

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

In terms of Section 24 and 24(D) of NEMA (Act No. 107 of 1998)

for:

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED CLEARANCE OF 127.5 HA OF INDIGENOUS VEGETATION, PARTIALLY LOCATED WITHIN AN ECOLOGICAL SUPPORT AREA FOR THE PROPOSED TOWNSHIP ESTABLISHMENT TO BE LOCATED ON A PORTION OF THE REMAINING EXTENT OF THE FARM CHURCHILL 211-HM AND A PORTION OF THE REMAINING EXTENT OF PORTION 2 OF THE FARM NYRA 213-HM, JOE MOROLONG LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE.

Report Date: April 2021



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DRAFT REPORT

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EXECUTIVE SUMMARY

The Applicant, the **Joe Morolong Local Municipality** has appointed **AB Enviro Consult CC**, an independent environmental consultancy, to undertake an Environmental Impact Assessment on the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province

As in the rest of South Africa, there is a housing shortage in the area. The local municipality intends to promote a more compact city in order to prevent the expansive provision of social and engineering services, as well as to prevent the economic decline of the traditional city centre. The Spatial Development Framework (SDF) addresses the scale of urban growth through planned extensions, infill and redevelopment strategies. The local municipality is aware of the need to integrate urban settlements, with a view to reduce travel distances to the areas of employment opportunities. It also addresses measures to promote compact and connected growth opportunities, such as the identification of revitalisation zones, densification and mixed land use zones. For any development to be sustainable and viable, land development and planning should ensure that communities are located close to job opportunities, social facilities and basic services.

The new "Human Settlements Plan" promotes the achievement of a non-racial, integrated society through the development of sustainable human settlements and quality housing. Housing is to be utilized for the development of sustainable human settlements in support of spatial restructuring.

The aim is to move beyond the provision of basic shelter towards achieving the broader vision of sustainable human settlements and more efficient towns, cities and regions.

The Churchill integrated human settlement project from the onset aims at providing a proper integrated human settlement that ascribes to the BNG Principles set out above. This will be achieved as follows:

- This project makes provision for a variety of erven that can be utilized for various housing typologies. The largest proportion of the township areas will however be aimed at both the subsidized housing sector through the implementation of one of Government's subsidized housing programmes as well as the need that exists for people that does not qualify for a Government subsidy, due to either already owning other property or earning in excess of the threshold household income prescribed in respect of the various housing subsidy programmes, but who still wishes to acquire an affordable stand where they can construct their own home. This project will also aim at alleviating the plight of people that live in informal settlement areas and in squalid conditions.
- The location of the proposed township area directly adjacent to the existing urban area of Churchill further enhances integration and will offer inhabitants the opportunity to access the existing social and commercial facilities on offer within the existing village area whilst also providing social and business opportunities within the proposed development area itself that can in turn be utilized by and to the benefit of the inhabitants of the existing village area.

The development of the Churchill integrated human settlement represents a definitive move away from providing housing-only township areas and towards the provision of a proper integrated human settlement that offers a magnitude of social, educational and commercial support facilities and infrastructure in close proximity to the inhabitants

Consistent with national priorities, environmental authorities must support "*increased economic growth and promote social inclusion*", whilst ensuring that such growth is "*ecologically sustainable*". In the National Spatial Development Perspective (NSDP) it is highlighted that, to achieve the goal of stimulating sustainable economic activities and to create long-term employment opportunities, it is required that spending on economic infrastructure is focused in priority areas with potential for economic development, with development to serve the broader societies' needs equitably

The activity is listed in terms of the Regulations (in force since 4 December 2014) in terms of Section 24(M) and 44 made under section 24(5) of the National Environmental Management Act (NEMA) 1998 (Act 107 of 1998) as amended and published in Government Notice No. R 326 of 2017. The proposed development triggers the following regulations and listed activities:

Listed activity as described in GN R.327 and 324.	Description of project activity that triggers listed activity	Anticipated years to complete construction (From date of commencement)
GN.R. 325 Item 15: <i>"The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan."</i>	The clearance of 127.5 ha of indigenous vegetation in order to establish a township.	10 Years

The purpose of the study is therefore to determine the impacts that the environment may have on the proposed activity, as well as the possible impacts that the activity may have on the environment.

