invader plants

Overview of other applicable legislation:

- **Constitution of the Republic of South Africa (1996)**: of special relevance in terms of environment is section 24
- **Conservation of Agricultural Resources Act 43 of 1983 (CARA)**: supports conservation of natural agricultural resources (soil, water, plant biodiversity) by maintaining the production potential of the land and combating/preventing erosion; for example, by controlling or eradicating declared weeds and invader plants.
- **Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947),** to control the sell, purchase, use and disposal of agricultural or stock remedies.
- **Hazardous Substances Act 15 of 1973**: to control substances that may cause injury, ill-health, or death through their toxic, corrosive, irritant, strongly sensitizing or flammable nature, or by the generation of pressure
- **National Environmental Management Act 107 of 1998 (as amended):** replaces the Environmental Conservation Act (ECA) and establishes principles for decision-making on matters affecting the environment, and for matters connected therewith.
    - **Environmental Impact Assessment Regulations**: identifying activities (listed activities) for which environmental authorisation must be obtained.
- **National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA):** supports conservation of plant and animal biodiversity, including the soil and water upon which it depends.
    - **National list of ecosystems that are threatened and in need of protection** (GN 1002 of 9 December 2011).
    - **Alien and invasive species list 2016** (GN R. 864 of 29 July 2016).
- **National Environmental Management: Protected Areas Act 57 of 2003 (as amended Act 31 of 2004) (NEMPAA):** To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes.
- **National Environmental Management: Waste Act 59 of 2008 (NEMWA):** To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.
    - **List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment**: Identifies activities in respect of which a waste management license is required.
- **National Forests Act 84 of 1998 (as amended)**: supports sustainable forest management and the restructuring of the forestry sector.
    - **List of protected tree species** (GN 716 of 7 September 2012)

- **National Heritage Resources Act 25 of 1999**: supports an integrated and interactive system for the management of national heritage resources, including supports soil, water and animal and plant biodiversity.
- **National Veld and Forest Fire Act 101 of 1998 (NVFFA):** protects soil, water and plant life through the prevention and combating of veld, forest, and mountain fires
- **National Water Act 36 of 1998 (NWA):** promotes the protection, use, development, conservation, management, and control of water resources in a sustainable and equitable manner.

4. INTRODUCTION AND PROJECT BACKGOUND

It is proposed that a farm storage dam be constructed on Portion 5 of Farm van der Wattskraal No. 399. Water will be used for the irrigation of proposed 105ha of citrus orchards.

The dam will be located on existing agricultural land (wheat farming) within the undulating Rûens veld and on the same property where the 100ha of the 105 ha citrus orchards will be established. The location was chosen to ensure the project life cycle costs are minimised (gravity feed vs. pumping cost etc.) as no pump station will be required and water will flow with gravity from the water source to the dam.

The citrus orchards will be developed on agricultural land previously used for wheat farming. It should be noted that existing historical crop lands will be used for the cultivation of citrus orchards and that the current footprint will not be enlarged. It is thus not virgin/ natural soil that will be disturbed, but previously cultivated, previously ploughed land. Please refer to **Appendix B1** for **layout plans** for the proposed dam and for the cultivation of the orchards.

Figure 1 of **Appendix B1** provides a layout plan for the proposed Dasberg dam as well as the proposed layout for the pipeline extension and shows Portion 5 of van der Wattskraal 399 (5/399) and Remainder of farm van der Wattskraal 399 (RE/399). **Figure 3** of **Appendix B1** provides a layout plan of the planned 105ha orchard cultivation in relation to the proposed dam. It is proposed that 5ha of orchards will be developed on Remaining extent of van der Wattskraal 399 (RE/399), west of the N2. 100 ha of orchards will be developed on Portion 5 of farm van der Wattskraal 399 (5/399), the same property on which Dasberg dam is proposed.

The proposed dam will have a maximum dam wall height of 19,5 m, a dam wall length of approximately 550 m, and will have a capacity of approximately 625 000 cubic meters. The water surface at full capacity will be approximately 8,8 ha. **Figure 1** of **Appendix B1** provides a layout plan of the proposed Dasberg Dam and **Figure 3** shows the proposed Dasberg dam design drawing. **Appendix 9 of the EIR** contains the Preliminary Design Report for the proposed dam which includes design drawings of the dam and associated infrastructure. Access to the dam will be from existing farm roads, with access to the farm from the N2.

A new pipeline, approximately 1.5 km in length and a diameter of about 250 mm will be constructed from the dam to the N2, where it will connect with an existing pipeline. Refer to **Figure 5 & 6** of **Appendix B1** for the layout plan of the proposed pipeline route. The route has been chosen to avoid the stream/ wetland habitat to the west of the property (Portion 5 of Farm van der Wattskraal No. 399) and will extend through cultivated land, (please refer to **Appendix B2 Figure 3** for the sensitivity map). It is proposed the pipeline will cross the N2 within an existing sheep culvert and connect to the existing pipeline on Remainder of the Farm Wattskraal No. 399. The pipeline will be constructed on previously disturbed land and will thus not trigger any listed activities in terms of NEMA 2014, as amended. The total footprint of the dam with associated infrastructure is expected to be approximately 9.55 ha.

For the proposed BEE project of 105ha citrus orchards. Water will be obtained from Eksteenkloof within existing water extraction rights (240 000 m^3). An additional 120 000m^3 abstraction from Eksteenskloof will be needed to be combined with the existing 240 000m^3 (to be transferred to van der Watts kraal399/5). An additional 232 000m^3 will be bought and transferred to the Dasberg Dam for storage, as well as an additional 60 000m^3 of summer listing waster which does not have to be stored. This will give a total of 652 000m^3 water that can be stored in the proposed dam. A WULA process, was submitted in April 2017 of which the reference number is **Ref 4/5/1/H10J/Dasberg 399/5**. Please refer to **Appendix 5.2.3.2 & 5.2.3.7 of the EIR.**

5. SITE LOCATION AND DESCRIPTION

The site is located on Portion 5 of Farm van der Wattskraal No. 399, about 15,5 km east of Riviersonderend and 45,7 km west of Swellendam in the Western Cape (See Figure 1 below and **Appendix A**). The dam will be located on existing agricultural land (wheat farming) within the undulating rûens veld.
The site coordinates for the dam wall are: S 34° 7'52.79", E20° 02'53.51".
The Surveyor General code for the property is: C073000000003990005

Access to the farm is from the N2, the site can be accessed via existing access roads on the property.

