

APPLICATION TO RECTIFY UNAUTHORIZED COMMENCEMENT OR CONTINUATION WITH ACTIVITIES IDENTIFIED IN ACCORDANCE WITH REGULATION GN R. 326 IN GAZETTE NR. 40772 OF 7 APRIL 2017 UNDER NEMA (ACT 107 OF 1998) AND ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 AS AMENDED

READ TOGETHER WITH GN R. 698 NEMA, 1998: REGULATIONS RELATING TO THE PROCEDURE TO BE FOLLOWED AND CRITERIA TO BE CONSIDERED WHEN DETERMINING AN APPROPRIATE FINE IN TERMS OF SECTION 24G, AS PUBLISHED IN GAZETTE NO. 40994 OF 20 JULY 2017



ENVIRONMENTAL ASSESSMENT REPORT

PROJECT:

**CLEARING OF APPROX. 200 HA OF INDIGENOUS VEGETATION FOR CITRUS ORCHARDS ON THE REMAINDER OF THE FARM ALICEDALE 138 MT
MUSINA LOCAL MUNICIPALITY
LIMPOPO PROVINCE**

PROPONENT:

Alicedale Estates (Pty) Ltd

Environmental Consultant:

TEKPLAN

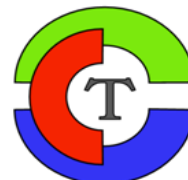
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SEPTEMBER 2018

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ACRONYMS

LEDET	Department of Economic Development, Environment and Tourism (Limpopo)
DWS	Department of Water & Sanitation
EMPr	Environmental Management Programme
EAP	Environmental Assessment Practitioner
I&AP	Interested and/or affected party (i.e. the public, adjacent landowners and the property owner)
EA	Environmental Authorisation
ECO	Environmental Control Officer

DEFINITIONS

Disturbance	Any event or series of events that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment.
Environmental incident	<p>a) Any action undertaken (or omitted) by the proponent or his duly appointed representatives (e.g. contractors) that results in overly/unnecessary disturbance or damage to the environment.</p> <p>b) Any action undertaken (or omitted) by the proponent or his duly appointed representatives (e.g. contractors) that could lead to (has potential for) overly/unnecessary disturbance or damage to the environment.</p> <p>c) Non adherence to environmental legal requirements/laws (including the stipulations of authorisations issued in respect of a proposed activity e.g. those contained in an Environmental Authorization).</p>
Environmental Management Programme (EMPr)	A guideline document/directive outlining the mitigation, monitoring and institutional measures to be taken during project implementation and operation to avoid or control adverse environmental impacts, as well as the actions needed to implement these measures (World Bank, 1999:1).
Environmental Control Officer	Independent environmental consultant appointed to monitor compliance with the EMPr
Grey water	Water contaminated by for example sewage, sediment, and/or chemical constituents.

Interested & Affected Party	A person, group of people, an organization (public or private), a business, or other party that has an interest or is affected in terms of their health, property rights, or economy by a proposed activity.
Mitigation measures	Mitigation measures encompass all actions taken to eliminate, offset or reduce potentially adverse environmental impacts to acceptable levels (World Bank, 1999:1).
Process water	Water used during construction activities (e.g. water used for concrete mixing).
Project (life) cycle	Represents the various stages of which a project/activity consists including project identification, design, construction, operation as well as decommissioning.
Proponent	An individual and/or organisation that is of the intention to undertake an activity identified in terms of Regulation 385 of the National Environmental Management Act, 1998 (Act No. 107 of 1998). Typically a proponent, <ul style="list-style-type: none"> a) stands to benefit directly from the proposed activity (e.g. a private developer gaining financially), or b) is duly sanctioned in terms of its legal mandate (e.g. a government department) to undertake such activities for the attaining of its objectives.
Visual Impact Assessments	A method used to estimate the potential visual impact of a proposed activity on the landscape, as well as to assess whether certain VQO's will be achieved.
Visual Quality Objectives (VQO's)	Objectives which reflect the desired level of visual quality, based on the physical characteristics and social concerns for an area.

SECTION 1. DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP) AND APPLICANT

1.1. ENVIRONMENTAL ASSESSMENT PRACTITIONER

The application will be handled on behalf of the applicant by:

TEKPLAN Environmental

P.O. Box 55714
POLOKWANE
0700

Tel: (015) 291 4177

Fax: 086 218 3267

Email: tecoplan@mweb.co.za

Contact person:

Mr. Danie Combrink (B.Sc. Geography; B.Sc. (Hons) Geography (Specializing in Environmental Management & Analyses))

1.2. APPLICANT

In this instance the applicant is:

Applicant:	Alicedale Estates (Pty) Ltd		
Contact Person:	Mr. Peter Nicholson / Mr. Jan-Erns Joubert		
Postal Address:	P.O. Box 18		
Physical Address:	Tshipise	Code:	0901
	Farm Alicedale 138 MT, R525,		
	Tshipise	Code:	0901
Telephone No:	083 306 0551	Cell:	082 2010 287 / 078 653 3839
E-mail address:	peternic@lantic.net / jan.alice@lantic.net	Fax:	086 509 2732

SECTION 2: ACTIVITY INFORMATION

2. PREAMBLE

2.1 BACKGROUND

The owner of the property (Remainder of the Farm Alicedale 138 MT) is of the intention to establish approximately 200 hectares of Citrus orchards on the property. The affected area is divided into the following two sections/areas:

- a) Area A measuring approx. 120ha. Site preparation (clearing of bush) commenced during October 2017. The majority of the site consisted of old orchards/cultivated fields.
- b) Area B measuring approx. 80ha. Site preparation (clearing of bush) commenced during July 2016 and citrus trees have been planted (with associated irrigation infrastructure). The site consisted of natural vegetation.

See enclosed diagrams depicting the size & outer boundary of the two affected areas (see Annexure A).

Site preparation (clearing of bush) unlawfully commenced, as the owner of the land was under the impression that since the following necessary approvals have already been obtained:

- Permit for the clearing of the area in terms of the National Forests Act, 1998 (Act No. 84 of 1998) from the Department of Agriculture, Forestry & Fisheries (see permit attached as Annexure M),
- Permit to cultivate virgin soil in terms of Regulation 2 of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) from the Department of Agriculture, Forestry & Fisheries (see permit attached as Annexure N),
- Permit to establish/demarcate *Casuarina equisetifolia* (horsetail trees) to act as windbreak in terms of Regulation 15B (2)(a) of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) from the Department of Agriculture, Forestry & Fisheries (see permit attached as Annexure O),
- Confirmation of the extent and lawfulness of Water Use in terms of Section 35(4) of the National Water Act, 1998 (Act 36 of 1998) to irrigate from the Nzhelele Water Scheme from the Department of Water and Sanitation (See approval attached as Annexure L),

and seeing that the property had been used for agricultural activities in the past, he could continue without having to apply for Environmental Authorization.

An official from LEDET visited the property on 18 May 2018 where it was indicated to the applicant that he contravened the stipulations of the Environmental Impact Assessment Regulations, 2014 under the National Environmental Management Act, 1998.

The applicant has appointed Tekplan Environmental to apply for “ex post facto” approval from the Limpopo Department of Economic Development, Environment & Tourism (EIM Section).

The applicant did not knowingly contravene the law in terms of the EIA Regulations when he cleared the land as he was under the impression that it’s a farming activity on agricultural land for which he have obtained the required authorizations as indicated above.

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2.2 PURPOSE OF THIS REPORT

2.2.1 Purpose of this Environmental Impact Assessment (EIA) Report

This Environmental Impact Assessment Report in support of the application for rectification of unlawful commencement and continuation of a listed activity that has been undertaken to satisfy the requirements of the environmental regulations in terms of Section 24G of the National Environmental Management Act, 1998 (Act 107 of 1998).

The purpose of this Environmental Impact Assessment Report is to:

- highlight the potentially significant impacts (negative & positive), associated with the existing development,
- to recommend further work/investigations (if necessary), and
- form part of the consultation process.

2.2.2 Listed activity (previous EIA regulations)

The new EIA regulations came into effect on 4 Dec. 2014 (and were amended during 2017). The development is listed in the following environmental regulation:

Environmental Conservation Act (Act No. 73 of 1989)	EIA Regulations of 21 April 2006 in terms of Chapter 5 of NEMA.	EIA Regulations of 18 June 2010 in terms of Chapter 5 of NEMA.	EIA Regulations of 04 December 2014 in terms of Chapter 5 of NEMA.
	GN R. 386, GN R. 387 of 21 April 2006	GN R. 544, GN R. 545 and /or GN R. 546 of 18 June 2010	GN R. 324, GN R. 325 and /or GN R. 327 of 07 April 2017
			<p>Number and date of the Government Notice:</p> <p>1) Activity no. 13 under R. 984 of 4 December 2014, as amended vide Regulation GN R. 325 in Gazette Nr. 40772 of 7 April 2017.</p> <p><i>The physical alteration of virgin soil to <u>agriculture</u>, or afforestation for the purposes of commercial tree, timber or wood production of <u>100 hectares or more</u>.</i></p>

			<p>2) Activity no. 15 under R. 984 of 4 December 2014, as amended vide Regulation GN R. 325 in Gazette Nr. 40772 of 7 April 2017.</p> <p><i>The <u>clearance of an area of 20 hectares or more of indigenous vegetation</u>, excluding where such clearance of indigenous vegetation is required for (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</i></p> <p>3) Activity no. 12 under R. 985 of 4 December 2014, as amended vide Regulation GN R. 324 in Gazette Nr. 40772 of 7 April 2017.</p> <p><i>The <u>clearance of an area of 300 square metres or more of indigenous vegetation</u> except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan, <u>within critical biodiversity areas</u> identified in bioregional plans.</i></p>
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See enclosed diagrams depicting the size & outer boundary of the two development areas that has already been cleared (see Annexure A).

SECTION 3: PUBLIC PARTICIPATION

3. PUBLIC PARTICIPATION

Comments, concerns and feedback that were received from Authorities/Stakeholders & other I&AP's during the public participation process, were factored into this report.

See Annexure C - Comments and Responses Report.

The public participation process as pertaining to this application for environmental authorization, consisted of the following elements:

3.1 SITE NOTICE

A site notice was placed at the site (and has been maintained for 20 days) in order to inform passers-by of the development and the associated Environmental authorisation process (see Annexure D).

3.2 NOTICES TO AUTHORITIES/STAKEHOLDERS & I&AP'S

Notices were distributed to adjacent property owners, to inform them about the development and the associated Environmental authorisation process (see Annexure F - Notice sent to I&AP's).

Notices were also distributed to the followings government stakeholders (see Annexure F - Notice sent to I&AP's):

- Vhembe District Municipality
- Musina Local Municipality
- Musina Local Municipality: Ward Councillor for Ward 1 (Tshipise Area)
- Department of Agriculture, Forestry and Fisheries - Land Use & Soil Management
- Department of Agriculture, Forestry and Fisheries - Forestry Regulation
- Department of Water and Sanitation - WQM Section (Limpopo Management Area)
- Department of Rural Development and Land Reform
- Office of the Regional Land Claims Commissioner
- Department of Mineral Resources
- Department of Sports, Arts and Culture - LIHRA
- Limpopo Tourism Agency
- Roads Agency Limpopo
- Department of Public Works, Roads and Infrastructure
- Eskom Holdings Ltd - Land and Rights
- Department of Economic Development, Environment and Tourism (Limpopo Province) - Protected Areas

Comments that were received from I&AP's & stakeholders are attached as Annexure G.

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3.3 NEWSPAPER ADVERTISEMENT

An advertisement giving notice of the environmental authorization process appeared in a local newspaper – The Northern Gazette on 3 August 2018 (see Annexure E - Newspaper advertisement).

3.4 COMMENTS FROM AUTHORITIES/STAKEHOLDERS & I&AP'S ON EIA REPORT

The comments of the following authorities/stakeholders and I&AP's on the environmental authorization Report were requested (See Annexure H – Letters requesting Comments from authorities/stakeholders & I&AP's on EIA Report):

- Vhembe District Municipality
- Musina Local Municipality
- Department of Agriculture, Forestry and Fisheries - Land Use & Soil Management
- Department of Agriculture, Forestry and Fisheries - Forestry Regulation
- Department of Water and Sanitation - WQM Section (Limpopo Management Area)
- Department of Sports, Arts and Culture – LIHRA
- South African Heritage Resources Agency (SAHRA)
- Roads Agency Limpopo
- Department of Public Works, Roads and Infrastructure
- Department of Mineral Resources
- Eskom Holdings Ltd - Land and Rights
- Department of Economic Development, Environment and Tourism (Limpopo Province) - Protected Areas
- Mr. Howard Knott (Registered I&AP)

The comments of the authorities/parties whom responded will be attached as Annexure I (Comments from authorities/stakeholders and I&AP's on EIA Report).

Authorities and other parties were given 30 days to respond.