The study is being conducted according to normal scientific practices. A theoretical background review was compiled for the different variables by using available information from the literature. Field verification was undertaken and visits paid to the site to gather further information and/or to verify information. It also includes the identification of *key interest groups*, both governmental and non-governmental, and to establish good lines of communication. Specialist studies were undertaken to determine the impacts on sensitive areas and to determine whether the proposed project can be sustainably implemented. The specialists will also advise on mitigation measures where applicable.

No "fatal flaws" has been encountered as of yet. All the issues envisaged at this stage can be mitigated.

1. INTRODUCTION

The Applicant, the **Joe Morolong Local Municipality** has appointed **AB Enviro Consult CC**, an independent environmental consultancy, to undertake an Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

1.1 THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The purpose of this document is to adhere to the requirements for compilation of Environmental Impact Assessment Reports in terms of the 2014 EIA Regulations, as amended and published in Government Notice R. 326 of 7 April 2017, Appendix 2, and the National Environmental Management Act (Act 107 of 1998) (NEMA).

1.2 DESCRIPTION OF THE PROCESS FOLLOWED

In order to assess a proposed development it is important to take into consideration the principles of NEMA. These principles are outlined in Chapter 1 and read as follows:

- 1) *"The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and—*
 - a. *shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination;*
 - b. *serve as the general framework within which environmental management and implementation plans must be formulated;*
 - c. *serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment;*
 - d. *serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and*
 - e. *guide the interpretation administration and implementation of this Act, and any other law concerned with the protection or management of the environment.*
- 2) *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*
- 3) *Development must be socially, environmentally and economically sustainable.*
- 4) (a) *Sustainable development requires the consideration of all relevant factors including the following:*
 - (i) *That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
 - (ii) *that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
 - (iii) *that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;*
 - (iv) *that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;*
 - (v) *that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;*

- (vi) that the development use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*
- (vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and*
- (viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.*
- (b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.*
- (c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.*
- (d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.*
- (e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.*
- (f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation and participation by vulnerable and disadvantaged persons must be ensured.*
- (g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.*
- (h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.*
- (i) The social, economic and environmental impacts of activities, including disadvantages and benefits must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration and assessment.*
- (j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.*
- (k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.*
- (l) There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.*
- (m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.*
- (n) Global and international responsibilities relating to the environment must be discharged in the national interest.*
- (o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.*

- (p) *The costs of remedying pollution, environmental degradation consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.*
- (q) *The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.*
- (r) *Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.”*

The above mentioned principals and the applicable legislation, Policies and Guidelines as described in Paragraph 5 of this Report were taken into account in the assessment of the Environmental Impacts for the proposed development. The process followed can be described as follows:

- 1) The EAP was contracted by the Applicant, the **Joe Morolong Local Municipality** as their Independent Environmental Assessment Practitioner.
- 2) A dolomite stability specialist was appointed to determine whether the site is suitable for the proposed development
- 3) The Civil Engineer was appointed to determine the capability of existing infrastructure to be linked to proposed development and readily available bulk services. He also designed the proposed infrastructure.
- 4) A SAHRA Specialist has been appointed to determine the possible impact of the development on Archaeological and Cultural features.
- 5) A Palaeontologist has been appointed to conduct a Palaeontological desktop assessment in order to assess the likelihood of palaeontological finds.
- 6) A Fauna and Flora and Wetland specialist has been appointed to determine the impact of the proposed development on the Fauna and Flora of the area.
- 7) A Civil Engineer was appointed to determine the 1:100 year flood line affecting the proposed development.
- 8) An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
- 9) Desk top studies were conducted and alternatives assessed.
- 10) Site inspections were carried out to verify the outcomes of the desktop studies, and the preferred alternative defined.
- 11) A full Public Participation Process is being followed to obtain inputs from interested and affected parties.
- 12) All the information obtained from the above mentioned processes is being used to assess the Environmental Impact that the proposed development may have on the Environment and vice versa.
- 13) The inputs from Specialists, interested and affected parties, together with the knowledge of the EAP is being used to determine measures to avoid, mitigate and manage potential impacts. These measures are described in the Environmental Management Programme.