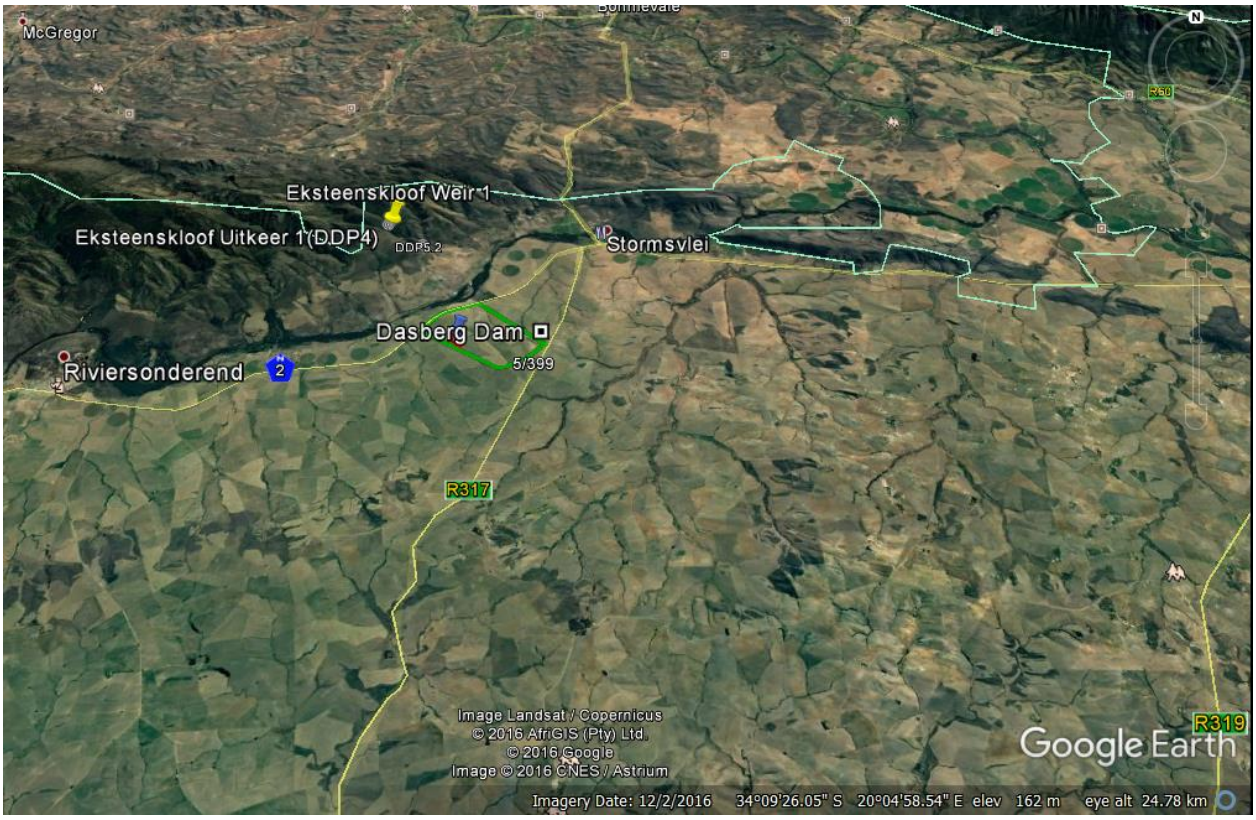

Figure 1: Areal image showing the site location, with a green polygon, in proximity to surrounding towns and roads

5.1 BIODIVERSITY FEATURES

According to the Overberg CBA overlay map, the proposed dam falls within an Ecological Support Area (ESA). The dam will also absorb the upper reaches of a small stream (and its buffer zone of approximately 40 m) which contains Central Rûens Shale Renosterveld, classified as critically endangered.

A Botanical Assessment was conducted by Bergwind Botanical and a Freshwater impact assessment was conducted by EnviroSwift. For the specialists terms of reference see the full specialist report attached as Appendix 7 and section 8 of the EIR

5.1.1 Botanical:

Key findings from the Botanical impact assessment include:

- A single Critically Endangered (A1) vegetation type, Central Rûens Shale Renosterveld would have been the original vegetation type found over an extensive area and over most of Van der Watts Kraal. At the study site this vegetation type persists as a small remnant on both sides of the stream below the existing two small dams.

- The remnant renosterveld was found to be species-rich but not all species were in flower or were identifiable even though the survey was undertaken in spring. No species of conservation concern were recorded but the importance of the remnant should nevertheless not be underestimated.
- It is estimated that approximately 1.5 ha of the remnant renosterveld would be lost due to dam construction and inundation (operation). This is roughly half of the renosterveld found along the stream.
- The impact of the loss of Central Rûens Shale Renosterveld at a local scale at the Dasberg Dam site would result in Medium negative impact but the proposed conservation easement and recommended 'Search and Rescue' (see below) would provide mitigation for the lost habitat.
- Plants that can be relocated such as geophytes (bulbs) and succulents e.g. *Trichodiadema sp*. should be located, marked and rescued before the dam-building commences. The rescued plants should be relocated into the remaining part of the remnant not affected by the dam or to the area of the conservation easement.
- The proposed site falls within an Ecological Support Area 2 (ESA2) and thus has a conservation merit but is not essential to meeting conservation targets.
- The area is also classified as a Freshwater Ecosystem Priority Area.

Native flora observed at the site included *Arctotis acaulis, Asparagus capensis, Babiana* sp., *Brunsvigia* cf. *orientalis, Chrysocoma* sp., *Cotula turbinata, Cyphia* cf. *digitata, Drosanthemum* sp., *Galenia africana, Gladiolus gracilis, Helichrysum crispum, Linum cinereum, Microloma sagittatum, Moraea ciliata, Oxalis purpurea, Oxalis* sp. (red), *Polygala garcinii, Romulea flava, Sparaxis* sp., *Syringodea longituba, Tenaxia stricta, Trachyandra* sp., *Trichodiadema* sp., *Tulbaghia alliacea, Indigofera heterophylla*, *Diascia capensis, Romulea* cf. *rosea, Ursinia nana* and *Zaluzianskya* sp.