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SECTION 4: PROJECT DESCRIPTION

4. PROJECT DESCRIPTION

The owner of the property (Remainder of the Farm Alicedale 138 MT) is of the intention to establish approximately 200 hectares of Citrus orchards on the property. The affected area is divided into the following two sections/areas:

- a) Area A measuring approx. 120ha. Site preparation (clearing of bush) commenced during October 2017. The majority of the site consisted of old orchards/cultivated fields.
- b) Area B measuring approx. 80ha. Site preparation (clearing of bush) commenced during July 2016 and citrus trees have been planted (and associated irrigation system installed). The site consisted of natural vegetation.

See enclosed diagrams depicting the size & outer boundary of the two affected areas (see Annexure A).

5. LOCATION & ACCESSIBILITY

The application property (Remainder of the farm Alicedale 138 MT), is located approximately 32 km south east of Musina and 4 km west of Tshipise.

The affected area is located north of the R525 (Road between the N1 and Tshipise) and south of the Nzhelele River.

The existing entrance to the orchards is located at Co-ordinates: S 22°37'51.17" E 30°8'24.17".

6. ZONING & EXISTING DEVELOPMENT AND SURROUNDING LAND USES

6.1 ZONING

The application property (Remainder of the farm Alicedale 138 MT, Musina local municipality) is zoned for Agricultural purposes.

6.2 EXISTING DEVELOPMENT ON THE APPLICATION PROPERTY

Existing development (infrastructure) on the application property comprise the following:

- Offices,
- Warehouse for packaging of Citrus,
- Several houses (managers and workers),
- Stores and workshop area,
- Nzhelele dam irrigation channel, and
- Existing Citrus orchards.

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6.3 SURROUNDING LAND USES

The surrounding land uses can mainly be described as agricultural and include several Game Farms and other Citrus Farms, mainly located adjacent to the Nzhelele River. The Tshipise Forever Resort (and Honnet Nature Reserve) also located approx. 4km west of the site.

The proposed land use (citrus orchards) will therefore form part of the existing land uses as most of the area is used for agricultural purposes.

7. METHODOLOGY EMPLOYED FOR ENVIRONMENTAL IMPACT ASSESSMENT

7.1 METHODOLOGY EMPLOYED

The methodology adopted in the compilation of this document is that of an Environmental Impact Assessment (EIA) Report in accordance with Government Notice No. 326 of 2017 under Section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

An environmental impact analysis must always include some statement, definition and delineation of specific environmental 'problems'. Some judgements necessarily have to be made during the steps of predicting, analyzing, and judging, environmental impacts – therefore this impact assessment has taken into account the following parameters during evaluation of the potential impacts that might result from the development:

- the geographical area/extent of the impact (e.g. local, immediate, regional or national),
- status & intensity (positive (beneficial) or negative (detrimental)),
- significance (an impact of low significance will have only a limited effect on the environment, whereas an impact of high significance will have a major impact on the environment),
- The probability of an impact (for example "definite", "highly probable", "probable" or "improbable"), and
- The duration of an impact.

In order to undertake the identification of the key issues (significant potential impacts) that might result from the proposed development the writer relied on the following;

- Inputs from interested & affected parties,
- Inputs from various specialists,
- The CIDA Handbook on Environmental Assessment: Checklists for determining environmental effects: Building construction, Water supply, Waste management, Roads, 1999.

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In this document the writer will allude to alternatives. The purpose of this is to ensure that the developer considers other approaches to the project (that could assist in preventing significant environmental damage). If unforeseen difficulties arise, for example during the operation of the project, re-examination of these alternatives may help to provide rapid and cost-effective solutions.

The reader is referred to SECTION 6: DESCRIPTION OF ENVIRONMENTAL ISSUES IDENTIFIED of this document for more information on methodology and identified impacts.

7.2 SPECIALIST INPUTS

Various specialist inputs have been obtained, in order that,

- a justifiable and scientifically correct assessment of the potential impacts of the development could be made by the environmental consultant, and
- that appropriate (suitable) mitigation measures could be identified.

Specialist input was obtained regarding the following aspects;

- The impact of the proposed development on the terrestrial ecology of the affected environment, and
- The impact of the proposed development on heritage & paleontological resources.

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SECTION 5: DESCRIPTION OF THE ENVIRONMENT

8. ENVIRONMENTAL COMPONENTS

8.1 TOPOGRAPHY

The topography of the site in Area A represents mostly lower foot slopes in the southern part with plains and partly floodplains towards the Nzhelele River to the north which is located outside Area A.

Area B represents an undulating landscape with low to mid slopes and limited rocky outcrops.

8.2 CLIMATE

The study area is located in the summer rainfall region of South Africa with very dry winters including the shoulder months of May and September. Mean annual precipitation (MAP) ranges between 300-400mm.

Average daily maximum and minimum summer temperatures (November to February) measured at the Tshipise Weather Station (No 0766277 1) range between 33°C and 20°C, while winter temperatures (May to August) range between 28°C and 7°C respectively.

The high average temperatures are reflected by the fact that the minimum average daily summer temperature is a high 20°C and the minimum average daily winter temperature does not dip below 7°C. The area is also generally frost free.

The climate is there for suitable for citrus production.

8.3 GEOLOGY & SOILS

The majority of the application area is underlain by Alluvium while the geology of the southern part of Area B consists of Basalt of the Letaba Formation and shale, mudstone and sandstone of the Klopperfontein and Solitude Formations of the Karoo Sequence (see Map 4 in the Ecologist's report - Annexure J).

According to the project ecologist, the land type on the application property can be classified as:

- **Land type: Ah 88**

Description:

Mostly terrain adjacent to the Nzhelele river where part of the land type falls within the developed area. A small drainage line to the east falls inside Area A. Deep Hutton and Oakleaf soils occur in this area with clay content between 10 and 15% in the A horizon and 15 to 25% in the B horizon.

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- **Land type: Ae 265**

Description:

Mostly terrain that borders the drainage line where it follows the Nzhelele River eastwards opposite the dirt road with the Nzhelele River outside the develop area. A small drainage line falls inside the area and flows west to north into the Nzhelele River. Deep Hutton and Oakleaf soils occur in this area with clay content between 10 and 20% in the A horizon and 15 to 30% in the B horizon.

8.4 PHYSIOGRAPHY AND DRAINAGE

Area A represents mostly lower foot slopes in the southern part with plains and partly floodplains towards the Nzhelele River to the north which is located outside Area A. The drainage of water flows towards the North into the Nzhelele River that is perennial.

Area B represents an undulating landscape with low to mid slopes and limited rocky outcrops. A drainage line in Area B flows North West towards the Nzhelele River.

8.5 ECOLOGICAL ATTRIBUTES

8.5.1 Vegetation

The Farm Alicedale is classified under *Veld Type 15: Mopani veld* according to Acocks (1975). Mucina and Rutherford (2005) classified the following veld types in the area that include the farm Alicedale:

- *Musina Mopani Bushveld*
- *Limpopo Ridge Bushveld*
- *Bushveld and the Subtropical Alluvial Vegetation alongside the Nzhelele River*

The conservation importance of the three veld types according to Mucina and Rutherford (2005) is summarized in Table 1 in the Ecologist's report (Annexure L) and is indicated as ***Least threatened***.

An Ecological Assessment of the vegetation on the two affected areas were undertaken (See Report attached as Annexure J). The 2 sites were evaluated on the basis of the natural vegetation present, its rarity, sensitivity, and conservation importance. The area, forms part of an agricultural node with irrigation systems, where no rare plants are present. Protected trees such as *Boscia albitrunca* and *Adansonia digitata* were found in the site. Transects were driven and walked within Area A measuring approximately 120 ha of which 80 ha consist of old lands and orchards. Approximately 40 ha consist of natural vegetation which are partly degraded and 30 ha thereof was cleared. Area B measures 80 ha in size and consist of natural vegetation that include

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protected trees such as *Adansonia digitata* and *Boscia albitrunca*. The entire area, except approximately 10 ha which consist of rocky outcrops, was cleared and citrus trees planted.

The natural vegetation adjacent to both areas outside the development and portion inside the development was evaluated in terms of sensitivity and presence of protected trees species. An assessment and analysis of the area is essential and was carried out to evaluate the sensitivity and rarity so that a more objective and scientific evaluation can be obtained. The negative impact of the proposed development is the loss of natural habitat and visual impact. Protected trees such as *Boscia albitrunca*, *Adansonia digitata* and probably *Philenoptera violancea*, were detected on areas A and B. The Department of Agriculture and Department of Forestry officials did visit the site and recommends replanting of protected trees such as *Adansonia digitata* and *Boscia albitrunca*.

It can be concluded that:

- All large *Adansonia digitata* (baobab) trees (6) were left intact in both areas and all small baobab trees (47) were replanted adjacent to these two positions, near the housing and office complexes.
- All *Boscia albitrunca* (Shepherd) trees (115) on kopjes in area A and B were left intact. A number of these trees could have been destroyed in the bush clearing process. Approximately 7 medium trees were replanted outside the fence in Area B.
- The rocky outcrops inside Area A and B are sensitive and should be protected.
- A large number of *Feadherbia albida* trees on the border of Area A are not removed yet and it is recommended that these trees should be left intact.
- Some disturbance occurred outside the development where the road and construction of new fence took place adjacent to the riparian zone.
- A few Protected trees such as *P. violancea* could have been removed in the abovementioned clearing process. Unfortunately, officials of Forestry did not advise the farmer that these trees are protected.
- The *Acacia tortilis* and *Acacia karoo* woodland outside the area and adjacent to the lower riparian vegetation should be regarded as sensitive with no future development in this zone.
- The development without the EIA process showing a serious lack of communication between Forestry, Environmental Affairs and Agriculture as an Interdepartmental Forum could pro-actively prevent unnecessary damage to the environment.

Key mitigation measures include planting of additional indigenous trees in degraded areas in the riparian zone. Protection of kopje areas in Areas A and B, as well as the portion of the group of *F. albida* trees as indicated on sensitivity map of the Ecological Report.

Soil erosion is the largest negative impact that can be expected in areas A and B as most of the citrus were planted on slight to medium slopes. The owner did however implement mitigation measures with contour planning and drainage systems of high quality that minimize erosion. Control of alien plants and pesticides in the orchards will need specialised advice regarding

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environmentally friendly products and correct application bearing the slope, soil type, climate, storage and in-service training of personnel into account. Pollution of the Nzhelele River should be prevented.

The planned development, which form part of agricultural land, can be supported provided that the necessary mitigation measures are implemented.

8.5.2 Recommendations of ecologist's assessment

The following is recommended as part of the ecologist's assessment

- No development should take place north of the fenced road in the Nzhelele River riparian vegetation. A fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) in Ecological Report).
- Limited rocky outcrops and demarcated sites of population of *Boscia albitrunca* trees as shown on sensitivity map 16 should be left intact.
- Demarcated drainage areas associated with the Nzhelele River as shown on sensitivity map (Map 16) should be left intact.
- The use of pesticides and herbicides needs specialist input as important aspects such as the following needs to be addressed
 - The use of pesticides, herbicides & fungicides should only be undertaken where pests are causing excessive economic damage.
 - Spraying programs should only commence after seeking advice from experienced pest and crop consultants.
 - Over spraying of pesticides & herbicides & fungicides should not take place.
 - Spraying should only take place within the proposed orchards (not on adjacent bush), unless a specialist has identified adjacent areas where spraying should be done.
 - To avoid significant damage to crops and to lessen the use of pesticides, regular monitoring & early implementation of a suitable spraying programme to stem pests is preferable, as it lessens the total amount of the chemicals that needs to be applied.
 - The planting of pest resistant cultivars should receive attention, in order to minimise spraying.
 - If it is found to be effective & viable, the use of biological control measures to stem pests should receive attention.
 - Care should be taken when using natural (e.g. manure) and or industrial fertilisers at the site.
 - Over-application should be avoided in order to prevent storm water containing fertilizer from reaching the Nzhelele River watercourse. The consequence would be eutrophication.
 - Strict protocols for storage and application of fertilizers are to be followed to prevent contamination of the adjacent Nzhelele River.
 - Avoid irrigation and application of fertiliser before or during heavy rains.
 - Fertiliser and water application should be timed to correlate with the needs of the trees at a given point in the phenological cycle – specialist to advise.

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- Fertilizer applications should be used at the right time and at the required rates – specialist to advise. The use of slow release nitrogen fertilizers is encouraged as this can improve nitrogen efficiency and reduce leaching of nitrogen.
- Only fertilize well established trees that are growing vigorously, approximately one year after planting.
- The use of organic fertilizers and mulching (as is currently being done) is encouraged.

8.5.3 Fauna

No endangered or rare species were noted on the site. Rare species that may occur on the site or move through the area include *Atelerix frontalis* (hedgehog) and *Atilax paludinosus* (water mongoose).

8.6 CULTURAL/HISTORICAL ATTRIBUTES

An archaeological & paleontological assessment was conducted to ascertain whether there are any remains of significance in the area that was and/or will be affected by the proposed citrus orchards.

The heritage study concluded that no sites of significant heritage importance had been damaged during the development phase. No rehabilitation is needed for any sites. Cognisance of sites close to the development area should be taken to ensure that peripheral activities do not impact on these.

No fatal flaws were identified by the heritage practitioner.