1.3 SCOPING PHASE

The Scoping phase included the necessary investigations to assess the suitability of the identified site and its surrounding environment, for the development proposal. The scoping phase described the “status quo” of the bio-physical, social, economic and cultural environment, and identifies the anticipated environmental aspects

associated with the proposed development. Scoping included the identification of *key interest groups*, (both government and non-government), and strived to establish efficient and effective communication. Identifying and informing Interested and affected parties of the proposed development may have an impact on the focus of the EIA. (S. Cliff, 2015)

The purpose of the Scoping Report was to document the outcome of the Scoping Phase of the project. The report fulfilled the requirements of the EIA Regulations (2014) for the documentation of the scoping phase. The Scoping Report was compiled in terms of the 2014 EIA Regulations, as amended in accordance with Section 21(3) as amended and published in Government Notice R. 326 of 7 April 2017.

Following the Draft Scoping Report, the Final Scoping Report was approved on 29 March 2021.

1.4 EIA PHASE

The EIA phase determines the *significance of the impact* of the proposed activity on the surrounding Environment. During the EIA phase, an Environmental Impact Assessment Report (EIAR) is compiled, and, following public review, is submitted to the approving authority – the DENC.

The EIA process is undertaken in accordance with the 2014 EIA Regulations, as amended and published in Government Notice R. 326 of 7 April 2017.

The EIAR (including all specialist reports) will be made available to all registered interested and affected parties (I&APs), providing them an opportunity to comment and to verify that the issues raised through the process have been captured and adequately addressed and considered within the study.

1.4.1 Objective of the environmental impact assessment process

The objective of the environmental impact assessment process is to, through a consultative process-

1. determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
2. describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted scoping report;
3. identify the location of the development footprint within the approved site as contemplated in the accepted scoping report; based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
4. determine the –
 - i. nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - ii. degree to which these impacts-
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources, and
 - (cc) can be avoided, managed or mitigated;

5. identify the most ideal activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;
6. identify, assess, and rank the impacts the activity will impose on the development footprint on the site as contemplated in the accepted scoping report through the life of the activity;
7. identify suitable measures to avoid, manage or mitigate identified impacts; and identify residual risks that need to be managed and monitored.

1.4.2 Scope of assessment and content of environmental impact assessment reports

The EIA assesses those identified potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with the project design, construction, and operation phases, and recommends appropriate mitigation measures for potentially significant environmental impacts. The Environmental impacts are assessed both before and after mitigation to determine:

- The significance of the impact despite mitigation; and
- The effectiveness of the proposed mitigation measures.

The EIA addresses potential environmental impacts and benefits associated with all phases of the project, including design, construction and operation, and aims to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project.

Table 1 below provides a summary of the legislative requirements in terms of an EIA Report as stipulated in Section 23 of the 2014 EIA Regulations, as amended and published in Government Notice R. 326 of 7 April 2017. Cross-references are provided in terms of the relevant section within this DEIA Report where the NEMA and DEIA Report requirements have been addressed.

Table 1: DEIA Report content as per Section 23 of the 2014 EIA Regulations, as amended and published in Government Notice R. 326 of 7 April 2017 Appendix 3.

3. (1) An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include:

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA Reports	Location in this EIA report
Appendix 3, section 3 (a)	Details of the EAP who prepared the report; and the expertise of the EAP, including a curriculum vitae;	Paragraph 2
Appendix 3, section 3 (b)	The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including – (i) The 21 digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Paragraph 4 Paragraph 4 Paragraph 4
Appendix 3, section 3 (c)	A plan which locates the proposed activity or activities applied for, at an appropriate scale, or, if it is –	Appendix A1 and Appendix A2

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA Reports	Location in this EIA report
	<p>(i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or</p> <p>(ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken;</p>	Paragraph 4
Appendix 3, section 3 (d)	<p>A description of the scope of the proposed activity, including –</p> <p>(i) all listed and specified activities triggered and being applied for; and</p> <p>(ii) a description of the associated structures and infrastructure related to the development;</p>	Paragraph 3 Paragraph 3
Appendix 3, section 3 (e)	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context	Paragraph 5
Appendix 3, section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report.	Paragraph 6
Appendix 3, section 3 (g)	a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report	Paragraph 4
Appendix 3, section 3 (h)	<p>A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including-</p> <p>(i) Details of all alternatives considered;</p> <p>(ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;</p> <p>(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;</p> <p>(iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</p> <p>(v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts-</p> <p>(aa) can be reversed;</p> <p>(bb) may cause irreplaceable loss of resources; and</p> <p>(cc) can be avoided, managed, or mitigated.</p> <p>(vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</p> <p>(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects;</p> <p>(viii) The possible mitigation measures that could be applied and level of residual risk;</p> <p>(ix) If no alternatives, including alternative footprints for the activity were investigated, the motivation for not considering such and;</p>	Paragraph 8 Paragraph 10 Paragraph 10 Paragraph 8 Paragraph 9 Paragraph 9 Paragraph 9 Paragraph 9 Paragraph 9 Paragraph 9 Not Applicable Paragraph 12