No alien flora was observed on the site.

5.1.2 Freshwater:

A Freshwater impact assessment was conducted by EnviroSwift..

Key findings from the Freshwater impact assessment include:

- The watercourse in which the dam is proposed falls within the Southern Coastal Belt Ecoregion and within the Breede Water Management Area (WMA) and Riviersonderend sub-Water Management Area (sub-WMA).
- The quarterly catchment indicated for the project footprint is H60K and the applicable wetland vegetation unit is the East Coast Shale Renosterveld, listed as critically endangered.
- The proposed dam will intersect a natural valleyhead seep wetland and floodplain wetland which are both indicated to be within a critically modified condition.
- The catchment in which the proposed dam falls has not been selected as a River Freshwater Ecosystems Priority Area (FEPA).
- According to the Western Cape Biodiversity Spatial Plan for Swellendam Municipality, the proposed dam will intersect an Ecological Support Areas (ESA 2) which is associated with a watercourse and wetland area. (ESA 2 are areas likely severely degraded or with no natural cover remaining *which require restoration*. These areas are not essential for meeting biodiversity targets but play a vital role in supporting the functioning of Critical Biodiversity Areas (CBAs) or protected areas, vital for delivering ecosystem services).
- The proposed dam will be located on an ephemeral watercourse which has been indicated as a combination of two Hydrogeomorphic (HGM) features namely valleyhead seep wetland and floodplain wetland as per the WCBSP. However, as per inspection by EnviroSwift the feature was considered to be more represented of an unchanneled valley bottom wetland.

- The unchanneled valley bottom wetland was dominated with obligate wetland species *Juncus* sp. with scattered, isolated patches of *Scirpus nodosus* and *Phragmites australi.*
- Cultivation of wheat within the wetlands catchment has resulted in decreased surface roughness (less natural vegetation cover), exposure of bare soils and in some areas compaction of soils. This has decreased the natural infiltration rates of soils and has increased stormwater runoff and wetland flood peaks.
- Three small impoundments have been created in the upper reaches of the unchannelled valley bottom wetland and a road has also been constructed immediately downstream of the area earmarked for the construction of the dam. The features have resulted in the alteration of the natural hydrological flow patterns through the wetland. The dams impede surface flow to downstream wetland habitat. All areas upstream of the impoundments and the road which would have been characterised by seasonal and temporary wetland habitat under natural circumstances remains saturated for longer.
- The stockpiling of rocks within the unchannelled valley bottom wetland has had an impact on the natural flow patterns through the wetland and has resulted in the loss of natural wetland vegetation in stockpile areas.
- An increase in sediment laden stormwater runoff from surrounding disturbed areas has resulted in the erosion and sedimentation.
- The overall wetland health score calculated for the unchannelled valley bottom wetland in its present state falls within Category C – Moderately modified: A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact.
- The development of the proposed dam will result in a decrease in the hydrology and vegetation condition of the wetland from a Category C Present Ecological State (PES) (Moderately modified) to a Category E PES (Seriously Modified). The overall health of the wetland after the development of the dam will fall within a Category D PES (Largely modified: A large change in ecosystem processes and loss of natural habitat and biota and has occurred).
- In terms of the Ecological Importance and Sensitivity (EIS). The unchannelled valley bottom wetland was determined to be of a moderate EIS (Wetlands that are ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers).
- It is considered unlikely that the disturbed and degraded wetland habitat associated with the unchannelled valley bottom wetland will support rare and endangered species or populations of unique species. The wetland is however likely to provide suitable breeding and foraging habitat for faunal species considered to be more common within the region.
- The unchannelled valley bottom wetland is not formally protected, however, the East Coast Shale Renosterveld wetland vegetation group is critically endangered within the region.
- The wetland calculated an overall low PES score (Largely modified), and therefore scored low for ecological integrity.
- The wetland has a low diversity of habitat types.

DESCRIPTOR	NAME / DETAILS
Water Management Area (WMA)	Breede Overberg WMA and Riviersonderend sub-WMA
Catchment Area	Breede River
Quaternary Catchment	H60K
Current Present Ecological State (PES)	C – Moderately modified
Ecological importance and sensitivity (EIS)	Moderate
River Freshwater Ecosystems Priority Area (FEPA) or Biodiversity conservation value	The site of the proposed activity is not within a FEPA
Type of water resource	River
Co-ordinates of applicable river portion (taken as the property boundaries)	• S34° 07' 56.12" E20° 02’ 40.54" (Approximately 250 m from the dam wall towards the South-western boundary of the property) • S34° 07' 42.81" E20° 03' 13.62" (Approximately 250 metres from the toe of the dam towards the North-eastern boundary of the property.)
Fresh Water Specialist	Mrs. Natasha van Haar and Louise Zdanow from EnviroSwift

6. OBJECTIVES OF MAINTENANCE ACTIVITIES/ TERMS OF REFERENCE

The main objectives of this river maintenance and management plan (MMP) is to guide the landowner and other responsible parties to correctly implement mitigation measures to protect the integrity of the wetland habitat and to minimise the impact of the proposed Dasberg dam on the receiving environment. This MMP aims to set guidelines for the correct management procedures and methods, in such a manner that they may be flexible. This MMOP will facilitate the landowner

6.1 TERMS OF REFERENCE

- Undertake a site visit in order to assess the general site area;
- Desktop review of DEADP's Maintenance Management Plan Guidelines;
- Identify the environmental risks associated with the maintenance management activities;
- Recommend appropriate, practicable mitigation measures that will reduce all major impact or enhance potential benefits, if any;
- Compile an MMP that takes into account all the aspects outlines in the DEADP Maintenance Management Plan Guidelines.

7. BRIEF DISCRIPTION OF MAINTENANCE ACTIVITIES:

The following section briefly describe the maintenance activities for the various phases of the project. Site specific Method Statements were developed for river maintenance from recommendations made by the specialists. Please refer to **Appendix D1 – D7** for more detailed Method Statements. The Environmental Management Programme (EMPr) (**Appendix 12 of the EIR**) should be read in conjunction with these Method Statements.