In terms of Paleontology Sensitivity the citrus orchard project area is underlain by (1) unfossiliferous, highly-metamorphosed Precambrian basement rocks of the Beitbridge Complex, (2) small outcrop areas of Karoo Supergroup sediments of the Tshipise Basin that are correlated with the Permo-Carboniferous Dwyka and Ecca Groups of the Main Karoo Basin, and (3) thick Late Caenozoic alluvium along the banks of the Nzhelele River. The Madzaringwe and Mikambeni Formations of the Karoo succession are known elsewhere in Limpopo Province to contain thin coal seams associated with plant fossils of the *Glossopteris* Flora of Gondwana. The Late Caenozoic alluvium might contain local concentrations of fossils such as mammalian remains, non-marine molluscs and plant debris but scientifically important fossil material is likely to be very sparse.

Given that (1) the alluvial sediments within citrus orchard study areas are already highly disturbed by recent agricultural activity, (2) the potentially-fossiliferous Karoo bedrocks are probably not exposed at surface here, and (3) the development footprint is comparatively small (c. 200 ha),

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significant impacts on local palaeontological heritage resources due to the citrus orchard development are considered to be unlikely. No further specialist studies or mitigation for this project are recommended. The Chance Fossil Finds Protocol appended to the Palaeontological report should be applied by the landowner should any substantial fossil remains (e.g. vertebrate bones, teeth, petrified wood, plant fossil beds) be found in future and SAHRA should be notified immediately regarding possible mitigation. The palaeontologist concerned with mitigation work would need a valid collection permit from SAHRA. All work would have to conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere to the minimum standards for Phase 2 palaeontological studies published by SAHRA (2013).

See attached Heritage Report (Annexure K).

8.7 HYDRO-GEOLOGY

8.7.1 Water rights, permissible water use & water demand

The Nzhelele River forms the Northern Boundary of the application property. Water for Irrigation for the orchards is however obtained from the Nzhelele Dam irrigation channel which runs through the property.

The owner has water rights in place for the property, as well as additional rights on some of the adjacent properties also belonging to him, which is more than sufficient to irrigate the current and proposed citrus orchards (See Annexure L - Copy of Confirmation of the extent and lawfulness of Water Use in terms of Section 35(4) of the National Water Act, 1998 (Act 36 of 1998).

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SECTION 6: DESCRIPTION OF ENVIRONMENTAL ISSUES IDENTIFIED

9. ENVIRONMENTAL ISSUES AND EVALUATION OF IMPACTS

9.1 METHODOLOGY FOR ASSESSMENT OF IMPACTS

This section examines *key issues/impacts* which may be predicted to occur as a result of the development. Where necessary, proposals for mitigation or optimisation of an impact will be noted. A brief discussion of the impact and the rationale behind the assessing of its significance is also included in this section.

The team of consultants/specialists identified potential issues and reached consensus regarding the significance and duration of potential negative and positive impacts. During the assessment of impacts, the following was taken into account:

- the extent,
- the duration,
- the intensity (positive/detrimental and minor/moderate/major),
- the probability, and
- the significance of impacts.

Each impact was assessed according to the project stages, viz;

- site preparation/construction, and
- operation.

An impact of “low significance” will have only a limited affect on the environment, whereas an impact of “high significance” will have a major impact on the environment.

A “positive impact” is one which enhances the existing environment, whereas a “negative impact”, is one which degrades the environment. Where impacts are of high or low significance, the degree of probability has been evaluated and includes the terms “definite”, “probable”, “possible” or “improbable”.

The assessment of the effects of an impact hereunder assumes that mitigation measures have been implemented. If this is not done a range of negative impacts will have a greater effect and positive impacts would not be enhanced.

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The duration of an impact is assumed to be short term (less than one year); medium term (one to three years) and long term (beyond three years). Sensitive or vulnerable environments or features as well as secondary and cumulative impacts were also taken into account during evaluation of impacts.

Interested and affected parties were also consulted and their concerns were addressed as potential issues. Impacts that may arise during the different stages of the proposed project lifecycle are addressed below in this section and the mitigatory measures recommended in section 8.

9.2 DESCRIPTION OF KEY ISSUES

Certain actions take place during the planning & construction and operational phases of the proposed development, which relate to the environment. These actions have potential to impact on adjacent land uses and the natural environment.

In view of this a list of potential environmental impacts (issues) were identified – these issues can be summarized as follows:

- a) Potential for the development to impact on the biological environment (i.e. fauna & flora) - especially red data species, biological communities, bio-diversity, etc.,
- b) Potential for the development to impact on the riparian zone adjacent to the Nzhelele River,
- c) Availability of engineering infrastructure to support the development (water, electricity, roads and others),
- d) Potential for the development to impact upon current adjacent land uses (i.e. during construction/site clearing e.g. nuisances (dust), erosion, pollution, etc.), - impacts on "quality of life" and character of the surrounding area,
- e) Potential for the development to impact on heritage resources,
- f) Potential for the development to impact on the physical environment (air e.g. dust, water e.g. increased storm water, land e.g. soil compaction),
- g) Potential for the development to impact on accessibility & traffic patterns,
- h) Potential for the development to create waste, pollution, etc.,
- i) Potential for the development to impact on groundwater resources,
- j) Social dimensions of the development (e.g. crime, security management, etc.).

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9.3 DEFINABLE IMPACTS – CAUSES, DESCRIPTION, EVALUATION & MITIGATION

9.3.1 Planning & construction phase impacts

9.3.1.1 Introduction

During the construction phase (i.e. during the clearing of the land and the installation of the irrigation infrastructure), there has already been and will be impacts on the biological and physical environment.

An ecological assessment of the development site was conducted. The main findings are:

- The conservation value of Area B is low and Area A is medium with some concern.
- The riparian vegetation outside these areas and north of the development is sensitive and no development or vegetation should be allowed.
- The proposed development will take place in a fragmented natural area approximately 4 km from the Tshipise Forever Resort and adjacent citrus farms.
- This area falls outside the Critical Biodiversity area that is outdated as development already took place prior to the development of the Conservation plan.
- The status of the Nzhelele riparian forest and associated floodplains is in various stages of degradation and protection of this system is necessary.
- This area is part of agricultural land with high potential of cultivation. The development is supported under the condition mitigation measures are adhering too.

a) RECOMMENDATIONS:

- No development should take place north of the fenced road in the Nzhelele River riparian vegetation. A fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) and Google kmz map in Ecological Report).
- Limited rocky outcrops and demarcated sites of population of *Boscia albitrunca* trees as shown on sensitivity map 16 should be left intact.
- Demarcated drainage areas associated with the Nzhelele River as shown on sensitivity map (Map 16) should be left intact.
- Control of alien plants by using pesticides and herbicides needs specialist input

Concerns are likely to range around the impacts caused by;

- Further destruction of habitat/biodiversity,
- Further destruction of protected trees,

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- Further construction traffic in and around the construction site (e.g. heavy vehicles used to prepare the area and removing rocks from sites),
- Impacts on the adjacent river & riparian zone,
- noise and air pollution, and
- the security of adjacent properties (e.g. children).

9.3.1.2 Predicted planning & construction phase impacts (negative impacts)

a) Primary impact component: Natural environment

Secondary impact component: Biological environment (vegetation)

Potential impact:

The destruction of natural vegetation during initial investigations, due to induced vehicular movement e.g. surveyors vehicles etc.

Significance/certainty: Low, Probable.

Spatial influence: The site.

Duration: Short term.

Mitigation / Optimisation: Existing tracks/roads should be used when accessing the site for planning purposes. Sampling rather than removal of existing plant material should take place (and then only if essential). The project ecologist determined the location of the Nzhelele riparian zone, which should be maintained between the citrus orchard development area and the river. The riparian area is fenced out from the area where orchards have been made. Significant alteration of the riparian zone adjacent to the Nzhelele River has not taken place. The project ecologist indicated that the small fraction of the riparian area that was cleared, must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) and Google kmz map in Ecological Report

Discussion: The existence of farm tracks on the property, means that this impact is of low significance.

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- b) Primary impact component: Existing pollution, risks and/or hazards and health & safety
Secondary impact component: Risks & hazards – Effects in the workplace
Potential impact:
Potential injury to construction workers during clearing / preparation of the area for the orchards
- | | |
|--------------------------|---|
| Significance/Certainty: | Moderate, Possible |
| Spatial influence: | Local |
| Duration: | Short term |
| Mitigation/Optimisation: | Implementation of safety measures and work procedures and first aid facilities should be required of contractors/employees. |
- c) Primary impact component: Social environment
Secondary impact component: Direct project inputs – Public safety
Potential impact:
Unsocial activities at construction site (e.g. crime)
- | | |
|--------------------------|---|
| Significance/Certainty | Moderate, Possible |
| Spatial influence: | Site and immediate surrounding residential areas. |
| Duration: | Short term |
| Mitigation/Optimisation: | Appointed contractors (if being used) / workers that will be installing infrastructure (i.e. storm water drainage systems, irrigation pipes etc.) at the site, should be required to implement security measures at their construction camp/material laydown area. Security (gate) control measures should be implemented in order that only labourers and authorised persons obtain access to the construction camp/material laydown area. |
- Discussion: Unfenced construction camps/material laydown areas may present a greater security risk – such sites should be fenced/secured. Access control is being done at the entrance to the property.

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- d) Primary impact component: Infrastructure and community services
Secondary impact component: Infrastructure services – transport (local roads)
Potential impact:
Construction traffic and access.
- Significance/Certainty: Moderate, Probable.
Spatial influence: Local.
Duration: Medium term.
Mitigation / Optimisation: Damping down of unsurfaced tracks should take place during construction. Trucks should avoid travelling unnecessarily through low-lying (wet) areas (typically adjacent to the Nzhelele River).
- Discussion: Adverse impacts from construction traffic can be minimised by good planning and by effectively controlling site activities. Warning signs informing passers-by of construction vehicle movement should be posted at the entrance/exit to the site. Working hours to be controlled by site engineer/manager. Working hours should be limited to between 6h00 and 17h00 (Mondays to Saturdays only).
- e) Primary impact component: Existing pollution, risks and/or hazards and health & safety
Secondary impact component: Existing pollution/environmental degradation - impact of noise
Potential impact:
Impact of construction noise on adjacent areas.
- Significance/Certainty: Low, Unlikely.
Spatial influence: Construction site and immediate adjacent areas.
Duration: Short term.
Mitigation / Optimisation: Keep residents of surrounding properties informed if any unusually noisy activities are planned. Noise impacts are reduced over distance at a rate of 1db (decibel) per

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13 metres. Working hours should be limited to between 6h00 and 17h00 (Mondays to Saturdays only).

- f) Primary impact component: Natural environment
Secondary impact component: Earth/land – compressive strength of soils
Potential impact:
Construction impacts on soils (upsetting of soil horizons through groundworks and/or compaction by vehicles)
- Significance/Certainty: Low to moderate, Definite.
Spatial influence: Construction site and immediate adjacent areas.
Duration: Long term.
Mitigation / Optimisation: Trucks should avoid travelling unnecessarily through low-lying (wet) areas (typically adjacent to the Nzhelele River). Damping down of unsurfaced tracks should take place to limit dust. Selective stripping of topsoil, subsoil and overburden should take place. Stockpiling of removed earth (separately) should take place and be returned for backfilling in the correct soil horizon order. In all construction areas (e.g. material laydown areas), topsoil and subsoils should be protected from contamination/pollution (e.g. by fuel etc.). Stockpiling of removed earth should not occur in drainage lines (Nzhelele River and drainage lines towards the Nxhelele River) or impede surface water runoff.
- Discussion: -

- g) Primary impact component: Natural environment:
Secondary impact component: Water underground – quality of groundwater
Potential impact:
Pollution of groundwater

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Significance/Certainty: Low, Unlikely
 Spatial influence: Local.
 Duration: Medium to long term.
 Mitigation / Optimisation: Controlled usage and or storage of all fuels and chemicals during construction of irrigation infrastructure and access roads is advised. Due to very limited amounts of the aforementioned substances being used during construction, leaching thereof into the underground water is highly unlikely. Adequate fuel containment facilities should however be used. Adequate sanitary facilities and ablutions must be provided for construction workers.

Discussion: The potential degradation of groundwater is unlikely to result from construction activities.

h) Primary impact component: Natural environment:
Secondary impact component: Earth/land - erosion

Potential impact:

Soil erosion due to vegetation clearance.

Significance/Certainty: Moderate, Possible.
 Spatial influence: Site and adjacent areas.
 Duration: Medium to long term.
 Mitigation / Optimisation: When soil is cleared of vegetation, management techniques to prevent water erosion should be employed (e.g. reduction of water velocity and the diversion of surface water runoff downslope).

Discussion: The area in general possesses a medium risk for erosion (this has increased due to the large scale removal of vegetation cover from the development area). The velocity of surface stormwater flows from the cleared areas towards the Nzhelele River, have been reduced by the implementation of contours and storm water drainage systems. Effective dissipating measures should be implemented

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where collected stormwater discharge takes place into the Nzhelele River or its tributaries (so as to lessen the velocity of the collected water, as it could lead to erosion at these point(s) of discharge).

i) Primary impact component: Natural environment:

Secondary impact component: Biological environment – Vegetation

Potential impact:

Damage to flora due to site clearing (including riparian area).

Significance/Certainty:

Low to Moderate/Definite.