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA Reports	Location in this EIA report
	(x) A concluding statement indicating the location of the preferred alternatives, including preferred footprint within the approved site as contemplated in the accepted scoping report.	
Appendix 3, section 3 (i)	<p>A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including-</p> <p>(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and</p> <p>(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;</p>	<p>Paragraph 9</p> <p>Paragraph 8</p> <p>Paragraph 9</p>
Appendix 3, section 3 (j)	<p>An assessment of each identified potentially significant impact and risk, including-</p> <p>(i) cumulative impacts;</p> <p>(ii) the nature, significance and consequences of the impact and risk;</p> <p>(iii) the extent and duration of the impact and risk;</p> <p>(iv) the probability of the impact and risk occurring;</p> <p>(v) the degree to which the impact and risk can be reversed;</p> <p>(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and</p> <p>(vii) the degree to which the impact and risk can be mitigated;</p>	<p>Paragraph 9</p> <p>Paragraph 9</p> <p>Paragraph 9</p> <p>Paragraph 9</p> <p>Paragraph 9</p> <p>Paragraph 9</p>
Appendix 3, section 3 (k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Paragraph 11
Appendix 3, section 3 (l)	<p>An environmental impact statement which contains-</p> <p>(i) a summary of the key findings of the environmental impact assessment;</p> <p>(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and</p> <p>(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;</p>	<p>Paragraph 12.2 and 12.2 Figure 2</p> <p>Paragraph 12</p>
Appendix 3, section 3 (m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation	Paragraph 11 and 12
Appendix 3, section 3 (n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment	Paragraph 12
Appendix 3, section 3 (o)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Paragraph 3.1.2.1
Appendix 3, section 3 (p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Paragraph 1.4.3
Appendix 3, section 3 (q)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Paragraph 12.4

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA Reports	Location in this EIA report
Appendix 3, section 3 (r)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised	Not Applicable
Appendix 3, section 3 (s)	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; and (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Paragraph 13 Paragraph 13 Paragraph 13 Paragraph 13
Appendix 3, section 3 (t)	Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Not Applicable
Appendix 3, section 3 (u)	An indication of any deviation from the approved scoping report, including the plan of study, including- (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;	Not Applicable
Appendix 3, section 3 (v)	Any specific information that may be required by the competent authority.	Not Applicable
Appendix 3, section 3 (w)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	Not Applicable

1.4.3 Assumptions, uncertainties, limitations and gaps in knowledge:

This report is based on current available information and, as a result, the following limitations and assumptions are implicit –

The report is based on the *project description* provided by the Applicant as a result of reports that was compiled by the following Specialists:

- A dolomite stability specialist was appointed to determine whether the site is suitable for the proposed development.
- The Civil Engineer was appointed to determine the capability of existing infrastructure to be linked to proposed development and readily available bulk services. He also designed the proposed infrastructure.
- A Town and Regional Planner designed the proposed development in such a way that the layout of the proposed development satisfies the needs of future occupiers of the site
- A SAHRA and a Palaeontological Specialist has been appointed to determine the possible impact of the development on Archaeological and Cultural features.
- An ecologist has been appointed to determine the impact of the proposed development on the Fauna and Flora of the area.
- A Wetland Specialist was appointed to determine the impact of the proposed development on wetlands and riparian zones in the area.

- An Environmental Screening Process was conducted by the EAP to ensure that all the relevant Environmental Legislation is taken into consideration.
- Desktop studies were conducted and alternatives assessed.

Descriptions of the biophysical and social environments are based on specialist fieldwork, investigations, and the Public Participation Process.

2. DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

AB Enviro Consult (CC) is a registered consultancy, owned and operated as an independent unit by the registered owner and consultant: **Prof. A.B. de Villiers**

- **Mr J.P. De Villiers** joined the consultancy during 2004
- **Mrs J.E. du Plooy** is a consultant since 2001

Over a period of 25 years (1996-2021) this consultancy has successfully applied for, and obtained positive ROD's and EA's for more than 380 projects. Environmental Control Officer's duties are also performed on various projects.

The company was involved (from 1992-1994) in evaluation of 114 applications for the subdivision of land, 23 applications for resort developments, and 54 applications for business rights for the Department of Agriculture, Conservation and the Environment - North West Province.

The consultancy is qualified to undertake professional studies in waste management and is still involved in the development of waste disposal- (solid and liquid effluent), and emission studies. These studies are conducted both academically and practically. This work relates to mine waste, domestic waste and effluent as well as to the monitoring of waste disposal. Environmental audits in this respect are undertaken on a regular basis

ACADEMIC AND PROFESSIONAL QUALIFICATIONS OF PROF DE VILLIERS

Post-Matric Qualifications

YEAR	Qualification	Institution	Field of Study
1968	B.Sc.	PU FOR CHE	Geography, Geology
1970	HONNS. B.Sc.	PU FOR CHE	Soil Science
1974	M.Sc.	PU FOR CHE	Geography
1981	Ph.D.	UOFS	Geography

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

YEAR	Qualification/ Registration	Institution	Field of Study
1986	Professional Natural Scientist	S.A. Council for Natural Scientists	Environmental Science
1994	Quality Auditor	ESKOM	Auditing
1998	Personnel & Verifying Auditor	SAATCA	Environmental Auditing
2006	Environmental Assessment Practitioner	Interim Certification Board EAPSA	Environmental Science

MEMBERSHIP AND PARTICIPATION IN SOCIETIES, COUNCILS, ETC.

Name of professional societies	YEAR	Capacity
S.A. Geographical Society.	1967-1996	Board Member
Society for Geography	1968-2004	Member
SAGS Western Transvaal	1985-1989 1987-1989 1996	Chairman
Africa Geographical Association	1993-1995	Vice-President.
Society for the Vaal River Catchment	1980-1999	Member
S.A. Society for Photogrammetry, Remote Sensing and Cartography	1984-1996	Member
Dendrological Society	1986-2005	Member
Birdlife South Africa	2003-present	Member
British Geomorphological Research Group	1985-1997	Member
Int Com on Water Resource Systems	1985-1997	Member
Int Com on Continental Erosion	1986-1990	Member
Int Com on Remote Sensing and Data Transmission	1986-1991	Member
Society for S.A. Geographers	1995-2005	Member
SA Photogrammetrical and Geo. Info.	1995-2003	Member
S.A. Association of Geomorphologists	1994-1999	Board Member and member
SADC Mine Dump Study Group	1996-2005	Member

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MR J.P. DE VILLIERS

YEAR	Qualification	Institution	Field of Study
1993	BA	PU FOR CHE	Geography, Economics
1994	HED	PU FOR CHE	Geography Economics
2006	B.Sc.(Honns) Cum Laude	North-West University	Environmental Management
2007	M.Sc.	North-West University	Geography

PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

YEAR	Qualification/ Registration	Institution	Field of Study
2008	Basic Principles of Ecological Rehabilitation and Mine Closure	Centre for Environmental Management (North West University)	Ecological Rehabilitation
2019	Registered Environmental Assessment Practitioner 2019/808	Environmental Assessment Practitioners of South Africa	

ACADEMIC AND PROFESSIONAL QUALIFICATIONS MRS J.E. DU PLOOY

YEAR	Qualification	Institution	Field of Study
1999	BA	PU FOR CHE	Geography, Tourism
2000	BA (Honns) Cum Laude	PU FOR CHE	Geography
2003	Masters degree in Environmental Management	PU FOR CHE	Environmental Management
2001	Aquabase Intro	AQUABASE	Hydrology
2001	Geomedia Professional	INTERTECH	GIS

2001	Map Info	SPATIAL TECHNOLOGY	GIS
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PROFESSIONAL QUALIFICATIONS AND REGISTRATIONS

<u>YEAR</u>	<u>Qualification/ Registration</u>	<u>Institution</u>
2020	Registered Environmental Assessment Practitioner 2019/1573	Environmental Assessment Practitioners of South Africa

3. DESCRIPTION OF THE ACTIVITY

The Applicant, the **Joe Morolong Local Municipality** has appointed **AB Enviro Consult CC**, an independent environmental consultancy, to undertake an Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

The site is influenced by a number of design factors that were considered for the proposed layout plan to be acceptable. These factors include the slope of the site, flood lines, environmental sensitivity, service provision, erf size, access, road layout and community facilities as well as the geotechnical features. To ensure that the proposed development do not infringe on any design principles and the environmental sensitive areas, development of residential units will only be allowed to take place according to the prescribed methods: subsequently no residential development is proposed to take place within the 1:100 year flood line.