It should be noted that these method statements are merely guidelines and must be refined once the applicable contractors are appointed. The department must be informed of any changes to the method statements and MMP.

7.1 IMMEDIATE WORK:

7.1.1 Pre-construction maintenance objectives:

Objective: Conserve as much of the remaining Renosterveld that does not fall within the footprint of the dam wall or dam itself
Mitigation Action: • Demarcate the development footprint/working area and put up signage to ensure construction activities only remain within the dedicated area **(Please refer to section 7.10.4 of the EMPr & MS07 Appendix D7)** • It should be noted that the landowner agreed upon a conservation easement whereby another area of renosterveld is being set aside for protection in compensation for the loss caused by the dam. • Environmental awareness training should be conducted with all staff **(Please refer to point 5.6.2 below as well as Section 7.5.1 of the EMPr)**

Objective: Mitigate where possible the loss of seasonal and temporary wetland habitat and vegetation. Seasonal and temporary wetland habitat will be lost from the wetland system during earthmoving activities associated with the construction of the dam and the dam wall.
Mitigation Action: • Demarcate the development footprint/working area and put up signage to ensure construction activities only remain within the dedicated area **(Please refer to section 7.10.4 of the EMPr & MS07 Appendix D7)** • Clearing of vegetation, stripping and topsoil management **(Please refer to section 7.10.8 of the EMPr & MS06 Appendix D7)**

Objective: Protect the bulbs and succulents found on site

Protect the bulbs and succulents found on site specifically within that 1.5ha renosterveld fringing the two parallel strips, that will be lost due to the construction of the proposed Dasberg Dam by conducting an intensive search and rescue operation.

Mitigation Action:

- A Botanist must be appointed to conduct a walk-through survey to identify all listed species that may occur within the project area, giving more attention to the 1,5ha renosterveld area fringing the stream in two parallel strips, that would be lost. This can be supplemented by observations from the ECO prior to construction.
- Demarcation of the search and rescue area as per recommendations of the botanist appointed to conduct the search and rescue operation.
- Rescued plants must be planted into a container to be housed within a temporary nursery on site.
- The ECO to give permission for topsoil removal and vegetation clearing only to start when all search and rescue operations have been completed. The ECO should monitor construction activities to ensure that remnant renosterveld (that does not fall within the construction footprint) is not disturbed.
- The collecting of plants by unauthorized persons should be prevented and signs stating so should be placed at the entrance to the site.
- It is suggested that the area below the dam wall (to the west of the dam that will not be affected by the development of the dam) should be the receptor area for the plants that are rescued from the area of the dam. The rocky nature of the terrain will provide many niches for various plant species.
- The size of planting holes should be sufficiently large to ensure the entire root system is well covered with topsoil. During transplanting care shall be taken to limit or prevent damage to roots.
- Topsoil material will be replaced within the planting holes. Any remaining material will be responsible spread around disturbed areas for rehabilitation.
- Plants should be watered immediately after transplanting to help bind soil particles to the roots and facilitate the new growth of functioning roots
- **Please refer to Method Statement 1: MS01 Search and Rescue plan (Appendix D1)**

Objective: Mitigate and monitor alien plant invasion on the property throughout the project and after construction.

The site is currently relatively clear of alien invasive plant species. Alien invasive plant species that may be found on site include: *Acacia saligna* (Port Jackson), *Acacia cyclops* (Rooikrans), *Acacia Mearnsii* (Black Wattle).

Mitigation Action:

- Removal of the invasive and alien plants should be according to the appropriate invasive plant clearing guidelines/ methods provided by the Working for Water Programme
- Alien and invasive plant species should be removed manually as far as possible, form the construction footprint as well as any areas on the property. All work will be done by hand (manually), either by pulling, using shears, hand saws or chainsaws (depending on the size of the tree). The use of vehicles or mechanical means for alien removal will be prohibited within the riparian zone.
- The use of herbicides should be avoided. However, only herbicides which have been certified and proved for wetland/ aquatic environments by an independent testing authority may be considered.

- As per the freshwater specialist recommendations, removed alien plant material should be covered when transported to prevent it from being blown away.
- **Please refer to Method Statement 2: MS02 Alien invasive plant management (Appendix D2).**

7.1.2 Construction maintenance objectives:

Objective: Mitigate the disturbance of habitat and compaction of soils up and down stream of the proposed dam due to construction activities/ maintenance activities.

Construction related activities such as the indiscriminate movement of vehicles and personnel and the dumping of excavated materials may result in the disturbance of wetland vegetation and the compaction/ disturbance of soil located up and down stream of the proposed dam. Disturbance may also result in the proliferation of alien and invasive plant species.

Mitigation Action:

- Demarcate the development footprint/working area and put up signage to ensure construction activities only remain within the dedicated area **(Please refer to section 7.10.4 of the EMPr & MS07 Appendix D6)**
- Immediately rip compacted soil to a depth of 300mm and reprofile the area according to natural terrain units where any accidental disturbance to portions of the unchanneled valley bottom wetland falling outside of the demarcated construction footprint area has taken place.
- If the disturbed area will be prone to erosion (sheet runoff or formation of gullies), it is recommended that straw bales (not Lucerne or hay) are used to intercept the bulk of the runoff. The bales should be placed strategically along contour lines and pegged. Disturbance and removal of vegetation within the immediate vicinity of the area where the bales are placed should be kept to a minimum.
- Sediment should be cleared manually as needed.
- If stockpiling of materials is required, stockpiles must be placed 32m from the border of the unchanneled valley bottom wetland.
- Prohibit dumping of excess excavated material within the unchanneled valley bottom wetland.
- Once construction is completed, all construction waste, rubble and equipment must be removed and disposed of in an appropriate manner as per the EMP.
- After construction, remove alien invasive plants manually as far as practically possible, from the construction footprint as well as any areas accidentally disturbed (**Please refer to MS 02).**
- **Please refer to Method Statement 3: MS03 Mitigate compaction of soil up and down stream of the dam due to construction/ maintenance activities (Appendix D3).**

Objective: Mitigate the increased stormwater runoff, erosion and sedimentation during construction

An increase in stormwater runoff from cleared, disturbed and compacted areas may result in an increase in stormwater flows and flow velocities into the unchanneled valley bottom wetland which can cause erosion. Earth moving activities can also result in an increase in the runoff of sediment onto the downstream wetland habitat.