Spatial influence:

Site and immediate adjacent areas.

Duration:

Short term threat, but damage permanent.

Mitigation / Optimisation:

Large scale removal of vegetation cover from the development area has taken place (approx. 200ha). Area A consists of approximately 120 ha of which 80 ha consist of old lands and orchards. Approximately 40 ha consist of natural vegetation which were partly degraded and 30 ha thereof was cleared. Area B is 80 ha in size and consists of natural vegetation that includes protected trees such as *Adansonia digitata* and *Boscia albitrunca*. The entire area, except approximately 10 ha which consist of rocky outcrops, was cleared and citrus trees planted. The Ecologist made the following findings/recommendations that:

- All large *Adansonia digitata* trees (6) were left intact in both areas and all small baobab trees (47) were replanted adjacent to these two positions, near the housing and office complexes.
- All *Boscia albitrunca* trees (115) on kopjes in area A and B were left intact. A number of these trees could have been destroyed in the bush clearing process. Approximately 7 medium trees were replanted outside the fence in Area B.

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- The rocky outcrops inside Area A and B are sensitive and should be protected.
- A large number of *Feadherbia albida* trees on the border of Area A is not removed yet and it is recommended that these trees should be left intact.
- Some disturbance occurred outside the development where the road and construction of new fence took place adjacent to the riparian zone.
- A few Protected trees such as *P. violancea* could have been removed in the abovementioned clearing process. Unfortunately, officials of Forestry did not advise the farmer that these trees are protected.
- The *Acacia tortilis* and *Acacia karoo* woodland outside the area and adjacent to the lower riparian vegetation should be regarded as sensitive with no future development in this zone.

Discussion:

No development should take place north of the fenced road in the Nzhelele River riparian vegetation. A fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) in Ecological Report).

Limited rocky outcrops and demarcated sites of population of *Boscia albitrunca* trees as shown on sensitivity map 16 should be left intact.

j) Primary impact component: Natural environment

Secondary impact component: Biological environment - vegetation

Potential impact:

Plant collection, utilising of trees for firewood, etc. by construction workers

Significance/Certainty: Low, Possible

Spatial influence: Construction site and immediate surrounding areas.

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Duration: Short term.

Mitigation / Optimisation: Effective site control and monitoring by site manager should take place.

Discussion: Fires (burning of cleared vegetation) should only be allowed within a controlled environment and within designated areas. Fires should be monitored to prevent any spreading thereof to adjacent natural areas.

k) Primary impact component: Natural environment:
Secondary impact component: Biological environment - animals
Potential impact:

Hunting and capture of birds and other fauna by workers

Significance/Certainty: Moderate, Possible.

Spatial influence: Site and local.

Duration: Short term.

Mitigation / Optimisation: Capture or snaring of birds or other fauna must be strictly prohibited on site - especially w.r.t. contractor's employees.

Discussion: Birds (e.g. guinea fowl and francolin) might be snared - this must be prevented. Fauna (especially avifauna) may be temporarily displaced from the area during construction due to the noise and activity. The immediate proximity of other available habitat means that this impact is of moderate significance.

l) Primary impact component: Natural environment
Secondary impact component: Biological environment - vegetation
Potential impact:

Proliferation of alien plant species during and after construction

Significance/Certainty: Low to moderate, Possible.

Spatial influence: Site and immediate surrounding areas.

Duration: Short to medium term.

Mitigation / Optimisation: Regulation 15 of the Act on the Conservation of Agricultural Resources (as amended), Act No. 43 of 1983, determines that the

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establishment of declared weeds and invasive plants during and after development should be prohibited. It is recommended that alien species be removed and destroyed, preferably burned, before commencement of any construction activities. No alien plants were however noted in both areas. Weeds are invasive and will flourish on the bare areas. The distribution of weeds should be monitored.

Discussion:

The Applicant did obtain a Permit to establish/demarcate *Casuarina equisetifolia* (horsetail trees) to act as windbreak in terms of Regulation 15B (2)(a) of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) from the Department of Agriculture, Forestry & Fisheries (see permit attached as Annexure O).

m) Primary impact component: Land use and landscape character

Secondary impact component: General – aesthetic quality

Potential impact:

Visual impact of construction (bush clearing) activities

Significance/Certainty: Medium, Possible.

Spatial influence: Local.

Duration: Long term.

Mitigation / Optimisation: The visual impact will initially be significant, when the natural vegetation have been cleared, but will become less significant after the establishment of the orchards. All protected trees outside the construction area and rocky outcrops should be left to minimize visual impact. Large *A. digitata* trees have been left intact. Protected tree species were translocated to areas outside the development. All natural trees outside the affected area should be left to minimize visual impact and to screen the site from view (especially alongside the R525 tar road).

Discussion:

Change of land use from relatively natural veld to an agricultural production area (citrus

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orchard) will occur. This must however be seen in the context of the surrounding area where such activities are commonplace.

- n) Primary impact component: Existing pollution, risks and/or hazards and health & safety
Secondary impact component: Pollution/environmental degradation
Potential impact:
Impact of nuisances resulting from construction (e.g. dust, smoke & noise).
Significance/Certainty: Low, Possible.
Spatial influence: Site and areas immediately adjacent to the site.
Duration: Short term.
Mitigation / Optimisation: Damping down of graded tracks and other cleared areas should take place during construction. As much natural vegetation should be retained as is possible (especially natural occurring protected trees). As a mitigatory measure, construction should be limited to normal working hours. Adjacent residents shall be informed of unusually noisy activities that will be undertaken.
Discussion: Construction activities could create larger amounts of atmospheric dust, thus causing a nuisance when it settles on adjacent properties & crops.
- o) Primary impact component: Socio-Economic environment
Secondary impact component: Historic/cultural characteristics
Potential impact:
Uncovering of heritage or archaeological sites/resources/graves
Significance/Certainty: Low, Possible.
Spatial influence: Site
Duration: Short Term.
Mitigation / Optimisation: In the case of an archaeological/heritage resources “find”, all excavation work should be halted and a heritage resources

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practitioner should be consulted (or alternatively the nearest SAHRA office). If found, graves shall be relocated in accordance with the stipulations of the South African Heritage Resources Act and its relevant regulations pertaining to graves.

Discussion:

An archaeological assessment was conducted to ascertain whether there are any remains of significance in the area that will be affected by the proposed development. The mentioned study concluded that there were no heritage resources of any value or significance in the study area. See attached Heritage Report.

9.3.1.3 Predicted planning & construction phase impacts (positive impacts)

- a) Primary impact component: Social environment
Secondary impact component: Community social organization - Distribution of resources

Potential impact:

High positive expectations regarding employment opportunities

Significance/certainty: Moderate, Definite.

Spatial influence: Local.

Duration: Long term.

Mitigation / Optimisation: Local employment and procurement should receive priority when embarking upon planning and construction activities.

Discussion: Contractors should be required to make use of local labour and suppliers where possible. The proposed development will create approx. 200 new employment opportunities.

- b) Primary impact component: Socio-Economic environment
Secondary impact component: Direct project inputs - employment

Potential impact:

Temporary employment creation

Significance/Certainty: Low to Moderate, Definite.

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Spatial influence:	Local.
Duration:	Short term.
Mitigation / Optimisation:	Where appropriate, labour intensive construction methods should be used. Where possible training of labour should take place to improve benefits to individuals well beyond this project. Use of emerging contractors should take place where possible.

9.3.2 Operational phase impacts

9.3.2.1 Introduction

The most significant (potential) environmental impacts during operation of the citrus orchards relate to effects resulting from;

- Impacts resulting from the use of water resources/groundwater for irrigation,
- Impacts on the natural environment resulting from the use of pesticides & herbicides,
- Impacts on humans resulting from the use of pesticides & herbicides,
- Impacts on the natural environment resulting from the use of agricultural chemicals (e.g. ethylene spraying),
- Impacts on the natural environment resulting from the use of fertilizer,
- Impacts related to the establishment of fences (particularly near riparian area),
- Impacts related to the construction of access and haul roads (particularly near riparian area),
- Impacts related to the ongoing clearing of bush for establishment, operation and maintenance of the citrus orchards,
- Impacts related to the trenching for and installation of pipelines for orchard irrigation,
- Weed control & disposal,
- Traffic impacts (heavy vehicle movement).

Basic requirements (considerations) for minimising the above include:

- Identifying potential impacts and already providing for them during the planning phase of the development,
- Appropriate site planning (considering factors such as sensitive biological communities/areas, catchments, etc.),

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- Early hazard assessment (nutrient loading on surface water resources, heavy rains & floods, etc.),
- Selection of appropriate mitigation measures (e.g. through implementation of adequate work procedures and/or other measures),
- Consideration of long-term measures that would contribute towards (environmental) sustainability of the proposed citrus farm development project (e.g. prohibiting certain actions within the development area, etc.),
- Regular monitoring of potential environmental threats (e.g. control of alien plants/invaders/weeds, impacts on adjacent biologically sensitive areas, etc.).

9.3.2.2 Operational phase impacts (negative)

- a) Primary impact component: Natural environment:
Secondary impact component: Physical environment - groundwater
Potential impact:

Impacts resulting from the use of water for irrigation

Significance/Certainty:	Moderate to high/Definite.
Spatial influence:	Site and immediate adjacent areas.
Duration:	Long term.
Mitigation / Optimisation:	The Nzhelele River forms the Northern Boundary of the application property. Water for Irrigation for the orchards is however obtained from the Nzhelele Dam irrigation channel which runs through the property. The owner has water rights in place for the property, as well as additional rights on some of the adjacent properties also belonging to him, which is more than sufficient to irrigate the current and proposed citrus orchards (See Annexure L - Copy of Confirmation of the extent and lawfulness of Water Use in terms of Section 35(4) of the National Water Act, 1998 (Act 36 of 1998). Boreholes were drilled during the drought to prevent water shortages

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and not for the proposed new orchards. The boreholes are currently in the proses of being registered with DWS and the sustainability and recovery rates are being determined by geo-hydrologists.

Discussion:

It will not be in the interest of the applicant to affect the water table negatively as their income is directly influenced by it. The applicant makes use drip irrigation in order to lessen irrigation water volumes that are required and to safe water loss through evaporation.

- b) Primary impact component: Natural environment:
Secondary impact component: Biological environment – terrestrial
Potential impact:
Impacts on the natural environment resulting from the use of pesticides & herbicides & fungicides
- Significance/Certainty: High, Possible
 Spatial influence: Site & immediate adjacent areas.
 Duration: Short term, damage permanent.
 Mitigation / Optimisation: The use of pesticides and herbicides needs specialist input as important aspects such as the following needs to be addressed:
- The use of pesticides, herbicides & fungicides should only be undertaken where pests are causing excessive economic damage.
 - Spraying programs should only commence after seeking advice from experienced pest and crop consultants.
 - Over spraying of pesticides & herbicides & fungicides should not take place.
 - Spraying should only take place within the proposed orchards (not on adjacent bush), unless a specialist has identified adjacent areas where spraying should be done.
 - To avoid significant damage to crops and to lessen the use of pesticides, regular

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monitoring & early implementation of a suitable spraying programme to stem pests is preferable, as it lessens the total amount of the chemicals that needs to be applied.

- The planting of pest resistant cultivars should receive attention, in order to minimise spraying.
- If it is found to be effective & viable, the use of biological control measures to stem pests should receive attention.
- Care should be taken when using natural (e.g. manure) and or industrial fertilisers at the site.
- Over-application should be avoided in order to prevent storm water containing fertilizer from reaching the Nzhelele River watercourse. The consequence would be eutrophication.
- Strict protocols for storage and application of fertilizers are to be followed to prevent contamination of the adjacent Nzhelele River.
- Avoid irrigation and application of fertiliser before or during heavy rains.
- Fertiliser and water application should be timed to correlate with the needs of the trees at a given point in the phenological cycle – specialist to advise.
- Fertilizer applications should be used at the right time and at the required rates – specialist to advise. The use of slow release nitrogen fertilizers is encouraged as this can improve nitrogen efficiency and reduce leaching of nitrogen.
- The use of organic fertilizers and mulching (as is currently being done) is encouraged.

In all instances the application of the herbicides and insecticides should be of such nature that it will not cause any environmental harm.

Discussion:

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- c) Primary impact component: Natural environment:
Secondary impact component: Biological environment – natural watercourses
Potential impact:

Chemical and effluent pollution (instream)

Significance/Certainty: Moderate, Possible
 Spatial influence: Site & immediate region.
 Duration: Short term, damage permanent.
 Mitigation / Optimisation: Extreme care should be taken when hazardous

compounds are used near the river/drainage lines. Controlled use and or storage of all materials, fuels and chemicals which could potentially reach the river and/or leach into underground water, should take place. Adequate fuel containment facilities are to be used at all times. Site activities should be properly managed. Adequate sanitary facilities and ablutions must be provided for construction workers. Soil ameliorants such as lime, gypsum, potassium and phosphate should not be stockpiled near the Nzhelele River. The use of all chemicals should be conducted in accordance with recommended application guidelines.