The proposed Township will consist of the following (See Figure 1&2 for a copy of the Layout Plans):

Proposed township Churchill extension 1:

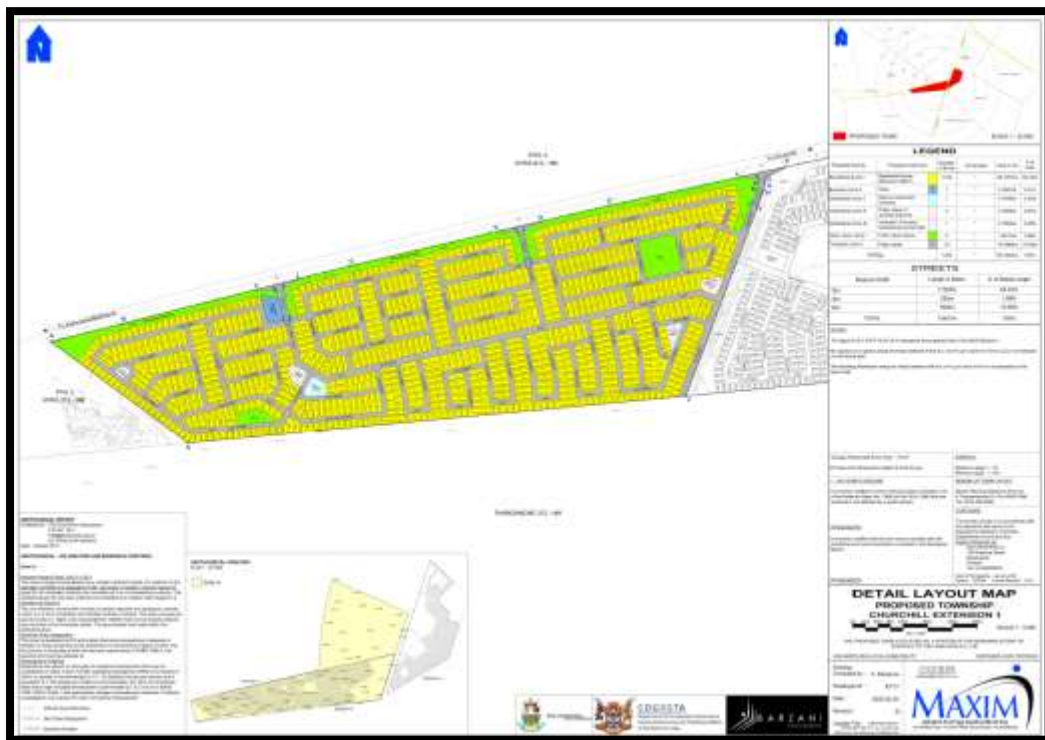


Figure 1: Proposed Churchill extension 1

Residential (Minimum 300 m ² erven)	1216 Stands
Business	1 Stands
Churches	3 Stands

