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BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PLAN

FOR THE

PROPOSED ESTABLISHMENT OF A RESIDENTIAL TOWNSHIP ON RADIOKOP EXTENSION 46 ON PORTION 1 OF THE FARM UITSIG 208 IQ

GAUT Ref. No.: 002/14-15/0199

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1 INTRODUCTION

Azzurro Environmental has been appointed by Deltaic Dunes (Pty) Ltd as independent environmental practitioners in order to make application for the proposed establishment of a Residential Township on Portion 1 of the Farm Uitsig 208 IQ in Radiokop Extension 46.

This report makes provision for the following information:

- Details of the proposed development
- Details of the site characteristics and surrounding environment
- Potential impact associated with the development and the proposed mitigation measures

1.1 Description of Activity

The current zoning of the proposed development on Portion 1 of Uitsig 208 IQ is "Agricultural" in terms of the Roodepoort Town Planning Scheme 1987. The following is a proposed township planned for development of the approved General Plan No. 7852/2006. It will comprise 5 erven zoned "Residential 3", 1 erf zoned "Private Open Space" and a road. The following sizes and zonings of the proposed erven apply:

Proposed Erf 479:	1.4459ha	"Residential 3" @ 30 dwelling units per hectare
Proposed Erf 480:	0.8899ha	"Residential 3" @ 40 dwelling units per hectare
Proposed Erf 481:	0.8144ha	"Residential 3" @ 40 dwelling units per hectare
Proposed Erf 482:	1.0651ha	"Residential 3" @ 40 dwelling units per hectare
Proposed Erf 483:	2.1596ha	"Residential 3" @ 30 dwelling units per hectare
Proposed Erf 484:	0.5042ha	"Private Open Space"
Road	1.6862ha	

Total area of the site: 8.5653ha

The private open space area will comprise storm water attenuation and have recreational value. A 20m wide access road with a cul-de-sac is provided. This plan also provides for the widening of Christiaan de Wet road for the future formalisation of Opera road. Appendix E shows the proposed plans and layouts of the development, as well as the surveyor general plan.

2 METHODOLOGY

This report has been compiled to ensure that NEMA BAR and EMP requirements are met.

2.1 Legislation

The environmental component of the project will strive to comply with the following legal requirements:

- The constitution of South Africa, 1996 (Act 108 of 1996);
- The National Environmental Management Act, 1998 (Act 107 of 1998);
- The Environmental Conservation Act, 1989 (Act 73 of 1989);
- The National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004);
- The National Heritage Resources Act, 1999 (Act 25 of 1999) (Not applicable to this application, as the site has no palaeontological value- according to the SAHRIS website);

2.2 Environmental and Social Impact Assessment

Environmental impact assessment (EIA) methods were developed to: (1) identify the potential impacts of the development on the environment; (2) predict the probability of these impacts and (3) evaluate the significance of the potential impacts.

The methodology used by Azzurro Environmental is as follows:

The <u>status</u> of the impact		
Status	Description	
Positive:	a benefit to the holistic environment	
Negative:	a cost to the holistic environment	
Neutral:	no cost or benefit	
The <u>duration</u> of the impact		
Score	Duration	Description
1	Short term	Less than 2 years
2	Short to medium term	2 – 5 years
3	Medium term	6 – 25 years
4	Long term	26 – 45 years
5	Permanent	46 years or more
The <u>extent</u> of the impact		
Score	Extent	Description
1	Site specific	Within the site boundary
2	Local	Affects immediate surrounding areas
3	Regional	Extends substantially beyond the site boundary
4	Provincial	Extends to almost entire province or larger region
5	National	Affects country or possibly world

The reversibility of the impact

Score	Reversibility	Description
1	Completely reversible	Reverses with minimal rehabilitation & negligible residual affects
3	Reversible	Requires mitigation and rehabilitation to ensure reversibility
5	Irreversible	Cannot be rehabilitated completely/rehabilitation not viable

The affect (severe or beneficial) of the impact

Score	Severe/beneficial effect	Description
1	Slight	Little effect - negligible disturbance/benefit
2	Slight to moderate	Effects observable - environmental impacts reversible with time
3	Moderate	Effects observable - impacts reversible with rehabilitation
4	Moderate to high	Extensive effects - irreversible alteration to the environment
5	High	Extensive permanent effects with irreversible alteration

The probability of the impact

Score	Rating	Description
1	Unlikely	Less than 15% sure of an impact occurring
2	Possible	Between 15% and 40% sure of an impact occurring
3	Probable	Between 40% and 60% sure that the impact will occur
4	Highly Probable	Between 60% and 85% sure that the impact will occur
5	Definite	Over 85% sure that the impact will occur

The Consequence

= Severity + Spatial Scale + Duration + Reversibility.

The Significance

= Consequence x Probability.

The rating is described as follows:

Score out of 100	Significance
1 to 20	Low
21 to 40	Moderate to Low
41 to 60	Moderate
61 to 80	Moderate to high
81 to 100	High

Will **mitigation** be possible (yes or no).

Finally the negative impacts are rated according to the **degree of loss of a resource** due to the particular impact. This is only assessed from the pre-mitigation perspective of the impact. The degree of loss of a resource is evaluated in terms of:

- **Low degree of loss:** where the resource will recover on its own with no/limited rehabilitation over an observable period of time;
- **Moderate degree of loss:** where the resource will recover over extended period or with rehabilitation or remedial measures to assist recovery of resource; and

- **High degree of loss:** Where the resource cannot be recovered, or the resource will recover over extended time periods.

2.3 Environmental Management Programme

The National Environmental Management Act (No. 107 of 1998 – NEMA) as amended (Act 62 of 2008) sets out the requirements for the environmental authorisation process. EIA Regulations R 543, R544, R545 and R546 published under NEMA (2010) set out limitations to various activities that require a basic assessment and an EIA process.

3 APPLICATION DETAILS

3.1 Details of Applicant

3.1.1 Contact Details

Name of Company: Deltaic Dunes (Pty) Ltd

Postal Address: PO Box 2762 Honeydew Johannesburg Gauteng 2040

Telephone: 011 475 5480

Fax Number: 086 580 0280 / 011 475 5400

Responsible Person: Mr Jimmy Shand

E-mail: acas@telkomsa.net

3.1.2 Owner of the Land

The applicant owns the affected properties and contact details are as above.

3.2 Location of site

The property is situated along Christiaan De Wet road adjacent to Opera Road, approximately 230 metres north of Erasmus Street/Christiaan de Wet road. It is within the Johannesburg Metropolitan Municipality. It is located within Radiokop suburb in Roodepoort. The distance to surrounding towns from the property are summarised in the table below. The site is also immediately adjacent to the Charter House Preparatory and Pre-Primary School.

Table 1: Distance and direction to surrounding towns from Radiokop X46

Direction	Town	Distance
North east	Roodepoort	6.5km
west	Randburg	7km
east	Krugersdorp CBD	15km

The following suburbs neighbourhood border the proposed Radiokop development (Figure 1).