Discussion: A range of hazardous chemicals, some of which are lethal to instream biota (fish and invertebrates) could contaminate the adjacent watercourse (Nzhelele River) during various stages of this project if due precautions are not taken. Hazardous substances associated with construction activities include hydrocarbons (oil, diesel). In addition, washing soap, faeces, etc. from workers using the river and riparian zone for ablutions could pollute the river. The Riparian area is however fenced-off from the development area to prevent unauthorized persons from entering. Pollutants could be harmful to aquatic biota, particularly during low-flows when dilution is reduced and could pose a health risk to locals using the river water for domestic purposes. Lime-containing construction materials such as concrete,

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cement, grouts, etc., are toxic and can be lethal to fish and other aquatic biota. If dry cement powder or wet uncured concrete is exposed to surface run-off or river water, these compounds can elevate the pH to lethal levels.

- d) Primary impact component: Natural environment:
Secondary impact component: Biological environment – natural watercourses
Potential impact:

Instream pollution resulting from use of pesticides & herbicides & fungicides

Significance/Certainty: Moderate, Possible
 Spatial influence: Site & immediate region.
 Duration: Short term, damage permanent.
 Mitigation / Optimisation: Extreme care should be taken when pesticides & herbicides & fungicides are used near the Nzhelele River (and associated drainage lines). During the growing of the citrus trees, the incorrect or excessive application of pesticides and fertilizers could result in these chemicals (or runoff containing these chemicals) contaminating the adjacent Nzhelele River. The consequence would be eutrophication. Strict protocols for storage and application of pesticides and fertilizers are to be followed to prevent contamination of adjacent areas.

- Avoid irrigation and application of pesticides before or during heavy rains.
- Control human-induced water quality impacts on receiving streams.
- Water quality and biological monitoring should be instituted as soon as possible if any contamination took place. Toxicological monitoring can also be done once a year to test the levels of pesticides & herbicides & fungicides entering the Nzhelele River watercourse. Where monitoring data indicate potential areas of

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Discussion:

concern, follow-up investigations by specialists should be required and appropriate remedial action taken.

A range of hazardous chemicals, some of which are lethal to instream biota (fish and invertebrates) could potentially contaminate the Nzhelele River during the operational stage of this project if due precautions are not taken. During the growing of the citrus trees, the incorrect or excessive application of pesticides and fertilizers could result in these chemicals (or runoff containing these chemicals) contaminating the adjacent Nzhelele River. The consequence would be eutrophication and/or toxicity of the water, with direct impacts on biotic health and diversity of fish and invertebrates. Every effort should be made to prevent further eutrophication of the system, which means (in particular) careful management of the use of fertilizers and pesticides in the orchards. The riparian zone (buffer next to the Nzhelele river) will to some extent facilitate the containment and uptake of chemicals used in the citrus orchards.

- e) Primary impact component: Existing pollution, risks and/or hazards and health & safety
Secondary impact component: Existing pollution/environmental degradation – use of pesticides, herbicides & fungicides
Potential impact:
Impacts on humans resulting from the use of pesticides, herbicides & fungicides
Significance/Certainty: Moderate to high, Possible.
Spatial influence: Site & sub-region.
Duration: Long term.
Mitigation / Optimisation: Extreme care should be taken when toxic and/or hazardous compounds are used

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near the Nzhelele River. Over-application of pesticides, herbicides & fungicides should be avoided. Toxicological monitoring can also be done once a year to test the levels of pesticides & herbicides & fungicides entering the Nzhelele River watercourse.

Discussion:

Pollutants could pose a health risk to locals using the Nzhelele River water for domestic purposes. During the growing of the Citrus trees, the incorrect or excessive application of pesticides and fertilizers could result in these chemicals (or runoff containing these chemicals) contaminating the adjacent Nzhelele River. Thus extreme care should be taken when these hazardous compounds are used near the Nzhelele River. Over-application should be avoided.

- f) Primary impact component: Natural environment:
Secondary impact component: Biological environment – natural watercourses – eutrophication
Potential impact:
Instream pollution resulting from use of fertilisers
Significance/Certainty: High, Possible
Spatial influence: Site & immediate region.
Duration: Short term, damage permanent.
Mitigation / Optimisation: Extreme care should be taken when using natural (e.g. manure) and or industrial fertilisers at the site. Over-application should be avoided in order to prevent stormwater containing fertilizer from reaching the Nzhelele River watercourse. The consequence would be eutrophication. Strict protocols for storage and application of fertilizers are to be followed to prevent contamination of the adjacent Nzhelele River. Avoid irrigation and application of fertiliser before or during heavy rains. Soil analysis prior to application of fertilisers is critical in order to ascertain the

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correct composition and application ratios. Fertiliser and water application should be timed to correlate with the needs of the trees at a given point in the phenological cycle – a specialist should advise. Fertilizer applications should be used at the right time and at the required rates – a specialist should advise. The use of slow release nitrogen fertilizers are encouraged as this can improve nitrogen efficiency and reduce leaching of nitrogen. The use of organic fertilizers and mulching is encouraged. Fertilisers could pose a health risk to locals using the Nzhelele River water for domestic purposes. Over-application should be avoided.

Discussion:

- g) Primary impact component: Natural environment:
Secondary impact component: Biological environment – natural watercourses
Potential impact:
Impacts related to the establishment of infrastructure (i.e. fencing & access roads) - particularly near the riparian area zone
 Significance/Certainty: High, Possible
 Spatial influence: Site & immediate region.
 Duration: Short term, damage permanent.
 Mitigation / Optimisation: No development should take place north of the fenced road in the Nzhelele River riparian vegetation. A fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) in Ecological Report).
 Discussion: According to the Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1983) regulations, the flood area (the 1:10 year flood line) and 10m within this flood area should not be cultivated, unless authorized.

- h) Primary impact component: Natural environment:
Secondary impact component: Biological environment – vegetation

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Potential impact:

Impacts related to the further clearing of bush for establishment, operation and maintenance of the Citrus orchards

Significance/Certainty:	Moderate, Possible
Spatial influence:	Site.
Duration:	Medium term, damage permanent.
Mitigation / Optimisation:	The rocky outcrops inside Area A and B are sensitive and should be protected.

A large number of *Feadherbia albida* trees on the border of Area A is not removed yet and it is recommended that these trees should be left intact.

No development should take place north of the fenced road in the Nzhelele River riparian vegetation. A fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees.

The *Acacia tortilis* and *Acacia karoo* woodland outside the area and adjacent to the lower riparian vegetation should be regarded as sensitive with no future development in this zone.

Limited rocky outcrops and demarcated sites of population of *Boscia albitrunca* trees as shown on sensitivity map 16 should be left intact.

Discussion:

The project ecologist evaluated the development area on the basis of,

- the natural vegetation present,
- its rarity and sensitivity, and
- conservation importance.

The area, forms part of an agricultural node with irrigation systems, where no rare plants are present. Protected trees such as *Boscia albitrunca* and *Adansonia digitata* were found in the site.

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i) Primary impact component: Natural environment

Secondary impact component: Earth/land – upsetting of soils

Potential impact:

Impacts related to the trenching for and installation of pipelines for orchard irrigation

Significance/Certainty:

Low to moderate, Definite.

Spatial influence:

Site.

Duration:

Long term.

Mitigation / Optimisation:

During both site preparation and construction, particularly for construction of access and haul roads and trenching for pipelines, may increase soil erosion and result in sediment input to the Nzhelele River. This will result in elevated instream turbidity levels and changes in instream habitat conditions. Construction activities could also result in infilling of the river channel, and transport and deposition of sediment downstream.

Loss of habitat adjacent to the linear infrastructure may result in an increase in alien invasive plant species (e.g. seeds of weeds and exotic plants attached to undercarriages of vehicles).

Mitigation Measures:

- An ongoing monitoring and eradication program for all invasive and weedy plant species along roads and pipelines should be implemented.
- Rehabilitation of natural vegetation along roads and pipelines should be undertaken immediately after installation of linear infrastructure. As far as possible, indigenous plant species naturally growing along road and pipeline routes should be used for re-vegetation.
- The buffer area adjacent to the Nzhelele River, is fenced off – no

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unauthorized vehicle access in the buffer areas should be allowed.

- The crossing of natural drainage systems should be minimized and only constructed at the shortest possible route, perpendicular to the natural drainage system.
- Measures must be taken to prevent erosion and sediment-laden water from entering the adjacent watercourse (Nzhelele River) - these measures should include:
 - minimising the clearing areas and the removal of topsoil, stockpiling, covering and reuse of topsoil where re-establishment of vegetation on cleared areas is possible,
 - re-establishment of indigenous vegetation wherever possible (particularly where the riparian zone has been disturbed by bush clearing)
 - implementation of a storm water management techniques and ongoing repair and stabilisation of any erosion.
 - Trucks should avoid travelling unnecessarily through low-lying (wet) areas (typically adjacent to the Nzhelele River).
 - Selective stripping of topsoil, subsoil and overburden should take place.
 - Stockpiling of removed earth (separately) should take place and be returned for backfilling in the correct soil horizon order. In all construction areas (e.g. material laydown areas), topsoil and

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subsoils should be protected from contamination/pollution.

- Stockpiling of removed earth should not occur in drainage lines or impede surface water runoff.
- Trees on the site that is to be cleared should be selectively removed (trees outside the site should be left intact).
- The rocky outcrops as shown on the ecological sensitivity map should be left intact.

Discussion:

During the construction of access and haul roads and trenching for pipelines, there may be an increase in soil erosion, resulting in sediment input to the Nzhelele River. This will result in elevated instream turbidity levels and changes in instream habitat conditions. This could also result in infilling of the river channel, and transport and deposition of sediment downstream. Loss of habitat adjacent to the linear infrastructure may result in an increase in alien invasive plant species (e.g. seeds of weeds and exotic plants attached to undercarriages of vehicles).

j) Primary impact component: Infrastructure and community services

Secondary impact component: Infrastructure services – transport (local roads)

Potential impact:

Congestion along access road leading to the development area

Significance/Certainty:

Low, Possible.

Spatial influence:

Tar road (R525) adjacent to the development area.

Duration:

Long term.

Mitigation / Optimisation:

Implement traffic warning measures (e.g. signage & points men) to ensure effective & safe heavy vehicle movements in and out of the site e.g. during harvest time.

Discussion:

The proposed development will contribute to more trips along the R525 tar road.

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SECTION 7: ALTERNATIVES

10. DESCRIPTION OF ALTERNATIVES

10.1 IDENTIFYING ALTERNATIVES

The IEM procedure (Department of Environmental Affairs) stipulates that the environmental investigation needs to consider feasible alternatives for proposed developments. This means that for any one development proposed there should consist of a number of possible proposals or alternatives for accomplishing the same objectives or meeting the same need. These guidelines suggest that alternatives be evaluated according to the following criteria:

- location,
- demand,
- activity,
- process,
- scheduling, and
- input.

The environmental assessment practitioner undertook an analysis of “feasible” alternatives as part of this Environmental Assessment Report - an account of the alternatives that have been considered, is provided below.

Alternatives are discussed in the following manner;

- the extent and significance of each identified environmental impact (only “significant issues”), will be elaborated upon, and
- the possibility for mitigation of each identified environmental impact will be elaborated upon.

In each instance below, the identified alternatives that are provided are linked to a number of significant potential impacts that might result from the development.

For clarification purposes, the writer will first define the following terms, in order that the reader has a clear understanding what is meant by these terms.

- *alternative,*
- *mitigation.*

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Alternative: A possible course of action, in place of another, that would meet the same purpose and need (of a proposal). Alternative proposals can refer to any of the following but are not limited to:

- alternative sites for development,
- alternative projects for a particular site,
- alternative site layouts,
- alternative designs,
- alternative processes,
- alternative materials.

Mitigation: The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of a proposed action. Proposed mitigation measures can influence (reduce) the significance of an impact (if designed and implemented correctly). Mitigation should specify how, where and when measures to reduce adverse impacts or enhance beneficial impacts, should be implemented.

10.2 LOCATION ALTERNATIVES

10.2.1 Introduction

Location alternatives were considered on account of the following significant impacts that might result from the establishment of the citrus orchards:

- **Impact / Issue: The destruction of natural vegetation (especially protected species such as *Boscia albitrunca* and *Adansonia digitata*)**
- **Impact / Issue: Soil erosion due to vegetation clearance**
- **Impact / Issue: Damage to riparian vegetation due to site clearing.**
- **Impact / Issue: Uncovering of heritage or archaeological sites/resources/graves**
- **Impact / Issue: Impacts on the biological & physical environment resulting from the use of pesticides & herbicides & fungicides (instream pollution)**
- **Impact / Issue: Impacts related to farming activities near the riparian area zone**

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10.2.2 Feasible alternative

Alternative positions (locations) for (any future) components of the development were considered based on the biophysical attributes of the area where the citrus orchards have been developed.

The project ecologist stipulated that –

- No development north of the fenced road in the Nzhelele River riparian vegetation. A fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) and Google kmz map).
- Limited rocky outcrops and demarcated sites of population of *Boscia albitrunca* trees as shown on sensitivity map 16 should be left intact.
- Demarcated drainage areas associated with the Nzhelele River as shown on sensitivity map (Map 16) should be left intact.