Mitigation Action:

- It is suggested that the development of the dam should be undertaken during the dry summer months.
- Erosion control measures must be implemented to prevent erosion and sedimentation of downstream wetland areas. These methods can include the strategic placement of straw bales (not Lucerne or hay) which will divert stormwater away from the areas susceptible to erosion.

- Strategically divert runoff from areas where earth moving activities is undertaken in the direction of pegged straw bales where required, in an attempt to intercept sediment-laden runoff before it reaches downstream wetland habitat.
- Protect stockpiles, if required, from erosion using tarp or erosion blankets.
- Seed the dam wall after construction with indigenous grass that has a good soil binding capacity such as *Cynodon dactylon* or stabilised with geotextiles in order to prevent erosion.
- **Please refer to Method Statement 4: MS04 Runoff, erosion and sedimentation control during construction/ maintenance activities (Appendix D4)**

Objective: Mitigate water quality impairment of the wetland habitat during construction phase

The movement of vehicles through the unchanneled valley bottom wetland increases the possibility of the contamination of the wetland by hydrocarbons which may leak from vehicles. Runoff cement and other construction related materials could also cause contamination of the wetland.

Mitigation Action:

- Avoid the use of infill material or construction material with pollution / leaching potential.
- Clean up any spillages (e.g. concrete, oil, fuel), immediately. Remove contaminated soil and dispose of it appropriately.
- Store fuel, chemicals and other hazardous substances in suitable secure weather-proof containers with impermeable and bunded floors to limit pilferage, spillage into the environment, flooding or storm damage.
- Inspect all storage facilities and vehicles daily for the early detection of deterioration or leaks.
- Dispose of used oils, wash water from cement and other pollutants at an appropriate licensed landfill site. Disposal of any of these within the valley bottom wetland should be strictly prohibited.
- Dispose of concrete and cement-related mortars in an environmental sensitive manner (can be toxic to aquatic life). Washout should not be discharged into the valley bottom wetland.
- Provide portable toilets where work is being undertaken. These toilets must be located at least 32m from the boundary of the valley bottom wetland and must be serviced regularly in order to prevent leakage/spillage.
- **Please refer to Section 7.10 of the EMPr Appendix 12 of the EIR for Standard Operating Procedures that will apply**

Please also refer to **Method Statement 7: MS07** which is draft Method Statement for the general construction activities for the proposed Dasberg dam.

7.1.1 Operations maintenance objectives:

Objective: Mitigate erosion of downstream wetland habitat resulting from water discharge during operational phase

Concentrated discharge water release from the pipe may result in the erosion and incision of the downstream wetland area where the water is released. Concentrated release of bottom water from the dam may also result in erosion at the area where the water is discharged.

Mitigation Action:

- Promote diffuse flow at discharge areas. Diffuse flow may be promoted with the use of perforated pipes at outlets or with the use of spreaders or rip-rap mattresses at discharge points.
- If vegetation does not establish after construction, revegetate discharge areas with wetland species indigenous to the area. Vegetation will aid in dispersing concentrated flows and will decrease the velocity and erosive potential of flows. Furthermore, the roots of vegetation will aid in binding the soils thereby reducing the possibility of erosion.
- **Please refer to Method Statement 5: MS05 Erosion control of downstream habitat due to discharge water during operations (Appendix D5)**

Objective: Mitigate and monitor alien plant invasion on the property throughout the project and after construction.

The site is currently relatively clear of alien invasive plant species. Alien invasive plant species that may be found on site include: *Acacia saligna* (Port Jackson), *Acacia cyclops* (Rooikrans), *Acacia Mearnsii* (Black Wattle).

Mitigation Action:

- **Please refer to Method Statement 2: MS Alien Invasive Plant Eradication Plan**

Objective: Ensure discharge points do not become blocked with sediment, debris, driftwood/nuisance vegetation

Mitigation Action:

- Removal of blockages must be conducted by hand wherever possible
- Use of machinery should only be as a last resort
- All debris, sediment and nuisance vegetation should be removed and properly disposed off
- **Please refer to Method Statement 6: MS06 Removal of sediment, debris, driftwood/ nuisance vegetation at discharge points (Appendix D6)**

7.2 FUTURE MAINTENANCE WORK:

The engineer responsible for the design and building of the dam must submit Operating, Maintenance and Emergency plan to DWS as a requirement of the dam safety regulation after construction which must be implemented.

The MMP should be approved by the deciding authority and subsequently complied with by the landowner and responsible parties during the pre-construction, construction and operational phase of the project. Should future maintenance activities be required, the principles and mitigation measures set out in the method statements still apply and must be adhered to.

The following additional general management activities and mitigation measures have been identified and must be implemented, should future maintenance management activities be conducted:

- Repairs and maintenance should be undertaken within the dry season, except for emergency maintenance works.
- The contractor must demarcate the boundaries of the site or area scheduled for maintenance during the maintenance management activities as required.
- Where at all possible, existing access routes should be used. In cases where none exist.
- Responsible management of pollutants through ensuring handling and storage of any pollutants is away from the watercourse. When machinery is involved, ensure effective operation with no leaking parts and refuel outside of the riparian area, at a safe distance from the watercourse to manage any accidental spillages and pose no threat of pollution.
- At no time should the flow of the watercourse be blocked (temporary diversions may be allowed) nor should the movement of aquatic and riparian biota (noting breeding periods) be prevented during maintenance actions.
- No new berms can be created.
- In circumstances which require the removal of any top soil, this must be sufficiently restored through sustainable measures and practices.
- Concerted effort must be made to actively rehabilitate repaired or reshaped banks with indigenous local vegetation.
- No deepening of the watercourse beyond the original, pre-damage determined thalweg, unless such deepening is directly related to the natural improved functioning and condition of such a watercourse.
- The build-up of debris/sediment removed from a maintenance site may:
    - be utilised for the purpose of in-filling or other related maintenance actions related to managing erosion, which form part of an adopted MMP;
    - not be used to enlarge the height, width or any extent of existing berms;
    - not be deposited anywhere within the watercourse or anywhere along the banks of a river where such action is not part of the proposed maintenance activity (ies). Material that cannot be used for maintenance purposes must be removed out of the riparian area to a suitable stockpile location or disposal site. Further action and consideration may be required where the possibility of contaminated material may occur, such as in urban watercourses.
- The use of foreign material, such as concrete, rubble, woody debris and/or dry land based soil, is strictly prohibited from being used in maintenance actions, unless for the specific purpose of repairs to existing infrastructure, coupled with appropriate mitigation measures.