- South – Strubensvalley, Weltevreden Park, Allens Nek
- North – Harveston AH, Radiokop and Randparkridge
- East – Randpark Ridge, Weltevreden Park and Glen Dayson
- West – Wilgeheuwel

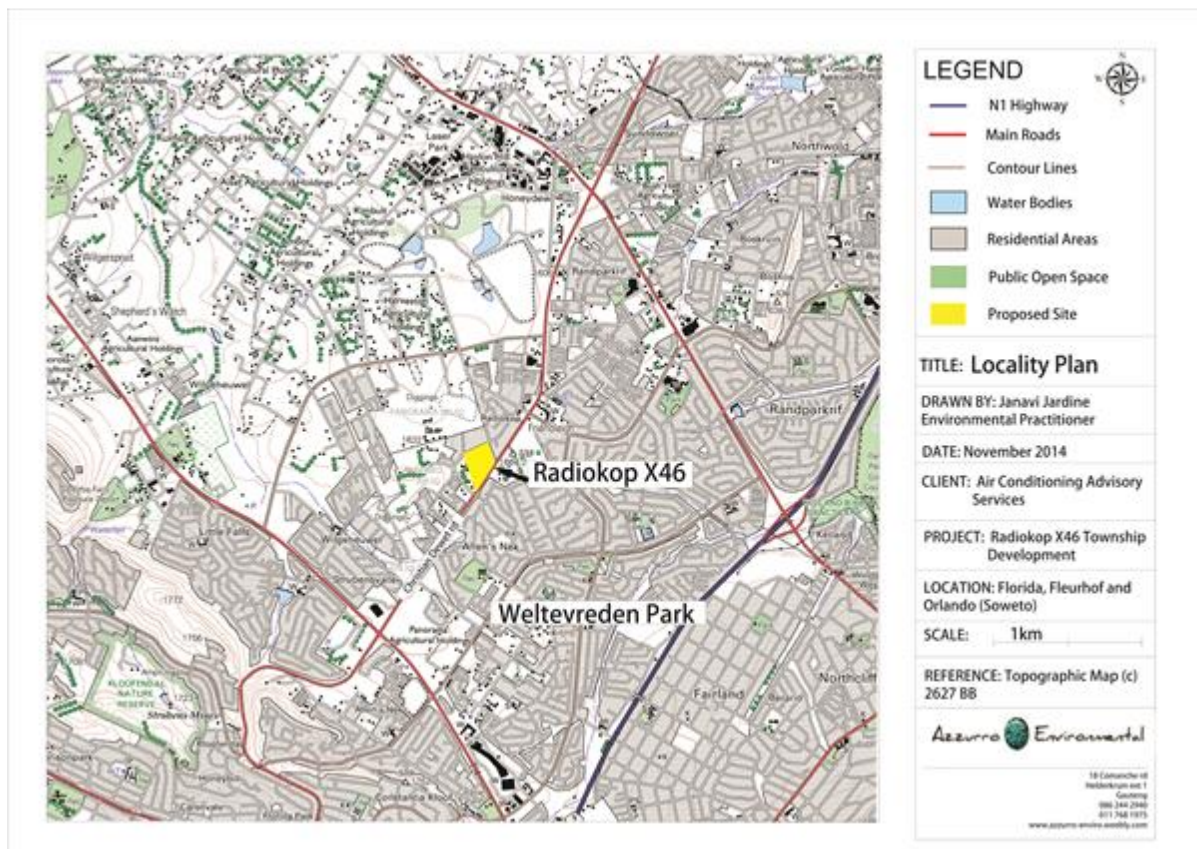


Figure 1: Locality Map of Radiokop X46

3.2.1 Current Land Use of Proposed Development

The property is zoned Agricultural, however a Special consent was granted for the use of the property for the purposes of a Golf Driving Range. This has been developed as a Golf Driving Range and the original buildings were converted to support this facility. The landowner office buildings are also present on the property. The current use and conditions of the site are represented in Figure 2. The images of the site showing all 8 cardinal directions are attached in Appendix B.





Figure 2: Image of the current state of the site

The aerial image of the site showing the current state of the site and its current state and land uses.

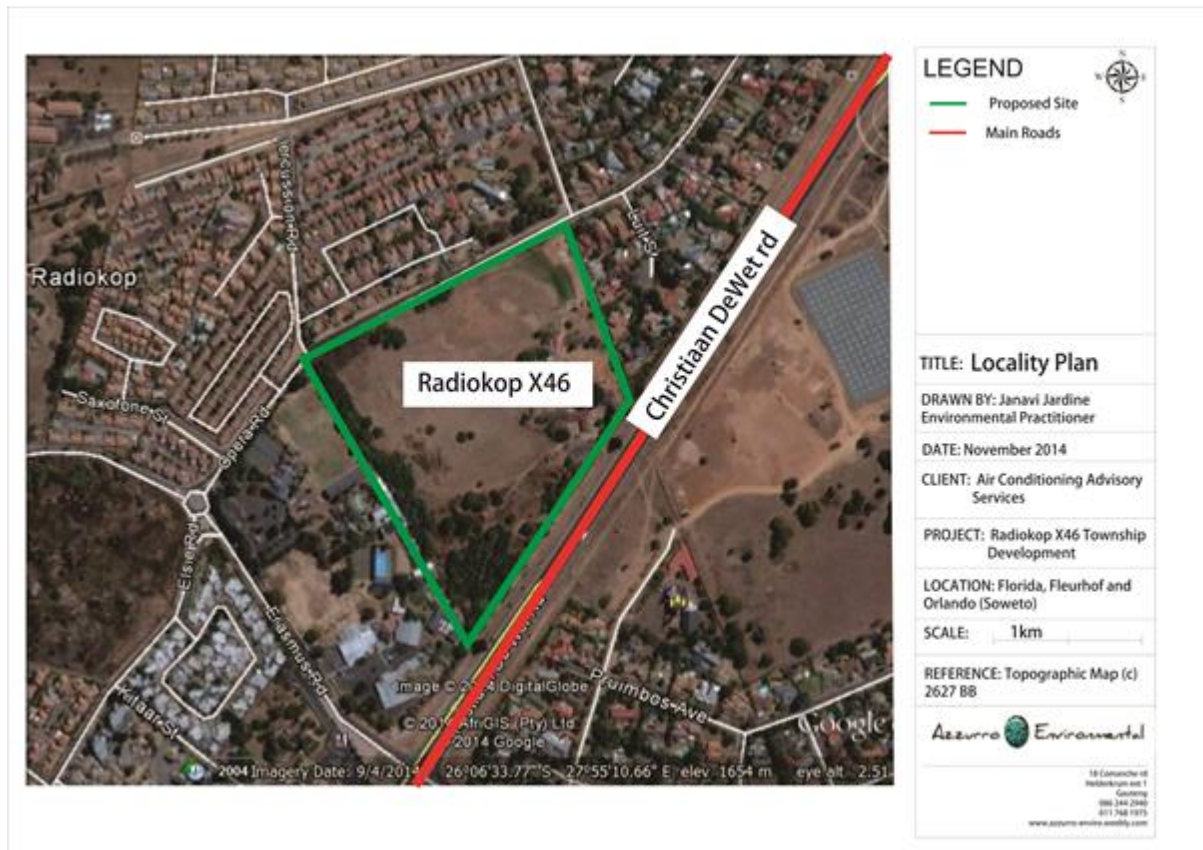


Figure 3: Aerial Image showing site characteristics

3.2.2 Land Tenure and Use of Immediately Adjacent Land

Land use of the surrounding area is mostly residential with some commercial. The site is situated in a highly built up environment within the urban edge. The land immediately adjacent to and surrounding the property is residential land.

4 DETAILED PROJECT DESCRIPTION

4.1 Infrastructure and/or services in or around the proposed development

4.1.1 Civil Engineering Services

Klunene consulting was contracted by the applicant to investigate and assess the requirements for the provision of civil engineering services to the proposed township and whether adequate external bulk services existed in the larger area to service the proposed township.

4.1.2 Water

An existing 100mm diameter main runs in Opera road and has a sufficient capacity to service this development especially considering that it is Rand Waters intention to provide an extra reservoir at the intersection of John Vorster and Christiaan de Wet road which is above the site.

It is estimated that three 100mm diameter erf connections will be sufficient to accommodate the proposed developments capacity.

4.2 Sewer

An existing link sewer system is situated within Opera road with the closest connection being at the Erasmus road intersection, approximately 230 meters away. The sewerage services extend westward towards Strubensvalley and the main Wilgespruit outfall which feeds into the Driefontein Sewer works. The size of the aforementioned system is adequate to drain the proposed township.

A 160mm diameter Upvc class 34/400 sewer pipe will meet all projected flow requirements for the proposed development. This will require a connection to the already existing link services located in Opera road.

4.2.1 Roads and Traffic

A Traffic Impact Study was undertaken to determine if the Erasmus/Opera/Elsie intersection requires an upgrade. This is discussed in more detail in the Section 5.12.

4.2.2 Storm Water

An attenuation dam can be provided jointly on erf 1 at the low point in the northern corner of the property or on each of the erven at their respective low points. No bulk services are required by this township. A system has been provided for along Opera road west of the proposed township and will discharge into the valley.

The internal storm water system will make provision for the drainage of the township roads in order to accommodate the 50 year flood event. The attenuation dam will also temporarily store runoff from the 25 year post development event. The dam will be able to provide capacity for the required 2700m³.