10.3 ACTIVITY ALTERNATIVES

10.3.1 Introduction

Activity alternatives were considered on account of the following impacts that might result from the establishment of the citrus orchards:

- ***Impact / Issue: The destruction of natural vegetation (especially protected species such as *Boscia albitrunca* and *Adansonia digitata*)***
- ***Impact / Issue: Soil erosion due to vegetation clearance***
- ***Impact / Issue: Impacts resulting from the use of water for irrigation (irrigation methods)***
- ***Impact / Issue: Impacts on the biological & physical environment resulting from the use of pesticides & herbicides & fungicides (instream pollution)***
- ***Impact / Issue: Impacts related to farming activities near the riparian area zone***

10.3.2 Feasible alternatives

Activity Alternatives for the components of the development were considered based on the biophysical attributes of the area where the citrus orchards have been developed. The following conditions (mitigation measures) were included into the EMP of the project;

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- The velocity of surface stormwater flows from the cleared areas towards the Nzhelele River, have been reduced by the implementation of contours and storm water drainage systems. Effective dissipating measures should be implemented where collected stormwater discharge takes place into the Nzhelele River (so as to lessen the velocity of the collected water, as it could lead to erosion at these point(s) of discharge).
- The applicant should use drip irrigation for irrigation purposes in order to lessen irrigation water volumes (as is currently being done in the area where the citrus trees have already been planted).
- Over-application of fertilisers and pesticides & herbicides & fungicides should be avoided in order to prevent stormwater containing these chemicals from reaching the Nzhelele River watercourse. Strict protocols for storage and application of fertilisers and pesticides & herbicides & fungicides are to be followed to prevent contamination of the adjacent Nzhelele River.
- Avoid irrigation and application of fertiliser before or during heavy rains.
- Soil analysis prior to application of fertilisers is critical in order to ascertain the correct composition and application ratios. Fertiliser and water application should be timed to correlate with the needs of the trees at a given point in the phenological cycle – specialist to advise.
- Fertilizer applications should be used at the right time and at the required rates – specialist to advise. The use of slow release nitrogen fertilizers are encouraged as this can improve nitrogen efficiency and reduce leaching of nitrogen.
- The use of organic fertilizers and mulching (as is currently being done in the area where citrus trees have already been planted) is encouraged.

10.4 PROCESS ALTERNATIVES

No process alternatives were considered.

10.5 INPUT ALTERNATIVES

No input alternatives were considered.

10.6 DEMAND ALTERNATIVES

No demand alternatives were considered.

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10.7 SCHEDULING ALTERNATIVES

10.7.1 Introduction

Scheduling alternatives were considered on account of the following impact that might result from the establishment of the development:

- **Impact / Issue:** Impact resulting from damage to fauna & flora.

The extent of the above impact is: **Immediate**.

The significance of the above impact is: **Medium-High**.

10.7.2 Feasible alternatives (timing of the project activities)

Hereunder the writer will allude to the “timing” of the project actions and its environmental implications.

The following conditions (mitigation measures) were included into the EMPr of the project;

- The timing of construction (clearing and preparation) should coincide with seasons in which environmental elements are at smallest risk.
- Avoid irrigation and application of fertiliser before or during heavy rains.

10.8 NO ACTION ALTERNATIVE

The “no-action: alternative was considered as an alternative. It was found that certain mitigation measures can reduce the significance of impacts on the respective environmental components. Therefor, the no-action alternative was found not to be a feasible alternative.

The consequences of “non-approval”/“non-establishment” of the citrus orchards:

- a) The potential for the proposed development to have a positive impact on the economic and social environments/sectors stems from the fact that employment opportunities will be created.
- b) The consequences of “no-go” option or the “non-establishment” of the proposed citrus orchards would mean that this need of the applicant will not be addressed. The non-establishment of the proposed orchard would mean that it would have to be done

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elsewhere (thus resulting in impacts at that (alternative) site) and that the current site will need to be rehabilitated.

- c) The non-establishment of the citrus orchards would mean that the applicant would forfeit a potential income that would be generated from the agricultural production that will take place on the site.
- d) The potential for the significant alteration of habitats resulting from the proposed development of the citrus orchards is low to moderate (only if the development is done inside the riparian buffer zone area will it be high). If the citrus orchards remain outside the riparian zone, the significance of the overall impact can be lessened substantially.

10.9 THE ENVIRONMENTAL COSTS ASSOCIATED WITH THE PROPOSED DEVELOPMENT

Certain actions will take place during the planning & construction and operational phases which have potential to impact on the environment (i.e. the bio-physical environment, social & economic environment).

The main environmental costs associated with the development include;

- a) The development has potential to impact negatively on the biological environment (specifically flora within the riparian zone). Limited disturbance/clearing has taken place. No development should take place north of the fenced road in the Nzhelele River riparian vegetation. The project ecologist indicated that the fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) and Google kmz map).
- b) The site was recently cleared of most of the vegetation that originally covered the development area. According to the project ecologist, the area, forms part of agricultural node with irrigation systems, where no rare plants are present. Protected trees such as *Boscia albitrunca* and *Adansonia digitata* were found in the site. Within Area A the approximately 120 ha of which 80 ha consist of old lands and orchards. Approximately 40 ha consist of natural vegetation which are partly degraded and 30 ha thereof was cleared. Area B measures 80 ha in size and consist of natural vegetation that include protected trees such as *Adansonia digitata* and *Boscia albitrunca*. The entire area, except approximately 10 ha which consist of rocky outcrops, was cleared and citrus trees planted.
- c) Soil erosion is the largest negative impact that can be expected in areas A and B as most of the citrus were planted on slight to medium slopes. The owner did however implement mitigation measures with contour planning and drainage systems of high quality that minimize erosion.

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- d) Fertilisers & pesticides & herbicides & fungicides could reach the Nzhelele River’s watercourse if application or use of these chemicals is not done judiciously. Strict protocols for storage and application of fertilisers and pesticides & herbicides & fungicides are to be followed to prevent contamination of the adjacent Nzhelele River.

- e) In conclusion it is clear that the sensitive areas have not been affected and that only a small portion of the riparian zone and rocky outcrops have been affected somewhat by bush clearing. If the development of the citrus orchards excludes the areas as specified by the project ecologist, the significance of the development can be reduced to acceptable levels. Furthermore, measures have been put into place to prevent siltation during rain events – i.e. to stabilise the exposed soils where all vegetation was removed. The owner did implement mitigation measures with contour planning and drainage systems of high quality that minimize erosion.

10.10 CONCLUSION

Through the implementation of the recommendations outlined in this report, as pertaining to the development, the overall impact upon the environment can be reduced as follows:

- a) Impacts on the **Biological Environment** could potentially be *Definite, Medium to high and Negative* if mitigatory measures are not implemented. The overall potential impact that will result, can be mitigated to acceptable levels by protecting the areas alongside the Nzhelele River and abstaining from development of the rocky outcrops and areas where protected trees are located. This has been done as the Riparian area has been fenced out of the development site and clearing of the rocky outcrops did not take place when the area was cleared.

- b) Impacts on the **Physical Environment** could potentially be *Definite, Low-Medium and Negative* if mitigatory measures are not implemented. The potential overall impact can be mitigated to acceptable levels by the implementation of certain engineering measures to prevent erosion & subsequent siltation of the Nzhelele River. This has been done as the owner did implement mitigation measures with contour planning and drainage systems of high quality that minimize erosion.

- c) Impacts on the **Visual/Aesthetic Environment** could potentially be *Possible, Low and Negative*. The potential overall impact can be mitigated to acceptable levels by retaining natural occurring trees around the development site. The change from indigenous vegetation to orchards will result in a visual change but will become less significant after the establishment

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of the orchards because it is surrounded by existing orchards and croplands in the area. All protected trees outside the development area and rocky outcrops should be left to minimize visual impact (as have been done). Large *A. digitata trees* have been left intact. Protected tree species was translocated to areas outside the development. All natural trees outside the affected area should be left to minimize visual impact and to screen the site from view (especially alongside the R525 tar road).

- d) Impacts on the **Cultural/Heritage Environment** could potentially be *Unlikely, Low and Negative* if mitigatory measures are not implemented. The overall potential impact can be mitigated to acceptable levels.

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SECTION 8: ENVIRONMENTAL MANAGEMENT PROGRAMME

11. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

11.1 INTRODUCTION

11.1.1 Environmental Assessment Practitioner

This Environmental Management Programme was compiled by:

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11.1.2 Mitigation and Responsibilities

Mitigation seeks to find better ways of doing things, minimise or eliminate negative impacts, enhance project benefits and protect public and individual rights. The applicant/proponent has a responsibility to avoid or minimise impacts, and plan for managing impacts.

This section of the report serves to prescribe measures to reduce, limit, eliminate or compensate for impacts, to acceptable/insignificant levels. The term 'mitigate' means to *'alloy, moderate, palliate, temper, intensify'*. In environmental terminology this term is used as follows:

- mitigation of a negative impact;
- to reduce the significance of an impact;
- mitigation/optimization of a positive impact;

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Hereunder the potential to mitigate each of the negative impacts identified will be discussed. Certain mitigation measures will be proposed and an indication will be given of how these proposed mitigation measures will influence the significance and status of each identified impact. Recommendations are arranged in order of sequence i.e. Planning/construction and Operational phases.

Mitigation should permeate through all stages of the development process. It is also essential that the mitigation plan be monitored during the construction and operational phases, to ensure compliance.

The stipulations of this report should be conveyed to contractors and persons responsible for construction (clearing and preparation of the area for the orchards). The applicant in collaboration with his duly appointed contractor(s) will be responsible for the implementation of this EMPr. This mitigation section should be issued as a stand along document to all parties involved with the planning, implementation and operation of the proposed project.

11.2 WHAT IS AN EMPr?

It is essential to develop measures to eliminate, offset or reduce impacts on the environment, to acceptable levels before the implementation and operational phases of a project commence. The integration of such measures to protect the environment during the implementation and operational phase of a project, can be done by clearly defining environmental requirements within an Environmental Management Programme (or EMPr) (World Bank, 1999:1).

EMPr's provide a link between 1) the predicted environmental impacts (that will be induced by a certain development/project), and 2) implementation and operational activities.

Generally an EMPr performs the following functions;

- it outlines the anticipated environmental impacts of a project,
- it outlines the measures to be taken to mitigate these impacts,
- it outlines responsibilities for mitigation of impacts.

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Definition of an “Environmental Management Programme” (EMPr):

An EMPr is a guideline document/directive outlining the mitigation, monitoring and institutional measures to be taken during project implementation, construction and operation to avoid or control adverse environmental impacts, as well as the actions needed to implement these measures (World Bank, 1999:1).

Definition of “mitigation measures”:

Mitigation measures encompass all actions taken to eliminate, offset or reduce potentially adverse environmental impacts to acceptable levels (World Bank, 1999:1).

11.3 GEOGRAPHIC SCOPE OF THIS EMPr

This EMPr shall apply to all areas that will be affected by activities that will be undertaken on the application property (Remainder of the Farm Alicedale 138 MT, Musina local municipality) as it relates to the establishment of citrus orchards comprising the following;

- Area A measuring approx. 120ha. Site preparation (clearing of bush) commenced during October 2017. The majority of the site consisted of old orchards/cultivated fields.
- Area B measuring approx. 80ha. Site preparation (clearing of bush) commenced during July 2016 and citrus trees have been planted. The site consisted of natural vegetation.

See Annexure A – Locality Maps.

11.4 TIME FRAME OF THIS EMPr

This EMPr shall apply to all actions that will be undertaken on the relevant parts of the Remainder of the Farm Alicedale 138 MT, Musina local municipality, between the date of issuing of environmental authorisation and the date of completion of the establishment of the citrus orchards, with the infrastructure related to the operational phase of the citrus farming activities.

11.5 EMPr TO INFORM PLANNING

During planning and design, the proponent and its planning consultants and contractors, should take into account the recommendations of this EMPr so that it is positively utilised on a pro-active basis to aid in the mitigation of impacts.

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11.6 EMPr TO CONTRACTORS/EMPLOYEES

The stipulations of this mitigation plan (EMPr) should be conveyed to contractors/employees prior to the commencement of construction. Contractors/employees should acknowledge receipt thereof in writing (this can be achieved by including this EMPr as an annexure to the tender documents/work instruction documents).

11.7 INCORPORATE RECOMMENDATIONS INTO CONSTRUCTION CONTRACTS

Construction-phase mitigation guidelines and clauses should be written into contract documents as specifications, in addition to the minimum requirements as set out in the SABS Standardised Specification for Civil Engineering Construction.

Additional clauses should be added as necessary in response to specific impacts that may be identified during the detailed design stage.

11.8 EMPr MONITORING AND REPORTING

Implementation of this EMPr (adherence to this EMPr) should be monitored to ensure compliance. There should also be penalties for non-compliance.