8. RESPONSIBLE PARTIES

- **The Applicant/client** – the applicant is responsible for employing the Contractors for the duration of the maintenance work. The contractor will employ the ECO. The applicant/ client will ensure, as a signatory to the MMP, that the Contractor fulfil their obligation in terms of this MMP

  For this project the applicant is also the land owner, namely Dasberg Boerdery (Pty) Ltd, who is represented by Mr. Schalk W Viljoen. Mr. Viljoen will be the permanent resident on the property and also responsible for the correct implementation of the river maintenance management plan.

- **Principal agent** - the Principal Agent is appointed by the client and is responsible to the client for ensuring that the maintenance work is carried out to completion on time, in budget and that the Contractor fulfils their obligations in terms of the MMP. The Principal Agent and ECO are expected to develop a close working relationship and to communicate frequently. The Principal Agent must be recognized as the senior authority on site and all communications and instructions between the ECO and the Contractor must occur via the Principal Agent. The Principal Agent is also responsible for deducting environmental penalties from the Contractor. The Principal Agent must ensure that the Contractor has a copy of this MMP and all approved Method Statements and that the Contractor is familiar with the relevant documentation.

- **The ECO** – the ECO must be appointed prior to the commencement of any maintenance activities. The ECO will advise the Contractor of any environmentally related issues during the maintenance phase of the development.
  - The responsibilities of the ECO will include monitoring of compliance of the MMP by the contractor
  - The ECO has the authority to recommend the cessation of works or any portion of the maintenance activity to the Principal Agent. This will be triggered if in his/her opinion the activity has caused or will imminently cause significant damage and/or harm to the environment or is in contravention of the relevant environmental legislation/permits/authorizations applicable to the site and/or activity/ies.
  - If the Contractor fails to show adequate consideration to the MMP or the recommendations of the ECO, then the ECO may recommend that the Contractor's representative or any employee/s responsible for not showing adequate consideration to the MMP are removed from the site. Alternatively, the ECO may recommend that all maintenance work on site be suspended until the matter is remedied. All costs will be carried by the Contractor.
  - Should modifications to this document be required, these must be agreed to by all parties concerned.

- **The Contractor** – the Contractor will adhere to the conditions of this MMP and ensure that all of its sub-Contractors, employees, suppliers, agents and so forth, for whom the Contractor is fully responsible for their actions on site, are fully aware of this MMP, its requirements and the consequences of any breach of the requirements of this MMP. The Contractor is fully responsible for implementing the MMP. The Contractor will ensure that works on site are conducted in an environmentally responsible manner and in accordance with the requirements of this MMP.

- **Council Representative** – will be an appropriately qualified environmental officer of the City of Cape Town. This representative will monitor compliance of this MMP by the client through the ECO.

- **Problematic Issues** – should problematic issues arise, as identified by the ECO, the ECO has the authority to call a special meeting with the Principal Agent to address and rectify the matter.

8.1 CONTACT DETAILS OF APPLICANT/ CLIENT

Relevant parties	Dasberg Boerdery (Pty) Ltd
Maintenance Proponent	Mr. Schalk W Viljoen
RSA Identity no.	6604185125088
Landowner	Dasberg Boerdery (Pty) Ltd
Address:	P.O. Box 21 Riviersonderend 7250
Tel:	028 261 1565
Fax:	086 768 5817
Cell:	082 441 9471
Email:	schalk@whalemail.co.za

9. ENVIRONMENTAL AWARENESS TRAINING

The applicant (who is also the landowner) has been involved during the NEMA EIA application process and understands the implications off the recommendations made by the various specialists' reports, especially the freshwater specialist. By signing the declaration of understanding **(Appendix E)** the applicant declares that he understands his responsibility towards the implementation of the MMP and EMPr.

General awareness training will be given (as needed) in accordance with the EMPr **(Section 7.5.1 of the EMPr)**.

- An ECO should be appointed prior to the commencement of any maintenance activities.
- The ECO should train the Contractor on site in order to ensure that all parties involved are familiar with the potential impacts and environmental risks of the maintenance and monitoring activities as week as the mitigation measures to reduce or avoid these impacts and potential pollution or degradation of the site and surrounding environment.

As a minimum, the following should be included in the awareness programme:

- Explanation of the importance of this MMP;
- Discussion of the potential environmental impacts of maintenance activities;
- Explanation of the management structure of individuals responsible for matters pertaining to this MMP;
- employees' roles and responsibilities, including emergency preparedness (also refer to **Section 8.11 of the EMPr**);
- Explanation of the mitigation measures that must be implemented when carrying out maintenance activities; and
- Explanation of the Environmental Do's and Don'ts (please refer to the **Appendix 3 of the EMPr**) for the Environmental Education section).

Attention should be focussed on the following areas of sensitivity:

- Removal/ disturbance of riparian vegetation;
- Aquatic habitat disturbance
- Soil erosion and sedimentation; and
- Water Quality degradation due to siltation and debris.

The awareness training for the maintenance activities should aim to prevent, and where prevention is not possible, mitigate detrimental health, safety and environmental impacts. In particular, it should promote awareness of environmental risk and management thereof.

10. GENERAL CONTROL

The following additional general management activities and mitigation measures have been identified and should be implemented where required during the maintenance management activities:

Description of the Activity & Associated Impacts	**Site Boundaries and No-Go Areas**
Measures to be implemented during maintenance activities	• The Contractor must demarcate the boundaries of the site or area scheduled for maintenance during maintenance management activities as required. • The minimum area scheduled for the maintenance activities should be demarcated. • Access to the site during maintenance activities must be restricted to ensure to only the required personnel in order to gain access via the designated, controlled access points. Sensitive areas must be demarcated in conjunction with the ECO prior to any maintenance work starting on site.