4.2.3 Electricity

Eksteen and le Roux Electrical Engineers cc consulted Johannesburg City Power regarding the provision of power to the proposed development.

4.2.3.1 Bulk supply

The bulk electrical supply to the proposed development will be provided from City Powers Christiaan de Wet substation. This is equipped with 3 x 40MVA 88/11 Kv transformers. The latest load reading from City Power indicated that there is currently 15 MVA spare capacity.

4.2.3.2 Link supply

The 11kV supply from the substation to the proposed development will be provided by the existing local network. This network runs through the northern portions of Strubensvalley and Radiokop extensions. There is currently spare capacity available on the 11kV feeder cable located in Opera road that will supply the proposed township.

4.2.3.3 Low Voltage Supply

The voltage supply to the individual erven of the proposed township will be provided by installing new miniature substations on the erven as and when required.

5 DESCRIPTION OF AFFECTED ENVIRONMENT

All proposed activities will take place within the footprint of the mining right boundary. Below is a summary of the current environmental status for the area in general and more specifically for the proposed opencast areas. General descriptions are given and only sensitive issues have been discussed in greater detail. For a full detailed account of a specific aspect please see the relevant appendix.

5.1 Climate

The DWA, Water Research Commission and the South African Weather Bureau were consulted to obtain rainfall and evaporation data. The most reliable data was used for further analysis. Due to the reliability and proximity to the project area, data from the Meteorological station 04756685 (Roodepoort) was used for local rainfall assessment.

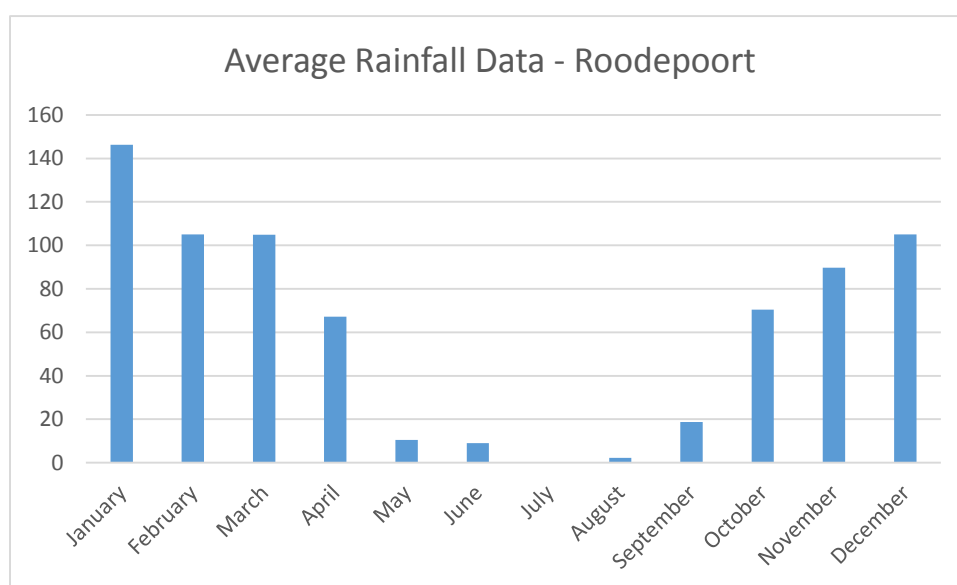


Figure 4: Mean Annual Precipitation

The Catchments Annual Precipitation 729.2 mm.

Table 2: Mean Annual Precipitation

Month	Rainfall
January	146.3
February	105.8
March	104.8
April	67.2
May	10.5

June	9.0
July	0.0
August	2.2
September	18.7
October	70.5
November	89.7
December	105.0
Annual Total	729.2

5.2 Geology

5.2.1 Regional Geological Setting

The A Geotechnical survey was undertaken, by Techo-EG Consultants and they found that the Geology of the site and Radiokop area is underlain with Granitic rocks of the Basement Complex. Isolated narrow diabase intrusives of the Witwatersrand age also occur in the area.

The residual soils are overlain by a relatively thin layer of pedagenic hillwash material. This mainly consists of either fine grained sandy material with scattered fine grit or slightly gritty sand. The Pebble marker horizon consists of a loosely packed thin layer of hard rock pebbles and fragments.

The geotechnical importance in this area is the presence of deep. Loose to medium dense residual soils (weathered granite) as well as that of hard rock stones within the residual granitic material. These residual soils could lead to significant differential settlement under load, particularly in wet areas.

5.2.2 Detailed Geology

The surface layer of hillwash materials vary in thickness from 0.3m to 0.8m and consist of loose to medium dense gritty sand with grass roots. The Pebble Marker horizon was not encountered in any of the Trial Pits and medium dense, completely weathered residual granite occurred and depths varying from 1.4metres to 3.1 metres. This horizon was absent at some Trial Pits (TP). Isolated sections of this horizon appears to be potentially collapsible and therefore compressible.

The site consists of highly weathered, closely fractured, very soft rock granite occurring down to 3.4 metres on medium weathered, medium hard rock granite.

The groundwater was not encountered at any of the TPs.

5.2.3 Foundation Indicator Tests

The plasticity indices tested low for the residual granitic soils. According to the van der Merwe classification method the potential expansiveness of the materials were calculated to be low. Such values indicate inactive soil materials, which should not constitute any heaving problems when subject to moisture migration.

5.2.4 Excavation conditions

It is anticipated that excavations for foundations and services, within the hillwash and the residual granitic soil formations should be accomplished by means of a back acting excavator or by pick or shovel. For excavations at depths below that of the Back actor refusal depths, the use of pneumatic tools would however become necessary. The possible inflow of groundwater into excavations appears to be at a low risk for the most of the area.

5.2.5 Founding Conditions

The Geotechnical Soils Investigation has indicated the absence of any undue geotechnical constraints at the site and therefore confirmed the presence of fairly favourable founding conditions for a major portion of the site provided that certain design criteria are utilised and the necessary precautionary construction measures are taken as prescribed by Techo-EG Consultants and the National Home Builders Registration Council.

5.3 Topography

Topography in the site is medium sloping from east to west as a gradient of approximately 1:20. There are no prominent outcrops of rock or hills. There are also no dongas pits, or natural drainage lines on the property.

5.4 Surface Water

No water bodies in the form of either rivers, wetlands or any other associated features occur on the site. The site is only made up of a terrestrial ecosystem.

The Strubenspruit and the Wilgespruit are located approximately 2.4km west and approximately 2 km west of the proposed development respectively. A stream tributary of the Klein Jukskei River is situation east of the site at an approximate distance of 1.1km. No other tributaries or water bodies exist within close proximity to the site.

5.5 Flora (Eco Assessments, 2005)

An ecological scan of the proposed site was conducted by Eco Assessments to assess the ecological sensitivities. The following apply to the ecology of the site:

The vegetation coverage over the largest part of the property has been altered to create a Golf Driving Range. The natural herbaceous layer as well as the tree layer has subsequently been disturbed and replaced by grass lawn species. The trees observed around the club house, residential and parking area were mainly exotic species. The tree species observed are listed in Table 3.

Table 3: Vegetation found onsite

Grasses	Trees and Shrubs
<i>Pennisetum clandestinum</i>	<i>Grewilia sp.</i>
	<i>Melia azedarach</i>
	<i>Eriobotrya sp</i>
	<i>Acacia mearnsii</i>
	<i>Populus sp.</i>
	<i>Solanum panduriforme</i>
	<i>Jacaranda mimosifolia</i>
	<i>Eucalyptus camaldulensis</i>
	<i>Morus alba</i>
	<i>Pinus sp.</i>
	<i>Acacia dealbata</i>

*Exotics indicated in bold script

5.5.1 Red Data Species

No red data species have been recorded on site. The following species may occur within the vicinity of the site or on the site itself should favourable habitat be present, (however no suitable habitat was present on site either):

- *Aloe peglerae*
- *Barchiaria subufolia*
- *Delosperma vogtsii*
- *Holotrix randii*
- *Melolobium subspicatum*
- *Trachyandra erythrorrhiza*

5.5.2 Exotic Species

Most of the species recorded on the site were exotic due to the anthropogenic nature of activities on site (Table 3). The site is not considered sensitive due to the fact that the site is currently in use.