- The proponent and/or its appointed contractors/managers shall monitor compliance with the EMPr.
- The proponent shall conduct inspections of the construction site on a weekly basis.
- The proponent shall document the findings of his monitoring actions.
- The proponent shall keep a documented complaints register (see enclosed Pro forma Complaints register - Annexure P).
- The contact details of the proponent shall be clearly displayed at the entrance to the site.
- The nature of complaints that are received shall be brought to the attention of LEDET and the contractor(s)/employees responsible to construction activities. The proponent shall give a suitable written response to complainants where required. See enclosed Pro forma Response to complaints - Annexure Q.
- The proponent's contractor shall document "environmental incidents" on an "Environmental Incident Report Sheet" (EIRS) within 1 day (24 hours) from the time that the incident has occurred. See enclosed Pro forma Environmental Incident Report sheet - Annexure R).
- In an instance where an "environmental incident" is recorded, the proponent shall take appropriate action to correct the "environmental incident" in accordance with the nature

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and scale of the recorded incident. Such corrective action shall be implemented as soon as possible after the occurrence of the incident. The re-occurrence of an environmental incident shall be avoided through the implementing of suitable precautionary measures to prevent the recurrence of such.

The proponent must appoint an independent Environmental Control Officer (ECO) to ensure that the EMPr (and required rehabilitation activities), are effectively implemented.

11.9 EMPr IMPLEMENTATION

The contractor must appoint an independent Environmental Control Officer to ensure that the EMPr (and required rehabilitation activities), are effectively implemented.

11.10 RECOMMENDED ENVIRONMENTAL IMPACT MANAGEMENT MEASURES

11.10.1 Planning phase mitigation guidelines

- a) Identified impact:
The destruction of natural vegetation during initial investigations, due to induced vehicular movement e.g. surveyors vehicles etc.

Mitigation / Optimisation:

Existing tracks/roads should be used when accessing the site for planning purposes. Sampling rather than removal of existing plant material should take place (and then only if essential). The project ecologist determined the location of the Nzhelele riparian zone, which should be maintained between the citrus orchard development area and the river. The riparian area is fenced out from the area where orchards have been made. Significant alteration of the riparian zone adjacent to the Nzhelele River has not taken place. The project ecologist indicated that the small fraction of the riparian area that was cleared, must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) and Google kmz map in Ecological Report.

- b) Identified impact:
Potential injury to construction workers

Mitigation/Optimisation:

Implementation of safety measures and work procedures and first aid facilities should be required of contractors.

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- c) Identified impact:
Unsocial activities at construction site (e.g. crime)

Mitigation/Optimisation:

Appointed contractors (if being used) / employees that will be installing infrastructure (i.e. storm water drainage systems, irrigation pipes etc.) at the site, should be required to implement security measures at their construction camp/material laydown area. Security (gate) control measures should be implemented in order that only labourers and authorised persons obtain access to the construction camp/material laydown area. Unfenced construction camps/material laydown areas may present a greater security risk – such sites should be fenced/secured. Access control is being done at the entrance to the property.

- d) Identified impact:
Construction traffic and access & construction impacts on soils (upsetting of soil horizons through groundworks and/or compaction by vehicles)

Mitigation / Optimisation:

Damping down of unsurfaced tracks should take place during construction. Trucks should avoid travelling unnecessarily through low-lying (wet) areas (typically adjacent to the Nzhelele River). Adverse impacts from construction traffic can be minimised by good planning and by effectively controlling site activities. Warning signs informing passers-by of construction vehicle movement should be posted at the entrance/exit to the site. Working hours to be controlled by site engineer/manager. Working hours should be limited to between 6h00 and 17h00 (Mondays to Saturdays only).

- e) Identified impact:
Impact of construction noise on adjacent areas.

Mitigation / Optimisation:

Keep residents of surrounding properties informed if any unusually noisy activities are planned. Noise impacts are reduced over distance at a rate of 1db (decibel) per 13 metres. Working hours should be limited to between 6h00 and 17h00 (Mondays to Saturdays only).

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f) Identified impact:
Pollution of groundwater

Mitigation / Optimisation:

Controlled usage and or storage of all fuels and chemicals during construction of irrigation infrastructure and access roads is advised. Due to very limited amounts of the aforementioned substances being used during construction, leaching thereof into the underground water is highly unlikely. Adequate fuel containment facilities should however be used. Adequate sanitary facilities and ablutions must be provided for construction workers.

The mixing of any solvents, asphalt, sealants, adhesives, paints, chemicals or other noxious materials shall only be undertaken in designated areas on concrete aprons that have spillage control channels and separate storage areas. The mixing of materials will not be permitted in the general areas of the site. All surplus or waste materials are to be removed from the site. All these operations shall only be allowed on site under strict observations of the manufacturers' instructions.

g) Identified impact:
Soil erosion due to vegetation clearance.

Mitigation / Optimisation:

When soil is cleared of vegetation, management techniques to prevent water erosion should be employed (e.g. reduction of water velocity and the diversion of surface water runoff downslope). The area in general possesses a medium risk for erosion (this has increased due to the large scale removal of vegetation cover from the development area). The velocity of surface stormwater flows from the cleared areas towards the Nzhelele River, have been reduced by the implementation of contours and storm water drainage systems. Effective dissipating measures should be implemented where collected stormwater discharge takes place into the Nzhelele River or its tributaries (so as to lessen the velocity of the collected water, as it could lead to erosion at these point(s) of discharge).

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h)

Identified impact:

Damage to flora due to site clearing (including riparian area).

Mitigation / Optimisation:

Large scale removal of vegetation cover from the development area has taken place (approx. 200ha). Area A consists of approximately 120 ha of which 80 ha consist of old lands and orchards. Approximately 40 ha consist of natural vegetation which were partly degraded and 30 ha thereof was cleared. Area B is 80 ha in size and consists of natural vegetation that includes protected trees such as *Adansonia digitata* and *Boscia albitrunca*. The entire area, except approximately 10 ha which consist of rocky outcrops, was cleared and citrus trees planted.

The Ecologist made the following recommendations that:

- Limited rocky outcrops and demarcated sites of population of *Boscia albitrunca* trees as shown on sensitivity map 16 should be left intact.
- A large number of *Feadherbia albida* trees on the border of Area A are not removed yet and it is recommended that these trees should be left intact.
- No development should take place north of the fenced road in the Nzhelele River riparian vegetation. A fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) in Ecological Report).
- The *Acacia tortilis* and *Acacia karoo* woodland outside the area and adjacent to the lower riparian vegetation should be regarded as sensitive with no future development in this zone.

No fires should be allowed on site except in designated areas. Access to the site should be controlled - local disadvantaged residents should be allowed to collect firewood (only where bush is to be cleared).

i)

Identified impact:

Hunting and capture of birds and other fauna by workers

Mitigation / Optimisation:

Capture or snaring of birds or other fauna must be strictly prohibited on site - especially w.r.t. contractors' employees. Birds (e.g. guinea fowl and francolin) might be snared - this must be prevented.

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- j) Identified impact:
Proliferation of alien plant species during and after construction

Mitigation / Optimisation:

Regulation 15 of the Act on the Conservation of Agricultural Resources (as amended), Act No. 43 of 1983, determines that the establishment of declared weeds and invasive plants during and after development should be prohibited. It is recommended that alien species be removed and destroyed, preferably burned, before commencement of any construction activities. No alien plants were however noted on both areas. Weeds are invasive and will flourish on the bare areas. The distribution of weeds should be monitored.

- k) Identified impact:
Visual impact of construction (bush clearing) activities

Mitigation / Optimisation:

The visual impact will initially be significant, when the natural vegetation have been cleared, but will become less significant after the establishment of the orchards. All protected trees outside the construction area and rocky outcrops should be left to minimize visual impact. Large *A. digitata* trees have been left intact. Protected tree species was translocated to areas outside the development. All natural trees outside the affected area should be left to minimize visual impact and to screen the site from view (especially alongside the R525 tar road).

- l) Identified impact:
Impact of nuisances resulting from construction (e.g. dust, smoke & noise).

Mitigation / Optimisation:

Damping down of graded tracks and cleared areas should take place during construction. As much natural vegetation should be retained as is possible (especially natural occurring protected trees). As a mitigatory measure, construction should be limited to normal working hours. Adjacent residents shall be informed of unusually noisy activities that will be undertaken. Construction activities could create larger amounts of atmospheric dust, thus causing a nuisance when it settles on adjacent properties & crops. Implement traffic warning measures (e.g. signage & pointsmen) to ensure effective & safe heavy vehicle movements in and out of the site e.g. during harvest time.

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- m) Identified impact:
Uncovering of heritage or archaeological sites/resources/graves

Mitigation / Optimisation:

In the case of an archaeological/heritage resources “find”, all excavation work should be halted and a heritage resources practitioner should be consulted (or alternatively the nearest SAHRA office). If found, graves shall be relocated in accordance with the stipulations of the South African Heritage Resources Act and its relevant regulations pertaining to graves.

The Chance Fossil Finds Protocol appended to the Palaeontological report should be applied by the landowner should any substantial fossil remains (*e.g.* vertebrate bones, teeth, petrified wood, plant fossil beds) be found in future and SAHRA should be notified immediately regarding possible mitigation (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The palaeontologist concerned with mitigation work would need a valid collection permit from SAHRA. All work would have to conform to international best practice for palaeontological fieldwork and the study (*e.g.* data recording fossil collection and curation, final report) should adhere to the minimum standards for Phase 2 palaeontological studies published by SAHRA (2013).

- n) Identified impact:
Toilet facilities

Mitigation / Optimisation:

Adequate sanitary facilities and ablutions must be provided for construction workers. The use of portable chemical toilets for use by the labour force, is essential to avoid pollution and attraction of vermin and flies (which could become a nuisance or a health hazard).

- o) Identified impact:
Waste handling

Mitigation / Optimisation:

Contractors/employees should remove all waste generated by themselves during construction and it should be disposed of at a suitable solid waste disposal venue – “dumping in the bush” should not take place. No materials or pollutants, etc. shall be

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dumped on site, adjacent thereto, or in any other place. Waste material will be in designated areas and not remain on site for a period longer than 90 days before it is disposed off.

p) Identified impact:

Mixing cement

Mitigation / Optimisation:

Where cement and concrete, etc. is mixed on site, this shall be done in specified areas on concrete aprons or on protected plastic linings and provision shall be made to contain spillage or overflows onto soils.

11.10.2 Operational phase mitigation guidelines

a) Identified impact:

Impacts resulting from the use of water for irrigation

Mitigation / Optimisation:

The Nzhelele River forms the Northern Boundary of the application property. Water for Irrigation for the orchards is however obtained from the Nzhelele Dam irrigation channel which runs through the property. Water saving irrigation systems such as drip irrigation should be used in order to lessen irrigation water volumes that are required and to save water loss through evaporation (drip irrigation is currently being used on the existing orchards). Should additional water be obtained through the use of boreholes a water use license should be obtained from DWS in terms of the National Water Act, 1998 (Act 36 of 1998).

b) Identified impact:

Impacts on the natural environment resulting from the use of pesticides & herbicides & fungicides

Mitigation / Optimisation:

The use of pesticides, herbicides & fungicides should only be undertaken where pests are causing excessive economic damage. Spraying programs should only commence after seeking advice from experienced pest and crop consultants. Over spraying of pesticides & herbicides & fungicides should not take place. Spraying should only take place within the proposed orchards (not on adjacent bush), unless a specialist has

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identified adjacent areas where spraying should be done. To avoid significant damage to crops and to lessen the use of pesticides, regular monitoring & early implementation of a suitable spraying programme to stem pests is preferable, as it lessens the total amount of the chemicals that needs to be applied. The planting of pest resistant cultivars should receive attention, in order to minimise spraying. If it is found to be effective & viable, the use of biological control measures to stem pests should receive attention.

c) Identified impact:

Chemical and effluent pollution (instream)

Mitigation / Optimisation:

A range of hazardous chemicals, some of which are lethal to instream biota (fish and invertebrates) could potentially contaminate the Nzhelele River during the operational stage of this project if due precautions are not taken. During the growing of the citrus trees, the incorrect or excessive application of pesticides and fertilizers could result in these chemicals (or runoff containing these chemicals) contaminating the adjacent Nzhelele River. The consequence would be eutrophication and/or toxicity of the water, with direct impacts on biotic health and diversity of fish and invertebrates. Every effort should be made to prevent eutrophication of the system, which means (in particular) careful management of the use of fertilizers and pesticides in the orchards. The riparian zone (buffer next to the Nzhelele river) will to some extent facilitate the containment and uptake of chemicals used in the citrus orchards.

Strict protocols for storage and application of pesticides and fertilizers are to be followed to prevent contamination of adjacent areas.

- Avoid irrigation and application of pesticides before or during heavy rains.
- Control human-induced water quality impacts on receiving streams.
- Water quality and biological monitoring should be instituted as soon as possible if any contamination took place. Toxicological monitoring can also be done once a year to test the levels of pesticides & herbicides & fungicides entering the Nzhelele River watercourse. Where monitoring data indicate potential areas of concern, follow-up investigations by specialists should be required and appropriate remedial action taken.