Crèche	1 Stands
Community Facility	1 Stands
Parks	5 Stands

Area of township **60.7444 ha**

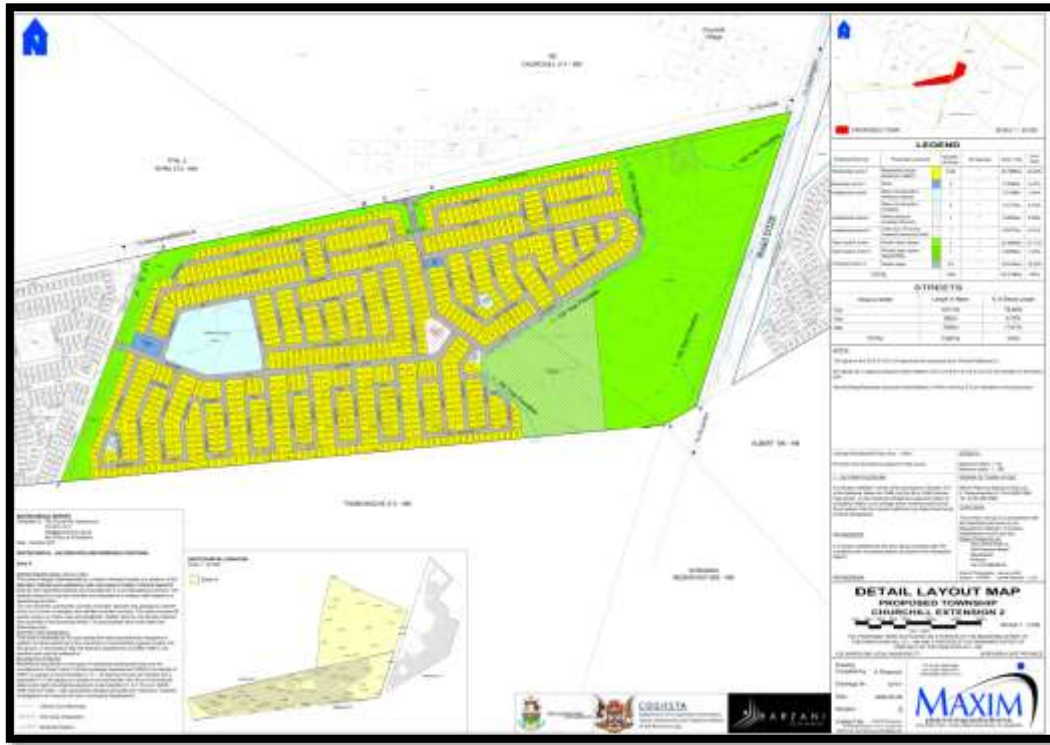


Figure 2: Proposed Churchill extension 2

Residential (Minimum 300 m ² erven)	1229 Stands
Business	2 Stands
Churches	1 Stands
Crèche	2 Stands
Primary School	1 Stand
Sports Field	1 Stand
Community Facility	1 Stands
Parks	3 Stands

Area of township **92.3198 ha**

WATER COURSES

A stream was identified where flood lines will have an effect on the proposed development. The **Stream 1** has a catchment of **51,9 km²** at the study area. Figure 4 illustrates the calculated 1:100 year flood lines.



Figure 3: Streams in the area.



Figure 4: 1:100 year flood lines in the area

These features has been incorporated into the Layout Plan and only services will cross the water course.

CIVIL SERVICES

Bulk services will be connected to Municipal infrastructure. A Civil Engineer has been appointed to assess the availability and design of services in the area and his report will be included in the EIAr.

WATER

The Civil Engineer found that the services will be designed to accommodate all requirements for developments of this nature. The internal services will be according to accepted engineering specifications and principles as well as acceptable environmental requirements and specifications. Drawings indicating the proposed preliminary water, sewer, access roads and parking layouts are included in this report. The layout of the water, sewer, roads and storm water infrastructure will be finalised during the preliminary engineering and detail design phases of the project.

Due to the dolomitic classification (D3) of the area it is essential that all requirements of SABS 1936-3:2012 is adhered to. An extract of selected items that needs to be considered as stipulated in SABS 1936-3:2012 is listed below:

De-watering and groundwater recharging

Before abstracting groundwater on dolomite land, the person or entity undertaking such abstraction shall obtain a water use licence from the relevant national authority in accordance with the relevant national legislation. The application for such licence shall clearly state that the ground from which the water is to be abstracted is dolomite land.

Where abstraction or recharging of ground water could result in changes of more than 6 m in the original groundwater level, the person or entity undertaking such abstraction or recharging shall notify the relevant national authorities.