5.6 Fauna

5.6.1 Habitats

The habitats present on site are not diverse and do not provide for effective resources and shelter. This is due to the anthropogenic nature of the site and the activities such as the Golf Driving Range. The types of habitat observed include cut lawns and exotic trees. The site is utilised by common bird species such as Plovers, Hadedda Ibis and Spotted Dik-kop. In addition it supports a wide variety of bird species from the surrounding residential area.

The site does not support any wetland or riverine area.

5.7 Site of Archaeological and Cultural Interest

According to the South African Heritage Resources Agency (SAHRA), the site has no palaeontological value and is considered insignificant in terms of cultural resources. Therefore no palaeontological or heritage studies are required.

5.8 Public Open Space

The public open space in the area is located within a 3km radius towards the south of the site. The following open space areas are of ecological and recreational importance:

- Panorama Sports Club – 600 metres north of the site
- Essenhout Park – Approx. 3.2 kilometres east
- Boskruin Nature Reserve – 4 kilometres
- Kloofendal Nature Reserve – 4 kilometres

5.9 Current and Potential Landuses

The site is currently being used to run a Golf Driving Range by the name of the Wood and Iron Driving Range and the original outbuildings converted into offices, which are currently being used by Mr Shand for the operation of his business.

The land immediately adjacent to the site is characterised by rural residential land use to the north of the land and residential land use, which includes cluster housing developments north and northwest “Residential 1” stands to the north and east of the proposed site. The site is located within a residential environment earmarked for township establishment for residential purposes.

The proposed property is located within the City of Joburg’s (CoJ) Urban Development Boundary.

5.10 Agricultural Potential

The site is considered to have a low agricultural potential due to the position of the land as well as the relatively small size. This would not be a viable option for crops or livestock.

5.11 Regional Socio- Economic structure

The establishment of this township within this property is not likely to negatively impact on the socio economic foundation of the surrounding area but will positively contribute towards the further development, expansion and economic success of the surrounding area.

The existing character and recent development trends indicate rapid increase in the demand for cluster housing within the CoJ urban edge.

5.12 Traffic and Road Network

The annual growth rate of 3.0% is considered reasonable for the study area. Given the weekday morning and weekday afternoon peak hour traffic volumes and the proposed township Radiokop ext. 46 and the surrounding road network, the proposed development will generate 240 trips during peak hours. The applicant site is affected by provincial road P139-1 (future K60) which follows the existing alignment of Christiaan de Wet road.

The proposed development will require a road network upgrade due to substantial traffic demand. The schematic layout of the proposed upgrade is in the Traffic Assessment Report which will be attached in the final BAR.

The proposed development will be responsible for certain external road upgrades and access to the development is planned for Alto Close.

The area is well served by frequent public transport throughout the day and limited improvement to the current system is required to accommodate any increase in public transport users and pedestrian traffic.

6 PUBLIC PARTICIPATION PROCESS (PPP)

6.1 Identifying Regulatory Authorities:

The authorities contacted with regards to this project include:

- The Department of Agriculture and Environmental Affairs;
- The Johannesburg Metropolitan Municipality; and
- The Department of Public Works, Roads and Transport.

A copy of the background information letter was forwarded to the authorities is included in Appendix C.

6.2 Identifying all Interested and Affected Parties (I&AP's):

6.2.1 Background Information Document (BID):

A background Information Document will be submitted to all Registered Interested and Affected Parties including all information pertaining to the site and proposed development. I & APs will be given an opportunity to register via notification from site adverts and a notice in the local Newspaper, the Roodepoort Northsider. THIS ADVERT WAS PLACED ON THE 29TH of January 2015.

Once registered, they will be sent a copy of the BID and given an opportunity to request a copy of the draft BAR.

6.2.2 Notices & Advertisements:

An advert was published in the Roodepoort Northsider on the 29th of January 2015 showing the details of the proposed development. All I & AP s will be given an opportunity to register and will be sent information regarding the proposed development.

In addition to this, 6 site notices were placed in and around the site on the 29th of January 2015 notifying the local residents of the proposed development. These notices are size A1 and were printed in English and Afrikaans. Proof of the notices and advert submission are included in Appendix C.

7 ASSESSMENT OF IMPACTS FROM ALTERNATIVE LAND USES & PROJECTS

7.1 Project Motivation

The property is in the ideal position for a residential development. The site has already been disturbed by years of use, by means of a Golf Driving Range and offices on site. This, however does not provide for the ever increasing demand for housing in the area, and it does not provide for a means of income for various sectors including, local government in terms of rates and services, local construction companies in terms of employment and the increase of local residents to make use of the amenities in close proximity to the site.

The development of this site will contribute to making more housing available along main routes and in an established area. Thereby preventing the disturbance of land that is in a pristine condition and allowing for the incorporation of the development into existing infrastructure. Thus making it more streamlined and cost effective.

The close proximity of shopping centres, schools, hospitals, recreational facilities and commercial properties makes this a viable development that will quickly create an income from the property for all available amenities and services.

7.2 Investigation of Alternative

The identification of alternatives provides a basis for choice among the options available. The exploration of such alternatives allows for the incorporation of practically, and technologically, the least environmentally impacting options available, whilst still meeting the need and purpose of the proposal. An alternative should thus be practicable, feasible, relevant, reasonable and viable.

The role of alternatives is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts.

7.2.1 The 'no-go' Option

The possible alternative is one of no development on the site, leaving the site in its present state and land use. The site is presently in a disturbed state and is being used as a Golf Driving Range. There are also parts of the site where illegal dumping is taking place and the southernmost extent of the property is being used by intermittent squatters. The continuation of this would imply the following:

- The proposed project objectives will not materialise; which implies a significant loss of opportunity for the development of the site and creation of a safe living environment for the community who will be living in the township development.
- Many direct and indirect spin-off benefits, such as job creation, capacity building, rates for the municipality and the upgrading of supply of services will not be realised.
- Invasive vegetation would probably continue to spread in areas where land is vacant and not actively used in its entirety.

- If not developed, the site will derive no income and will not contribute to the services and total income of the area.
- Illegal squatters are becoming increasingly interested in using this site and are posing more of a threat to local inhabitants. They are setting up temporary structures on unsupervised areas of the site that are well hidden. If this continues unchecked, it may spread and the land may become unmanageable.
- Agriculture is not economically viable to this property due to the nature of the surrounding properties as well as the soil conditions and size of the property.

7.2.2 Land use Alternatives

In accordance with NEMA, alternative land uses in the area must be identified and their potential impacts identified.

The land use alternative of this site are very limited as the agricultural potential of the site is very limited and would not be a viable course of action. This can be attributed to the following factors:

- This would include the preservation of a relatively small portion of land with negligible agricultural potency. Given the required scale for agricultural land to be successful, this would be a waste of otherwise useful land in the given context.
- Based on development drivers that exist in the area, this would be a temporary solution and would eventually be taken over by the need for housing in the area.
- This site also does not fall within an agricultural hub, therefore it is not feasible in terms of infrastructure and logistics.

7.2.3 Project Type Alternatives

The majority of surrounding land is or has been utilised for residential developments and as such it would make sense for this property to be used for this purpose. In terms of density, the general typology of housing in the area consists of medium to higher density housing. This would fit in with the property prices and affordability of property in the area.

A high to medium density residential development will be a feasible option especially considering the type of housing already present.

The higher density option would also offer an increase in available rate payers and an optimum use of space in an area that is already under pressure in terms of need for housing.

The areas increased development of retail and commercial developments in recent years have also increased the desirability of owning property in this area due to the proximity to high end and top retail amenities.

Another potential development may include the construction of self-storage units. However this will detract from the aesthetic appeal of the area and may increase traffic along Opera Road as an approximate 300 units of self-storage would fit on the property. This when compared to the residential component will only create income for the municipality of approximately 10% of a township development. It will also create a problem in terms of traffic along Opera road because approximately 300% more people will be using the site,

albeit less frequent. This is not a favourable option as it will create an industrial feel in the area and it will lose its sense of place as a residential suburb.