Description of the Activity & Associated Impacts	**Use of Materials** **Potential environmental impact as a result of the use/misuse of inappropriate materials**
Measures to be implemented during maintenance activities	• The principle of "re-use and recycle" (i.e. try to use recycled materials) should be implemented as far as possible on site for all maintenance related activities. • The Contractor must at all times carefully consider the requirements of the NEMA Principles and take appropriate measures to implement such as far as practicably possible.

Description of the Activity & Associated Impacts	**Occupational Health and Safety** **Potential health and Safety Impacts associated with the maintenance activities on site**
Measures to be implemented during maintenance activities	• All people working on site are responsible for their own safety on site. • Contractors must at all times comply with the relevant statutory requirements including the Occupational Health and Safety Act, Act 85 of 1993. • A comprehensive site specific first aid kit must be available on site at all times. • At least one person trained in safety and first aid and familiar with the first aid equipment on site must be present on the site at all times. Emergency procedures must also be established prior to the start of maintenance operations on site.

Description of the Activity & Associated Impacts	Waste Management Possible pollution of or damage to the environment in the general areas of the site, as a result of incorrect or poor waste management.
Measures to be implemented during maintenance activities	**Liquid waste:** (if machinery is used) • Use of machinery should only be as a last resort • Liquid dispensing receptacles (e.g. lubricants, diesel, shutter oil etc.) must have drip trays beneath them/beneath the nozzle fixtures. • Material safety data sheets (MSDS) must be available on site (if required) where products are stored, so that in the event of an incident, the correct action can be taken. • Depending on the types of materials stored on site during the maintenance activities, suitable product recovery materials (such as Spillsorb or Drizit products) must be readily available. Vehicles should ideally be washed at their storage yard as opposed to on site. • Storm water must be managed in such a way that no overland flow is possible onto any area of the site which could contain potential contaminants (such as concrete mixing areas, material and hazardous storage areas from any adjacent area). **Solid waste:** • Waste must be categorized by the Contractor and disposed of in a suitable manner into separate waste streams (this includes general, hazardous and recyclable waste) only at authorised waste disposal facilities. • The Contractor must provide an adequate number of waste receptacles for the duration of the maintenance management activities for general waste at points around the site as well as for hazardous and recyclable waste. • Waste is to be disposed via a licensed waste disposal Contractor. • The frequency of collections/emptying of waste receptacles will be of such a frequency that waste receptacles do not overflow. Particular care must be taken with the disposal of materials that could be wind-borne or waterborne to ensure that the release of these materials is minimised (the latter is a requirement for hazardous waste). The use of netting covers or similar sealed containers must be implemented as and when required by the ECO. • Areas demarcated for specific activities including food consumption must have suitable waste receptacles provided. • Wherever possible recycling must be carried out. • No dumping within the surrounding area is to be permitted. No burning of solid waste is allowed. • All material used by the Contractor during the maintenance management activities must be managed in such a way that it does not cause pollution, or that it minimises pollution. In the event of a spillage, the Contractor should have suitably trained personnel who can correctly clean up any spillage in an efficient and environmentally sound manner.

Description of the Activity & Associated Impacts	**Erosion Control** **Erosion of soil and material resulting along the impacted areas.**
Measures to be implemented during maintenance activities	• Soil erosion on site must be prevented at all times. • Maintenance activities should preferably be undertaken in the low rainfall months when the potential for erosion impacts from the maintenance activities can be contained.

Description of the Activity & Associated Impacts	**Fire Safety** **Potential fire risk associated with the maintenance activities on site.**
Measures to be implemented during maintenance activities	• Fires and burning of waste on site should not be allowed. • Open fires will not be permitted anywhere on the site during the maintenance activities.

11. REHABILITATION SPECIFICATIONS AND SITE CLEAN-UP

The following measures have been identified to ensure that restoration and rehabilitation of the environment affected by the maintenance activity following the completion of these activity:

- The contractor shall be responsible for rehabilitating (vegetation planting etc. where applicable) all disturbed areas during the maintenance activities to the satisfaction of the ECO.
- Vegetation to be replanted shall be indigenous species that are endemic to that region only. Any invasive alien plants within the disturbed area should be removed according to **MSO2 Appendix D2** according to the guidelines provided in the Working for Water Programme.
- Any soil and vegetation cover removed during the maintenance activities should be replaced at the same level as the existing level.
- All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO.
- The implementing agent shall clear and clean the site and ensure that everything not forming part of the permanent works is removed from site before issuing the completion certificate or as otherwise agreed.
- Any rubble or waste associated with the maintenance activities should be removed to an approved disposal site after the maintenance activity is complete.
- Burying or burning rubble or waste on the site is prohibited.
- The site is to be cleared of all litter following the completion of maintenance activities.
- All surfaces are to be checked for waste products from maintenance activities and cleared in a manner approved by the ECO.

12. ENVIRONMENTAL MONITORING & REPORTING

Monitoring aims to detecting changes that will inform intervention or remedial actions that might be needed to inform environmental performance. Monitoring will be done by physically walking the property, inspecting the dam itself as well as the wetland habitat up and down stream of the dam.

Part of the watercourse that is monitored	Frequency of Monitoring	Monitoring procedure	How results are analysed and presented	Comments
The wetland habitat up and down stream of the dam must be monitored. S34° 07' 56.12" E20° 02’ 40.54" (Approximately 250 m from the dam wall towards the South-western boundary of the property). S34° 07' 42.81" E20° 03' 13.62" (Approximately 250 metres from the toe of the dam towards the North-eastern boundary of the property).	Prior to the commencement of activities and after activities are complete. If necessary also during the maintenance activities.	➢ The ECO will visit the site during the maintenance management activities and ensure that conformance with the MMP. ➢ Guidance will be given to the implementing agent as required with regards to implementing the MMP. ➢ Photographs of the maintenance management activity will be taken as a record of the correct undertaking of the specific maintenance management activity.	The record of the site visit undertaken during the maintenance management activities will include the following: ➢ Report which will illustrate what activity was undertaken at the site; ➢ Correct implementation as well as non-conformance of the MMP will be outlined; ➢ Recommendations to ensure conformance with the MMP in future maintenance management activities if required. ➢ Photographs of all maintenance management activities undertaken at the site.	The following in particular should be monitored: • Post-construction monitoring of plants relocated during search and rescue to evaluate where the intervention was successful or not. This should be undertaken on a three-monthly basis for two years after transplanting in order to evaluate the success thereof, or as suggested by the appointed botanist who will be conducting the entire search and rescue operation. o Monitoring and clearing of alien invasive plants on the property will need to be undertaken on an ongoing basis according to the applicable recognised methods for clearing of alien invasive plant growth. o Monitor discharge points for erosion and incision on a quarterly basis and after heavy rainfall events. Should erosion and incision be noted, corrective measures must be undertaken.