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d) Identified impact:

Health impacts on humans resulting from instream pollution through use of pesticides & herbicides & fungicides

Mitigation / Optimisation:

Pollutants could pose a health risk to locals using the Nzhelele River water for domestic purposes. During the growing of the Citrus trees, the incorrect or excessive application of pesticides and fertilizers could result in these chemicals (or runoff containing these chemicals) contaminating the adjacent Nzhelele River. Thus extreme care should be taken when these hazardous compounds are used near the Nzhelele River. Over-application should be avoided.

e) Identified impact:

Instream pollution resulting from use of fertilisers

Mitigation / Optimisation:

Extreme care should be taken when using natural (e.g. manure) and or industrial fertilisers at the site. Over-application should be avoided in order to prevent stormwater containing fertilizer from reaching the Nzhelele River watercourse. The consequence would be eutrophication. Strict protocols for storage and application of fertilizers are to be followed to prevent contamination of the adjacent Nzhelele River. Avoid irrigation and application of fertiliser before or during heavy rains. Soil analysis prior to application of fertilisers is critical in order to ascertain the correct composition and application ratios. Fertiliser and water application should be timed to correlate with the needs of the trees at a given point in the phenological cycle – a specialist should advise.

Fertilizer applications should be used at the right time and at the required rates – a specialist should advise. The use of slow release nitrogen fertilizers are encouraged as this can improve nitrogen efficiency and reduce leaching of nitrogen. The use of organic fertilizers and mulching is encouraged.

f) Identified impact:

Impacts related to the establishment of infrastructure (i.e. fencing & access roads) - particularly near the riparian area zone

Mitigation / Optimisation:

No development should take place north of the fenced road in the Nzhelele River riparian vegetation. A fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) in Ecological Report).

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According to the Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1983) regulations, the flood area (the 1:10 year flood line) and 10m within this flood area should not be cultivated, unless authorized.

g) Identified impact:

Impacts related to the further clearing of bush for establishment, operation and maintenance of the Citrus orchards

Mitigation / Optimisation:

The rocky outcrops inside Area A and B are sensitive and should be protected. A large number of *Feadherbia albida* trees on the border are not removed yet and it is recommended that these trees should be left intact.

No development should take place north of the fenced road in the Nzhelele River riparian vegetation. A fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees.

The *Acacia tortilis* and *Acacia karoo* woodland outside the area and adjacent to the lower riparian vegetation should be regarded as sensitive with no future development in this zone.

Limited rocky outcrops and demarcated sites of population of *Boscia albitrunca* trees as shown on sensitivity map 16 should be left intact.

h) Identified impact:

Impacts related to the trenching for and installation of pipelines for orchard irrigation

Mitigation / Optimisation:

During both site preparation and construction, particularly for construction of access and haul roads and trenching for pipelines, may increase soil erosion and result in sediment input to the Nzhelele River. This will result in elevated instream turbidity levels and changes in instream habitat conditions. Construction activities could also result in infilling of the river channel, and transport and deposition of sediment downstream.

Loss of habitat adjacent to the linear infrastructure may result in an increase in alien invasive plant species (e.g. seeds of weeds and exotic plants attached to undercarriages of vehicles).

Mitigation Measures:

- An ongoing monitoring and eradication program for all invasive and weedy plant species along roads and pipelines should be implemented.

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- Rehabilitation of natural vegetation along roads and pipelines should be undertaken immediately after installation of linear infrastructure. As far as possible, indigenous plant species naturally growing along road and pipeline routes should be used for re-vegetation.
- The buffer area adjacent to the Nzhelele River, is fenced off – no unauthorized vehicle access in the buffer areas should be allowed.
- The crossing of natural drainage systems should be minimized and only constructed at the shortest possible route, perpendicular to the natural drainage system.
- Measures must be taken to prevent erosion and sediment-laden water from entering the adjacent watercourse (Nzhelele River) - these measures should include:
 - minimising the clearing areas and the removal of topsoil, stockpiling, covering and reuse of topsoil where re-establishment of vegetation on cleared areas is possible,
 - re-establishment of indigenous vegetation wherever possible (particularly where the riparian zone has been disturbed by bush clearing)
 - implementation of a stormwater management plan and ongoing repair and stabilisation of any erosion.
 - Trucks should avoid travelling unnecessarily through low-lying (wet) areas (typically adjacent to the Nzhelele river).
 - Selective stripping of topsoil, subsoil and overburden should take place.
 - Stockpiling of removed earth (separately) should take place and be returned for backfilling in the correct soil horizon order. In all construction areas (e.g. material laydown areas), topsoil and subsoils should be protected from contamination/pollution.
 - Stockpiling of removed earth should not occur in drainage lines or impede surface water runoff.
 - Trees on the site that is to be cleared should be selectively removed (trees outside the site should be left intact).
 - The rocky outcrops as shown on the ecological sensitivity map should be left intact.

i) Identified impact:

Congestion along access road (R525) leading to the development area

Mitigation / Optimisation:

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Implement traffic warning measures along the R525 tar road (e.g. signage & points men) to ensure effective & safe heavy vehicle movements in and out of the site e.g. during harvest time.

11.10.3 Decommissioning phase

Should the site for any reason be closed, an Environmental Management Programme shall be submitted to LEDET for approval.

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SECTION 9: ENVIRONMENTAL IMPACT STATEMENT

12. ENVIRONMENTAL IMPACT STATEMENT

12.2 CONCISE BACKGROUND

The owner of the property (Remainder of the Farm Alicedale 138 MT) is of the intention to establish approximately 200 hectares of Citrus orchards on the property. The affected area is divided into the following two sections/areas:

- c) Area A measuring approx. 120ha. Site preparation (clearing of bush) commenced during October 2017. The majority of the site consisted of old orchards/cultivated fields.
- d) Area B measuring approx. 80ha. Site preparation (clearing of bush) commenced during July 2016 and citrus trees have been planted (with associated irrigation infrastructure). The site consisted of natural vegetation.

See enclosed diagrams depicting the size & outer boundary of the two affected areas that has already been cleared (see Annexure A).

Site preparation (clearing of bush) unlawfully commenced, as the owner of the land was under the impression that since the following necessary approvals have already been obtained:

- Permit for the clearing of the area in terms of the National Forests Act, 1998 (Act No. 84 of 1998) from the Department of Agriculture, Forestry & Fisheries (see permit attached as Annexure M),
- Permit to cultivate virgin soil in terms of Regulation 2 of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) from the Department of Agriculture, Forestry & Fisheries (see permit attached as Annexure N),
- Permit to establish/demarcate *Casuarina equisetifolia* (horsetail trees) to act as windbreak in terms of Regulation 15B (2)(a) of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) from the Department of Agriculture, Forestry & Fisheries (see permit attached as Annexure O),
- Confirmation of the extent and lawfulness of Water Use in terms of Section 35(4) of the National Water Act, 1998 (Act 36 of 1998) to irrigate from the Nzhelele Water Scheme from the Department of Water and Sanitation (See approval attached as Annexure L),

and seeing that the property had been used for agricultural activities in the past, he could continue without having to apply for Environmental Authorization.

An official from LEDET visited the property on 18 May 2018 where it was indicated to the applicant that he contravened the stipulations of the Environmental Impact Assessment Regulations, 2014 under the National Environmental Management Act, 1998.

The applicant has appointed Tekplan Environmental to apply for “ex post facto” approval from the Limpopo Department of Economic Development, Environment & Tourism (EIM Section).

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The applicant did not knowingly contravene the law in terms of the EIA Regulations when he cleared the land as he was under the impression that it's a farming activity on agricultural land for which he have obtained the required authorizations as indicated above.

12.2 THE ENVIRONMENTAL COSTS ASSOCIATED WITH THE PROPOSED DEVELOPMENT

Certain actions will take place during the planning & construction and operational phases which have potential to impact on the environment (i.e. the bio-physical environment, social & economic environment).

The main environmental costs associated with the development include;

- a) The development has potential to impact negatively on the biological environment (specifically flora within the riparian zone). Limited disturbance/clearing has taken place. No development should take place north of the fenced road in the Nzhelele River riparian vegetation. The project ecologist indicated that the fraction of area opened must be rehabilitated by planting of *F. albida*, *F. sycomorus* and *P. violancea* trees (See photo 11, Maps 9 and 16 (arrows) and Google kmz map).
- b) The site was recently cleared of most of the vegetation that originally covered the development area. According to the project ecologist, the area, forms part of agricultural node with irrigation systems, where no rare plants are present. Protected trees such as *Boscia albitrunca* and *Adansonia digitata* were found in the site. Within Area A the approximately 120 ha of which 80 ha consist of old lands and orchards. Approximately 40 ha consist of natural vegetation which are partly degraded and 30 ha thereof was cleared. Area B is 80 ha in size and consist of natural vegetation that include protected trees such as *Adansonia digitata* and *Boscia albitrunca*. The entire area, except approximately 10 ha which consist of rocky outcrops, was cleared and citrus trees planted.
- c) Soil erosion is the largest negative impact that can be expected in areas A and B as most of the citrus were planted on slight to medium slopes. The owner did however implement mitigation measures with contour planning and drainage systems of high quality that minimize erosion.
- d) Fertilisers & pesticides & herbicides & fungicides could reach the Nzhelele River's watercourse if application or use of these chemicals is not done judiciously. Strict protocols for storage and application of fertilisers and pesticides & herbicides & fungicides are to be followed to prevent contamination of the adjacent Nzhelele River.

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- e) In conclusion it is clear that the sensitive areas have not been affected and that only a small portion of the riparian zone and rocky outcrops have been affected somewhat by bush clearing. If the development of the citrus orchards excludes the areas as specified by the project ecologist, the significance of the development can be reduced to acceptable levels. Furthermore, measures have been put into place to prevent siltation during rain events – i.e. to stabilise the exposed soils where all vegetation was removed. The owner did implement mitigation measures with contour planning and drainage systems of high quality that minimize erosion.

12.3 CONCLUSION

Through the implementation of the recommendations outlined in this report, as pertaining to the development, the overall impact upon the environment can be reduced as follows:

- a) Impacts on the **Biological Environment** could potentially be *Definite, Medium to high and Negative* if mitigatory measures are not implemented. The overall potential impact that will result can be mitigated to acceptable levels by protecting the areas alongside the Nzhelele River and abstaining from development of the rocky outcrops and areas where protected trees are located. This has been done as the Riparian area has been fenced out of the development site and clearing of the rocky outcrops did not take place when the area was cleared.
- b) Impacts on the **Physical Environment** could potentially be *Definite, Low-Medium and Negative* if mitigatory measures are not implemented. The potential overall impact can be mitigated to acceptable levels by the implementation of certain engineering measures to prevent erosion & subsequent siltation of the Nzhelele River. This has been done as the owner did implement mitigation measures with contour planning and drainage systems of high quality that minimize erosion.
- c) Impacts on the **Visual/Aesthetic Environment** could potentially be *Possible, Low and Negative*. The potential overall impact can be mitigated to acceptable levels by retaining natural occurring trees around the development site. The change from indigenous vegetation to orchards will result in a visual change but will become less significant after the establishment of the orchards because it is surrounded by existing orchards and croplands in the area. All protected trees outside the development area and rocky outcrops should be left to minimize visual impact (as have been done). Large *A. digitata trees* have been left intact. Protected tree species was translocated to areas outside the development. All natural trees outside the affected area should be left to minimize visual impact and to screen the site from view (especially alongside the R525 tar road).

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- d) Impacts on the **Cultural/Heritage Environment** could potentially be *Unlikely, Low and Negative* if mitigatory measures are not implemented. The overall potential impact can be mitigated to acceptable levels.

The proposed development of the citrus farm should be permitted / authorised based on the fact that a) no so-called “fatal flaw(s)” will result, and b) negative impacts can be mitigated by the implementation of a range of recommendations.

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SECTION 10: CONCLUDING REMARK

13. CONCLUDING REMARKS

In conclusion it can be stated that several negative and positive impacts/effects can potentially arise from the development. These can however be mitigated through the implementation of a number of mitigation measures (as contained in the *Environmental Management Programme*) - see Section 8 of this document. The mentioned EMPr provides guidelines to contractors/employees on alternative ways of conducting construction activities and to lessen the overall impact of the development.

The proposed development possesses the potential to have a negative impact on the natural environment (if appropriate mitigatory measures not be implemented). During the operational phase various types of pollution could result, this can however be avoided through adherence to the proposed mitigatory measures as contained in this report.

It is of vital importance that the proponent takes note of the recommendations contained in this document in order that it can be included into the contracts of the parties that will be responsible for construction/development of the citrus orchards.

The Limpopo Department of Economic Development, Environment and Tourism is respectfully requested to approve this Environmental Assessment Report, which forms part of the application for rectification of unlawful commencement and continuation of a listed activity in terms of Section 24G of the National Environmental Management Act, 1998 (Act 107 of 1998) - the said application specifically pertains to the activities that have been undertaken as described in Section 4, in this document.

Compiled by:

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D. COMBRINK

25 SEPTEMBER 2018

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- YSTERBERG ENVIRO VELD AND GAME MANAGEMENT SERVICES. ECOLOGICAL REPORT. AN ENVIRONMENTAL REPORT REGARDING THE ECOLOGICAL ASSESSMENT OF THE CLEARING OF INDIGENOUS VEGETATION AND AREA WITH EXISTING CULTIVATED LAND, THAT HAS BEEN CLEARED TO PLANT CITRUS ON REMAINDER OF THE FARM ALICEDALE 138 MT, MUSINA LOCAL MUNICIPALITY AREA, LIMPOPO PROVINCE. AUGUST 2018

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