7.2.4 Site Alternatives

There are no site alternatives. The site which is available is surrounded by existing residential developments. This site is also owned by Deltaic Dunes (Pty) Ltd and does not own the property in the vicinity. Therefore this is the only property available to them for development.

8 ENVIRONMENTAL IMPACT ASSESSMENT

Table 4 indicates all the impacts that can be expected from the various activities and sub-activities during the various phases of the project associated with the proposed development. The table also indicates the significance of the impacts, the management measures to mitigate negative impacts, and monitoring that would be required to detect potential impacts. Also included in the table is the degree of loss of a resource.

Table 4: Impacts associated with the project phases

Direct Impacts	Extent	Duration	Probability	Intensity	Deg. Of confidence	significance without mitigation	Mitigation Measures	Significance after mitigation
CONSTRUCTION PHASE								
Destruction of Indigenous Vegetation - No rare or endangered species were recorded in or near the site. The site is only made up of alien vegetation due to the fact that the site is being used as a Golf Driving Range	Site specific	Permanent	Possible	Low	Low	Low Negative	None. As the site is mostly made up of alien vegetation.	Very Low Negative
Destruction and Removal of Exotic Plants - the alien vegetation on site will be removed during the construction phase.	Site specific	Permanent	Definite	Medium	High	Medium Positive	Cleared and disturbed areas must be re-vegetated (grassed) as soon as possible to prevent the future colonisation by weeds and invasive exotic species. · The construction footprint area should be monitored regularly and follow-up clearing done before problem plants can become established. The landscape development should be followed for the planting and management of indigenous vegetation within the completed development.	High Positive

<p>Disturbance and injury to fauna during construction - Due to the level of disturbance and the proximity to residential area with domestic dogs and cats, the site is not expected to have any indigenous fauna. However precaution is required in case they are discovered. The incidence of harm to domestic animals or potential indigenous animals will need to be prevented.</p>	<p>Site specific</p>	<p>Temporary</p>	<p>Highly Probable</p>	<p>Low</p>	<p>Medium</p>	<p>Medium Negative</p>	<p>The site should be fenced off for the duration of the construction process the prevent domestic animals from entering the site and being injured.</p> <ul style="list-style-type: none"> · No fauna encountered at the site may intentionally be harmed or killed. · All personnel should be made aware of the need to prevent harm to fauna on site. · All open excavations must be securely fenced or barricaded. · Speeds travelled by vehicles must be kept to a minimum. · Excavations must be checked daily for trapped fauna; and trapped animals rescued and released. · Special care should be taken not to kill or injure snakes and reptiles when removing or trans locating termitaria present in the development footprints. · Injured fauna should be referred to an appropriate faunal rehabilitation or care centre 	<p>Very Low Negative</p>
<p>Soil erosion of disturbed and unconsolidated soil in construction footprints and stockpiles - disturbed soil may be prone to erosion by wind and water. Stockpiles of topsoil and excavated material may also be prone to erosion.</p>	<p>Site specific</p>	<p>Temporary</p>	<p>Probable</p>	<p>Low</p>	<p>High</p>	<p>Medium Negative</p>	<p>Site offices and storage area, construction areas, material lay-down areas, access routes, infrastructure footprints and No-Go areas should be clearly demarcated.</p> <ul style="list-style-type: none"> · Limit all access and construction related activities to the demarcated area. · Limit vegetation disturbance outside the construction footprints. · Storm water on the site must be controlled for the duration of construction by employing appropriate temporary storm water control structures e.g. cut-off berms. · Topsoil should be cleared in a phased manner to avoid large areas of unconsolidated soils. · Topsoil should be removed and stockpiled in an appropriate manner: <ul style="list-style-type: none"> o Stockpiled separately from subsoil, monitored for- and protected from erosion, kept clear of exotic vegetation · Topsoil should be replaced on undeveloped portions of the site and the footprints re-vegetated immediately after construction. · Re-vegetated areas should be watered until vegetation has become established. · Should erosion scars begin to form on the landscape, erosion counter measures should be implemented immediately. · Erosion control and construction disturbance should be an important monitoring facet falling under the control of an Environmental Control Officer (ECO), who should be appointed to implement the 	<p>Very Low Negative</p>

<p>Dust generation during excavation - Areas of unconsolidated soil will be present in the footprint and soil stockpiles. These soils will be prone to wind erosion. The associated dust erosion will be caused by windblown with high wind velocities.</p>	Site specific/Local	Temporary	Probable	Medium	High	Medium Negative	<p>Limit vegetation disturbance outside the construction footprints.</p> <ul style="list-style-type: none"> · Topsoil should be cleared in a phased manner to avoid large areas of unconsolidated soils. · Topsoil and soil stockpiles should be covered, wetted or otherwise stabilised to prevent wind erosion and dust generation. · Topsoil should be replaced on undeveloped portions of the site and the footprints re-vegetated immediately after construction. · A water cart or sufficient watering equipment should be available to wet soils during windy days if wind-blown sand and dust becomes problem. 	Very Low Negative
<p>Noise and disturbance during construction activities</p>	Site specific	Temporary	Probable	Medium	High	Medium Negative	<p>Limit construction activities as far as possible to working hours, i.e. 7am - 5pm weekdays, excluding public holidays.</p> <ul style="list-style-type: none"> · Should after hours work take place nearby residents should be notified. · Signage with the contact details of the responsible person should be provided at the site. · A complaints register should be kept to document complaints and the corrective action taken. · No loud music to be allowed on site. 	Very Low Negative
<p>Generation of waste during construction</p>	Site specific	Temporary	Highly Probable	Medium	High	Medium Negative	<p>Excavated material should be used at other sites where fill is required or disposed of at an appropriately licensed waste disposal facility.</p> <ul style="list-style-type: none"> · Construction waste (e.g. packaging material, unused concrete) must be disposed of at an appropriately licensed waste disposal facility. · No construction phase waste to be stockpiled on site. · Adequate litter bins should be provided at the site for waste generated by construction personnel. · Litter bins should be emptied on a regular basis and waste disposed of at an appropriately licensed waste disposal facility. 	Very Low Negative

Pollution of soils due to chemical spills from either construction vehicles and other sources.	Site specific	Temporary	Probable	Medium	High	Medium Negative	<p>Generators and fuel supply needed during construction must be placed on trays, which rest on clean sand. Once construction is complete this must be removed from the site and disposed of at an appropriately registered waste disposal facility.</p> <ul style="list-style-type: none"> · No cement / concrete mixing are to take place on the soil surface. Cement mixers are to be placed on large trays to prevent accidental spills from coming into contact with the soil surface; · Vehicles and construction equipment should not be serviced at the site to prevent pollution of the soils by hydrocarbons or oil. · Ensure secure storage of materials on site particularly hazardous materials e.g chemicals and fuels. · Sufficient portable chemical toilets or similar sanitation facilities should be provided and suitably maintained at the site for the duration of construction. 	Very Low Negative
Construction related impacts on potential undiscovered archaeological or palaeontological material or artefacts on site	Local	Temporary	Improbable	Medium	Very Low	Very Low	<p>Obtain specialist input in if any artefacts of archaeological material that may be encountered during construction.</p> <ul style="list-style-type: none"> · If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials or other categories of heritage resources are found during construction activities, SAHRA must be alerted immediately, and an accredited professional archaeologist must be contacted as soon as possible to inspect the findings. 	Very Low Negative
Temporary employment opportunities and skills development opportunities will be created during the construction phase.	Local	Temporary	Definite	High	High	Medium Positive	Source local labour as far as possible.	High Positive