12.1 MONITORING REPORT

Monitoring report will focus mainly on physical site inspections aiming at early detection of erosion and the need for intervention and the measures to be taken. As such the monitoring report needs to address the following minimum criteria, namely the date of inspection, the portion of the river that was inspected, the result of the inspection and any actions that was or needs to be taken as well as photographs showing the site before and after the maintenance activity was completed.

The landowner is responsible to ensure a record of all maintenance activities is recorded as per the forms below. Form A and B below must also be sent to the Provincial Department of Agriculture, Directorate: Sustainable Resource Management.

The Department may, within a reasonable notice period, request to evaluate the maintenance activities and assess the maintenance sites as per the adopted MMP.

Form A should be completed at least 7 working days before the commencement of any maintenance activity and Form B at least 3 working days following the completion of the maintenance activity(ies). At least two photographs are required from two different points of perspective (A and B) looking at the site (coordinates of these points are required). When listing the type and reference code, this must be done by specifically listing the relevant detail within the adopted MMP.

REPORTING FOR INTENT TO UNDERTAKE MAINTENANCE ACTIVITIES – FORM A				
Section A: Landowner Details				
Name	**Surname**	**Farm No.**	**Erf No.**	**Today's Date**
Section B: Details of proposed maintenance activity				
WUA/GA reference number and DEA&DP reference number for MMP.	**Activity Type:**	**Reference code (*make reference to MMP*)**	**Footprint area (m^2)**	**Volume of material (m^3)**
Equipment to be used:	**Description of method for planned activity:**			**Date when work will commence:**
Date of last flood event for site:	**Note any further damage and comments regarding the state of the site**			
Section C: Photographs of activity location before maintenance				
Before A **Coordinates:** **S** **E**				
Before B **Coordinates:** **S** **E** **Date of photos taken:**				

REPORTING COMPLETION OF MAINTENANCE ACTIVITIES – FORM B				
Section A: Landowner Details				
Name	**Surname**	**Farm No.**	**Erf No.**	**Today's Date**
Section B: Details of proposed maintenance activity				
WUA/GA reference number and DEA&DP reference number for MMP.	**Activity Type:**	**Reference code (*make reference to MMP*)**	**Footprint area (m^2)**	**Volume of material (m^3)**
Equipment that was used:	**Description of method for completed activity and if the commence date changed**			**Date when work will commence:**
Date of last flood event for site:	**Note any challenges or difficulties experienced in following the MMP method statement**			
Section C: Photographs of activity location after maintenance				
Before A **Coordinates:** **S** **E**				
Before B **Coordinates:** **S** **E** **Date of photos taken:**				

13. APPENDICES TO THE MMP

Appendices to the MMP has been included as part of the appendices of the larger EMP. Please refer to the following as reference to the applicable appendices:

- Locality maps (Appendix A)
- Layout Plans (Appendix B1)
- Sensitivity Maps (Appendix B2)
- Site photographs (Appendix C)
- Method statements pertaining to the MMP (Appendix D1 – D7)
  - MS01 Search and rescue plan
  - MS02 Alien invasive plant eradication plan
  - MS03 Mitigate disturbance of habitat and compaction of soils due to construction/maintenance activities
  - MS04 Runoff, erosion, sedimentation control during construction
  - MS05 Erosion control at discharge during operations
  - MS06 Sediment, Debris, nuisance vegetation control at discharge points
  - MS07 Method Statement for the construction of Dasberg dam from Sarel Bester Ingenieurs BK
- Signed declaration (Refer to Appendix E)

Please note that this MMP should be read in conjunction with the EMPr (Appendix 12 of the EIR).

APPENDIX A: LOCALITY MAPS

APPENDIX B1 LAYOUT PLANS

Figure 1	Map showing the proposed layout of Dasberg dam and the pipeline extension on Portion 5 of farm van der Wattskraal 399 (5/399) & Remainder of 399 (Rem399)
Figure 2	Proposed Dam design drawing
Figure 3	Layout plan of the planned orchard cultivation, 5 ha on Rem 399 (west of the N2), and 100 Ha on 5/399, in relation to the proposed dam
Figure 4	Portion 5/399 divided into fields in proximity to the proposed dam
Figure 5	Proposed pipeline route drawing
Figure 6	Pipeline route in relation to wetland/ stream to the South West

APPENDIX B2 SENSITIVITY MAPS

Figure 1	Vegetation Map
Figure 2	Overberg Critical Biodiversity Areas Map
Figure 3	Pipeline route in relation to wetland/ stream, indication the route is less than 32m from the stream
Figure 4	Map from Freshwater Impact report, indicating wetlands and rivers in relation to the proposed dam
Figure 5	Map from Freshwater Impact Report, indicating the ESAs
Figure 6	Map from Freshwater Impact Report, indicating the Unchannelled Valley Bottom Wetland in relation to the proposed dam

APPENDIX C: SITE PHOTOGRAPHS

APPENDIX D: METHOD STATEMENTS

Appendix D1	MS01 Search and rescue plan
Appendix D2	MS02 Alien invasive plant eradication plan
Appendix D3	MS03 Mitigate disturbance of habitat and compaction of soils due to construction/maintenance activities
Appendix D4	MS04 Runoff, erosion, sedimentation control during construction
Appendix D5	MS05 Erosion control at discharge during operations
Appendix D6	MS06 Sediment, Debris, nuisance vegetation control at discharge points
Appendix D7	MS07 Method Statement for the construction of Dasberg dam from Sarel Bester Ingenieurs BK

APPENDIX E: DECLARATION OF UNDERSTANDING