Risk to human health and safety due to open excavations and moving construction machinery	Site specific/Local	Temporary	Highly Probable	High	High	High Negative	<p>Construction footprints, including site offices, excavations, storage areas, materials lay-down areas, stockpile area, and workers rest areas should be clearly demarcated or fenced off before construction commences.</p> <ul style="list-style-type: none"> · Open excavations must be kept free of water and should be securely fenced in. · All construction activities should be limited to the demarcated area. · Access to the demarcated construction area must be strictly controlled. · Entry points and access routes to the site must be clearly marked and traffic limited to those areas as far as possible. · Suitable warning and information signage should be erected before construction commences. · Speed travelled by vehicles must be kept to a minimum and speed limits enforced. · Residents of affected area must be notified timeously (two weeks minimum) prior to construction commencing. · Ensure that there is a first aid facility and trained first aiders at the site. 	Low Negative
OPERATIONAL PHASE								
Many employment opportunities will be created by the proposed development. This will include direct business on the site and indirectly through external sources of money.	Local	Long term	Definite	High	High	High Positive	Source labour from the local community as far as possible.	High Positive
Increased storm water runoff from the site due to increased sealed surfaces.	Site specific	Long term	Definite	High	High	Medium Negative	<p>Design adequate storm water management infrastructure to convey storm water from the site to outfall points associated with the natural drainage patterns in the landscape.</p> <ul style="list-style-type: none"> · Provide scour protection structures at storm water outfall / discharge points. · Keep storm water management structures free of litter and debris. 	Low Negative
Increase in electricity consumption and therefore exerting a greater pressure on the local power grid	Site specific/Local	Long term	Low	Possible	High	Low Negative	<p>Ensure that sufficient electricity supply is available from the local service provider.</p> <ul style="list-style-type: none"> · Encourage the use of energy efficient equipment (E.g. geyser switches, CFL lighting) in homes and residential complexes. · Ensure that street lighting is kept to the minimum required, and switched off when not required. 	Low Negative

Pressure on water resources and water supply infrastructure as a result of increase water use. Due to the increased demands placed by the increase in housing.	Site specific/Local	Long term	Low	Possible	High	Low Negative	Use vegetation (lawn grass, trees) with low water requirements on sidewalks / road verges. · Capture water from roof surfaces in water tanks for use to water gardens. · Monitor infrastructure for leaks and malfunctions.	Very Low Negative
Pressure on sanitation services infrastructure as a result of increased sewage generation. Due to the increased in housing being linked up with the sewerage system.	Site specific/Local	Long term	Low	Possible	High	Medium Negative	The sewerage system must be according to Municipal specifications.	Neutral
Increased waste generation and littering	Site specific	Long term	Definite	High	High	Medium Negative	Provide and maintain communal waste skips on site. · Provide informative signage to educate the public regarding proper waste disposal practices.	Very Low Negative
increased pressure on services infrastructure e.g. water, sanitation and electricity	Local/Regional	Long term	Probable	Medium	Medium	Medium Negative	The bulk services as discussed in the concept services report covers all proper implementation measures. This must be adhered to during construction and operation.	Low Negative

9 CUMULATIVE IMPACTS

9.1 Air Quality

Vehicle movement and the activity of machines on site will generate dust that may lead to nuisance complaints and impacts. The increase in traffic on the road may slightly increase the emissions of traffic. This will however have an impact that is negative, site specific, definite and of very low significance.

9.2 Noise Pollution

Vehicle movement and the activity of machines on site may increase noise. This may give rise to nuisance complaints. This is unlikely as a cumulative impact as it will reduce once the construction phase is over.

9.3 Litter and Waste

Activities associated with use of the site results in littering. Similarly the building process generates wastes that could pollute the site and its surrounds. For this reason it is important that a waste management plan must be developed. The litter will reduce as the construction phase ends. This will not result in a cumulative impact.

9.4 Vegetation and Fauna

The proposed development will totally transform the site and will lead to the complete loss of habitat for any potential plant of animal species. This is considered to be an impact of no significance as the site is currently transformed and limited opportunity exists to improve ecological function by not developing the site. The cumulative impact is non-existent.

9.5 Sedimentation

Construction activities will loosen the soil and this will wash away during intense rainstorms and with storm water runoff. Silt could be deposited in the roads. Measures will be necessary to limit the extent of storm water runoff. Topsoil that has been removed from the building sites should also be stored upslope waters do not erode it away. The cumulative impact is considered local, definite, low intensity and of low impact.

9.6 Health and Safety

Measures to secure the site and ensure that it is safe will be necessary to prevent impacts that may occur if members of the public access to the site. This would include risks associated with operating heavy machinery on site, excavating trenches or pits and installing services such as electricity and sewage. The movement of vehicles to and from

the site further increases the risk that members of the public may be affected by the development. No cumulative impacts are expected for health and safety as this will be finished when the construction phase is finished.

9.7 Traffic

The additional increase in traffic volumes owing to the establishment of the township may lead to greater pressure on the road system in Johannesburg. This cumulative impact is however considered to be of local extent and medium intensity with very low significance.

9.8 Service Provision

Adequate services will be required to ensure that impacts such as sewage spills, leaking water, power cuts, and refuse removal are prevented or minimised.

9.9 Stormwater Runoff

The development of hard surfaces will give rise to greater volumes and velocity of runoff waters during high peak flows. This water will drain into the road system. Localised flooding may result on negative impacts on bed and banks of the stream course due to the cumulative effects. These impacts could manifest as erosion and the spread of exotic trees.

9.10 Visual Sense of Place

It will be necessary to ensure that the character of the area be moulded by the proposed development. At present the suburb is an upmarket residential development and it will be necessary to ensure that the architectural styles, nature of the finishes and sense of place is kept to a standard. The township layout and the ambience that it creates will complement adjacent properties and the neighbouring areas.

9.11 Regional Socio- Economic structure

As much as the proposed development will not result in major new employment opportunities, the financial input of the development will have a positive impact on the socio-economic aspects of the area. This will be through the continued direct employment of staff and contractors and indirectly through the continued use of suppliers. This feeds through to other sectors and other people in the area through the multiplier effect. The cumulative impact is positive, local, highly probable and of moderate significance.

10 KNOWLEDGE GAPS AND SPECIALIST RECOMMENDATION

All specialist studies are conducted to certain levels of confidence, but in all instances known methodologies have been used and confidence levels are generally high. This means that in most cases the situation described in the pre-construction environment is accurate at high certainty levels, but there exists a low probability that some issues have not been identified during the studies. Furthermore, statistical analyses and mathematical models are merely tools which assist the researcher in assessing field observations and have innate assumptions which can reduce objectivity of the results obtained. This is not seen as a major flaw but should always be considered when assessing results.

10.1 Vegetation, Fauna and Wetlands

No knowledge gaps or limitations identified and no recommendations made other than mitigation and management plans as included in the relevant section.

10.2 Traffic and Road Network

The approval is subject to the following:

The construction of the following external road upgrades:

- Christiaan de Wet & Erasmus/Rinyani – Optimise traffic signal settings.
- John Vorster & Opera – Provide an exclusive slip lane (storage capacity = 25m) on the westbound approach of John Vorster road. Optimise traffic signal settings.
- Opera & Erasmus/Elsie – the installation of traffic signal. Provide right-turn lane (storage capacity = 60m) all approaches.

The upgrades are only necessary if the latent lights are completed within 5 years. The traffic circle at Opera & Erasmus/Elsie intersection will experience capacity problems on certain approaches by 2017. The results warrant a traffic signal plus additional right –turn lanes to be provided on all four approaches of the intersection. It is however recommended not to implement the upgrades, but to monitor the future operations of the intersection to monitor the reaching of critical levels.

Based on the above, the development should be responsible for the upgrade of the proposed Christiaan de Wet/Erasmus road/Rinyani ave intersections in order to provide a second right hand turn lanes (storage = 90m) on the eastbound approach of Erasmus road and optimise traffic signal settings.

11 ENVIRONMENTAL OBJECTIVES

Environmental and social objectives are broad based goals to guide the environmental management plan and ensure mining activities proceed in an environmentally and socially responsible manner. The objectives take into account the various legislations regarding the social and physical environment.

11.1 Mitigation and Management Objectives

The objectives of the mitigation and management plan as set out in the document are to:

- Primarily pre-empt impacts and prevent the realisation of these impacts -PREVENTION.
- To ensure activities that are expected to impact on the environment are undertaken and controlled in such a way so as to minimise their impacts – MODIFY and/or CONTROL.
- To ensure a system is in place for treating and/or rectifying any significant impacts that will occur due to the proposed activity – REMEDY.
- Implement an adequate monitoring programme to:
 - Ensure that mitigation and management measure are effective.
 - Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
- Reduce duration of any potential negative impacts

11.2 Environmental Objectives and Goals

Environmental objectives are to:

- Protect the biophysical environment as far as possible
- Minimise impacts to the biophysical environment.
- Ensure relevant legislation in National Environmental Management Act and Conservation of Agricultural Resources Act are applied on site including but not limited to alien invasive management and protection of ecologically sensitive species and environments.
- Ensure atmospheric pollution is kept to a minimum:
 - Manage dust generation

11.3 Socio-economic Objectives and Goals

The social objectives are to:

- Employment strategies and opportunities
- Training in basic literacy.
- Additional skills training.
- Retrenchment strategies.
- Provide a safe environment for people to work in and:
 - Ensure safety policies are established on site in line with national policy.
 - Ensure adequate PPE for staff, contractors and visitors to the site.

- Ensure health and environmental policies are established and in line with national policies.
- Provide a safe environment for people to live in by:
 - Ensuring environmental objectives are followed.
 - Provide open and transparent communication opportunity with all I&APs.

11.4 Historical and Cultural Aspects

- Ensure all archaeological and cultural artefacts/sites are preserved in situ until such time that a specialist advice has been provided.
- Ensure South African Heritage Resources Act (SAHRA) principals are applied with regard to all archaeological and cultural artefacts/sites.
- Ensure any relocation of culturally sensitive sites is done according to SAHRA principals, in a socially sensitive manner and with open and transparent communication with relevant I&APs.

12 ENVIRONMENTAL MANAGEMENT PLAN

This section shows the main management and monitoring measures required for each of activities during design and planning, construction and operation phases respectively.

12.1 Compliance with the Environmental Management Plan

The Environmental Management Plan (EMP) is a lifecycle document for the project and considers the mitigation of detrimental impacts as per NEMA principles. This document can act as a legally controlling document to contractors working on site.

This document should be implemented by the Applicant and contractors should be obliged to apply the principles set out in this document.

12.2 Implementation of the EMP

This Environmental Management Plan (EMP) will be issued to the client and contractors for use during the implementation of the project. A recommendation could be to appoint an official to act as Environmental Control Officer (ECO) that will ensure smoother reporting and direct responsibility of the EMP.

Steps to be followed:

Appointment of an Environmental Manager / Environmental Controlling Officer responsible for ensuring that the EMP is implemented and submitting quarterly reports for the duration of the construction period, or as required.

12.3 Appointment of Environmental Officer

During the construction period, the Developer shall appoint an Environmental Control Officer (ECO) (an Official from a private company), who shall be a senior member of the construction team and have overall environmental management responsibilities on site.

The ECO will have the following responsibilities:

- Monitor activities of the main contractor and all subcontractors, and ensure that mitigation measures contained in this document are adhered to.
- The ECO must submit quarterly reports to the Gauteng Department of Agriculture and Rural Development (GDARD) on the status of the environmental compliance on site. Until such time that the construction phase is complete.
- The ECO will be responsible for maintaining communication channels with Interested and Affected Parties (I&APs) and the surrounding community throughout the construction phase. A record of all correspondence (if any) should be kept noting date, details of I&AP, details of correspondence, issues discussed and follow-up action taken.

During the operational phase, the developers will be responsible for environmental management of the development. A responsible person should be appointed/ selected to be responsible for the following:

- Ongoing environmental management
- Compliance with this report
- Controlling where required

12.4 EMP Compliance Monitoring and Audits

The ECO appointed will conduct regular monitoring inspections to ensure compliance with this EMP and keep records of such monitoring as these may be requested by GDARD.

The results of the monitoring inspections must be reported to the site manager and duly appointed managing member of the Development, in the form of a regular quarterly report. The ECO shall also keep records of non-compliance and how this was rectified. This should be included in the environmental audit report.

12.5 Design and Planning

There will be no further impacts to the site during this phase as the site has had any of the required specialist studies undertaken already and the site is under use by people using the property for a Golf Driving Range and offices. This impact exists and will not be exacerbated. Therefore the impacts discussed will only be in terms of the construction and operational phases.

12.6 Construction Phase Management Plan

12.6.1 Topography and Soils

Impacts to topography will be limited to soil stockpiling, construction and initial grading area. Soil stockpiling can be kept from releasing nuisance dust by the periodical wetting of the surface of these stockpiles and the management of erosion. The following should be included as mitigation of impacts to soil conditions and topography:

- All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks.
- Truck activity will be limited to the road and construction area to reduce risk of soil compaction in undisturbed areas and ensure that any leaks that do occur are managed as part of the enclosed dirty water management system.
- All leaks will be cleaned up immediately using an absorbent material or as per the emergency response plan. For large spills Hazmat will be called in.
- Where required the compacted soils will be disked to an adequate depth and re-vegetated with indigenous plants.
- Erosion prevention measures will be implemented along infrastructure.
- Portable toilets will be managed by reputable contractors and inspected daily for any potential leaks.

- All hydrocarbons will be stored in bunded areas fitted with taps and oil traps. Bunded areas will be to SABS standards, and bunded area will have adequate capacity (110% of storage volume) to contain leaks.
- Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduced risk of environmental contamination. Refuse bins will be placed around site to collect all non-recyclable waste for disposal at the municipality.

12.6.2 Geology and Surface Stability

Impacts to geology will be limited to initial excavation and associated grading. The impacts to the geology onsite will be directly linked to the foundational aspects and safety of the structures being built. The following must be considered when planning mitigation of impacts to geology (excerpt from the Geotechnical soils investigation by Techno-EG consultants):

- Foundation trenches must be inspected by competent personnel prior to concrete casting.
- Brickface should be included in all external and internal walls. It should be laid every course for the first four courses above the strip footings and thereafter every fourth course.
- 80mm unreinforced slabs are to be placed on approximately 300mm of approved hard core granular material, compacted to 93% MOD. ASSHTO density.
- Adequate provision should be made for the drainage of surface run-off water and a concrete apron should be placed around all buildings to protect the underlying foundations from the filtration of such water.
- All structures should have sound waterproofing, as development of perched groundwater conditions below the sites surface and foundations may be possible. This is highly improbable due to the position of the site relatively far from water resources and the lack of water resources on site, but provision should be made in case any point sources of water are found on site.

12.6.3 Flora and Fauna

Main impacts will be the potential for disturbance to flora and fauna to surrounding areas through the increased activity at site. Soil and surface water management measures above will be followed as these will impact on flora and only additional measures are discussed below.

- Re-vegetate any impacted areas and allow pioneer species to establish as soon as possible.
- Complete a visual survey of area for protected species prior to any activity and ensure permits are obtained to remove and relocate protected species if needed.
- Plan activities carefully so that only vegetation that needs to be impacted is impacted. All potential sensitive areas will be fenced/demarcated.
- Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank.
- Ensure measures are in place to protect areas where protected species occur as per specialist recommendations, such as berms/trenches between the area of activity and such areas.

- Eradicate and control all alien invasive species on site. Rehabilitate and revegetate all areas where alien invasive species were removed.
- Inform staff, contractors and visitors to not harm fauna on site.

12.6.4 Noise & Blasting

The probability of noise disturbance in the neighbourhood where construction will take place is relatively high due to the close proximity in which houses and the preschool to the south of the site is situated. The following is recommended to prevent unnecessary disturbance:

- Vehicles will be regularly serviced to ensure acceptable noise levels are not exceeded.
- All construction equipment to comply with the standards as for construction vehicles as explained in the IFC's Environmental Health & Safety Regulations.
- Construction activities will be conducted during the day-time hours as far as possible. These are from 7 am to 5pm.
- No work will be permitted on a Sunday or past 12pm on a Saturday.
- Point sources of noise will be enclosed where possible.
- Acoustic screens will be considered if I&AP complaints are received.

12.6.5 Air quality

Impacts to air quality will include dust generation and vehicle emissions.

- Speed limits will be established on the road to minimise dust generation. All contractors will enforce speed limits.
- Dust suppression by water cart will be undertaken during times of high dust generation in any areas where dust is sourced.
- All vehicles will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions.
- No burning of the vegetation is allowed especially in winter months as veld fires can ensue and cause catastrophic consequences by burning masses of dry grass.

12.6.6 Visual

All environmental management plans as discussed above will be applied on site and are relevant to the visual aesthetics of the area, as visual deterioration in the neighbourhood will be a negative impact on the visual aesthetics of that area.

- Consider use of visual screens if I&AP complaints are received.
- Prevent the spread of litter and the storage of excess waste to prevent visual disturbance.
- The site camp should be fenced off and kept to a small area on one side of the site during all construction activities. The construction vehicles must be kept in this area and all waste and staff facilities must be kept in this area. This should be screened from view of passersby and surrounding neighbours.

12.6.7 Sites of Cultural Significance

- Should artefacts or archaeological items be observed, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity.

- Should graves be observed on site during activity progress then all activity should cease and the area demarcated as a no-go zone. A specialist will need to be consulted and responsible action considered, whether grave relocation or ceasing activity completely within the area and a 50m buffer zone (100m buffer zone for mining).

12.6.8 Traffic and Safety

The potential for construction vehicles to impact traffic in the area and road safety are important to consider. This will be managed in the following ways:

- Drivers will be enforced to maintain speed limits.
- Trucks will be in road-worthy condition with reflective strips.
- A fund will be set aside to maintain the serviceability of the road verge where the trucks approach or depart from the main road.

12.6.9 Storm Water

- Quality, quantity and flow direction of surface water should be assessed and mitigated to protect watercourses and existing storm water facilities from undue flooding, damage and erosion.
- It should be ensured that all storm water that results from the development is contained adequately in the storm water system, and does not become a source of flooding to residences or cause the spread of eroded soil onto the surrounding roads.
- Storm water on the site must be managed, including measures to ensure that the energy of storm water that is to be released into the drainage area is dissipated. Measures must be implemented to distribute storm water as evenly as possible to avoid point sources of erosion.
- Silt traps (interceptors) should be incorporated into the drainage system, where pollution risk is high from storm water run-off. This has been done by means of the dam being built. This must however be properly managed.

12.6.10 Waste Management

- No littering by construction workers may be permitted.
- Rubble and upgrading refuse should be collected and removed weekly.

12.6.11 Socio-economic

- Labourers/contractors will initially be sought locally and only regionally if skills are not available.
- Ensure advertising is limited to local and regional areas, and only specifically advertise for jobs nationally if skills are not available.
- Employment of local labour from the surrounding communities and the implementation of training is to be instituted.
- The appointment could be combined with the requirement for the appointment of an ELO, i.e. the Community Liaison Officer CLO and Environmental Liaison Officer ELO may be one person with dual functions, and or the appointee may form part of the local labour procurement mentioned above.

- It is recommended that the CLO should be a member of the community affected by the contract.

12.7 Operational Phase Management Plan

The operations phase activities and related impacts and summarised managements are indicated in Table 4. The detailed management plan is given below.

12.7.1 Topography

No impacts will be experienced in terms of site topography. No mitigation measures can be applied.

12.7.2 Geology

Impacts to geology will not be experienced during the operational phase. No mitigation measures can be applied.

12.7.3 Flora and Fauna

Additional mitigation measures are discussed below.

- Eradicate and control all alien invasive species on site. Rehabilitate and revegetate all areas where alien invasive species were removed.
- The Landscape Development Guideline must be followed when it comes to planting and garden maintenance on the proposed development. This will create an indigenous environment for all common areas of the garden. This report will be included in the final draft of the BAR.
- Only indigenous planting may be used on site and surrounding the dam and attenuation ponds. Only indigenous hydroseeding can be used for erosion control. The Veld Mix seed mix can be bought from Sakata Seeds for use on the site.

12.7.4 Traffic and Safety

- All recommendations as per the traffic impact assessment must be followed with regard to road use. This report will be included in the final BAR.
- The entrance to the development must be clearly sign posted and must make available space for parking of cars entering the development.

12.7.5 Socio-economic

- Ensure that any future employment will be sourced locally.

13 MONITORING PROGRAMME AND REPORTING

A detailed monitoring programme and associated action plans for the site are indicated in Table 5 which includes timeframes required for monitoring, the action plans related to monitoring findings and the responsible person on site for monitoring activities. Also included are the estimated costs involved in monitoring activities and where possible the action plans. The following general actions are applicable:

- A monitoring register will be compiled in which the monitoring plan as indicated in Table 5 is included. The monitoring will be conducted and any issues observed noted. The particular register will be signed off on completion.
- All incidences and issues will also be recorded into an incident log, as will the actions taken to address issues. These will be filed and kept at the construction site offices as an incidence and action report and will keep all details for future reference.

Table 5: Monitoring Schedule and Actions

Frequency	Monitoring & inspection	Summary of actions plans to consider should monitoring indicate the need	Responsible person	Cost / annum
CONSTRUCTION PHASE				
Weekly	Inspect area for erosion and soil compaction	Repair all erosion on site using contour berms or gabions. Consult specialist if required.	Site & Environmental manager	Internal running cost as inspection and treatment will be conducted by employees.
Weekly	Inspect all water management facilities, including toilets	All leaks identified will be repaired immediately.	Site Manager	Internal running cost. Cleaning activities will be conducted by employees. Costs with repairs will vary depending on the damage.
Monthly	Inspect area for damage to flora species.	Fines will be implemented to staff, contractors and visitors to site who damage local flora.	Environmental manager	Internal running cost as inspection will be conducted by employee.
Monthly	Visually inspect rehabilitated area for cover abundance	Re-seed areas of poor germination or plant growth. Consider hand-planting with seedling plugs and ensure soils quality is adequate for plant growth in areas where germination and poor plant growth is persistent.	Environmental manager	Part of running costs
Weekly depending on species	Maintain alien invasive monitoring programme	If aliens are observed onsite then these will be removed, preferably using mechanical methods before consideration to chemical methods. Plants must be removed when not seeding if possible.	Environmental & Site manager	Internal running cost as inspection will be conducted by employee. Additional costs for equipment and chemicals should be minimal.
As and when required	Monitor any ecologically sensitive species should they be observed surrounding the dam.	These must be protected as far as possible. If these are disturbed by means of maintenance activities these species may be removed only if absolutely necessary with the assistance of specialists.	Environmental manager	Running cost. Cost of relocation of species will be dependent on type of species. A Conservation group may be able to offer services at no cost.
As required	Ensure adequate reporting network is in place to communicate issues as they occur	This system needs to be established on site as soon as possible to ensure that all issues and incidences are reported to the site manager immediately. Should inspection activities indicate that incidences have not been followed up on then these need to be investigated and rectified.	Site & Environmental manager	Ongoing during construction costs

14 CONCLUSION

14.1 Environmental Impact Statement

A review of the information contained herein shows that the proposed development does not have a significantly detrimental impact on the environment. The development is located within the CoJs Urban Development Boundary, which is earmarked for densification and development into a residential property.

The development is similar in character to what is currently occurring in the surrounding area. There is no fatal flaw associated with this development, especially when making use of the mitigation measures proposed. It is therefore necessary to ensure that an Environmental Management Plan, along with proactive planning is used to minimise the potential impacts of the proposed impacts of the proposed development. However the proposed development is still a highly viable option for the land in question.

The accuracy of this document is based on information that was available at the time of writing the report.

15 APPLICANT UNDERTAKING

I,, the undersigned and duly authorised thereto by that the Radiokop X46 township development will comply with the provisions of the National Environmental Management Act as amended (Act 62 of 2008) and its Regulations.

I have studied and understand the contents of this document and duly undertake to adhere to the conditions as set out therein, unless specifically or otherwise agreed to in writing.

Signed at on thisday of20.....

Name:

- Designation: _____

16 REFERENCES AND SUPPORTING DOCUMENTATION

Mucina, L. & Rutherford, M.C. (eds) Reprint 2011. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria. ISBN: 978-1919976-21-1

South African Weather Beureau. Roodepoort Climate data. From 2004 until 2013.

National Environmental Management Act 107 of 1998.

Mariteng Consulting Engineers. 2012. Traffic Impact Assessment for the new Development on Proposed Township Radiokop ext 46. Johannesburg, South Africa.

Appendix A: EAP CV and Company Profile

Appendix B: Images in 8 cardinal directions

Appendix C: PPP details

Appendix D: GDARD Acknowledgement letter for Application

Appendix E: Layout Plans and Surveyor General Plan