Exisitng Water Infrastructure:

Churchill is supplied with ground water abstracted from 4 boreholes situated in the vicinity of the proposed development. See **Borehole details below:**



Bulk Supply: Potable Water:

The only bulk water supply to the area is by means of 4 boreholes. These boreholes are currently being used to provide water to the existing inhabitants of Churchill. Borehole Results DWS the permissible abstraction rate (**269kℓ/day**) is less than the required summer peak demand for the proposed development. Bearing in mind that the existing boreholes are used to provide domestic water to the current residents, the supply of the 4 boreholes will not suffice to accommodate the required supply of the proposed development. It is proposed that in depth specialised study is done to explore the option of using more boreholes in the area to supply the development with the required amount of domestic water. The water quality is therefore unknown which makes the possibility of the construction of some form of water treatment infrastructure a reality. Further studies regarding this is also proposed. However, in accordance with the dolomitic study, the dewatering of dolomitic area poses a risk for the formation of sink holes and as stated the water rest level has subsided from 3m in 2012 to more than 10m in 2017. Taking into consideration that the yield of the existing boreholes are minimal and acquiring additional water sources could pose a challenge, the alternative would be to provide a bulk water pipeline from Kuruman which could serve as a water source to other villages in the vicinity.

The proposed trunk main to serve the proposed Churchill development shall be installed from Kuruman to a Reservoir approximately 25kms away.

It is important to note that alternative water sources need to be investigated as the existing boreholes in the vicinity are insufficient.

SEWER

According to the Department of Water and Sanitation (DWS) dry sanitation is commonly used in Joe Morolong Local Municipality due to the vast expanses of the municipality. Therefore, there is no formal bulk sewer infrastructure in the proximity of the proposed development. Following discussions with Joe Morolong Local Municipality and the idea of developing Churchill as a nodal point, waterborne sanitation will be provided.

Proposed Design Criteria

A waterborne gravitational sewerage system is recommended to convey sewer effluent from all the areas of the proposed development to common low points. In order to keep excavations as shallow as possible a Pumpstation will have to be built. The Pumpstation will lift the sewage a second gravity network which will further convey the sewage to the proposed oxidation ponds. Due to the dolomitic classification (D3) of the area it is essential that all requirements of SABS 1936-3:2012 is adhered to.

Proposed Bulk Sewer Infrastructure

The proposed bulk infrastructure will consist of the following components namely:

- Bulk Sewer Lines
- Bulk Electrical connection
- Bulk sewer pump station
- Construction of new oxidation pond system (aerobic and non aerobic ponds)

(This does not form part of the application and requires an application for a Waste licence)

STORM WATER DESIGN

All storm water on the roads will gravitate and flow via drifts towards the lined channel and daylight into open veldt.

Due to the dolomitic classification (D3) of the area it is essential that all requirements of SABS 1936-3:2012 is adhered to. An extract of selected items that needs to be considered as stipulated in SABS 1936-3:2012 is listed below.

- Stormwater drainage
- Stormwater drainage systems shall discharge into a natural watercourse unless the land upon which it is discharged is
 - a) not dolomite land; or
 - b) dolomite land categorized as dolomite area designation D1 in accordance with SANS 1936-1.
- Storm water drainage
- Channels and canals which are constructed to reroute water from natural drainage paths shall be lined. Any joints in such channels shall be suitably sealed to be watertight.
- Unlined storm water cut-off or diversion trenches shall be avoided as far as possible.
- All concentrated storm water entering any parcel of land shall be diverted away from any building and structures by means of concrete-lined channels. Where necessary, earth berms and contouring shall be used to enhance site drainage.
- Storm water drainage systems shall incorporate measures to ensure watertightness (zero leakage) of conveyance systems, culverts and other compartments, including the sealing of all joints, and shall be designed to minimize the effects of settlement. All manholes, junction boxes and conveyance systems shall be tested for watertightness during construction. Reinforced concrete manholes shall be designed as liquid-retaining structures.
- Storm water drainage conveyance systems shall be designed to gradients which are self-cleansing. Such systems shall have an internal diameter equal to or greater than 300 mm.
- For drainage purposes, surfaced roadways and parking areas should be constructed at a level below the surrounding buildings, developed or landscaped areas and gardens.
- All storm water from downpipes and gutters from buildings and structures shall discharge onto concrete-lined channels which, in turn, shall discharge the water at least 1,5 m away from structures onto areas permitting surface drainage away from buildings and structures. Joints between any open channel drains and buildings shall be suitably sealed.
- Small diameter storm water drainage pipes shall not be placed parallel to buildings unless they are at least 5 m (if stand size allows) from the structure. If this is not practical, a rational design shall be performed by a competent person (engineer).
- Buildings and structures without gutters shall be provided with impervious paving not less than 1,5 m wide with a minimum slope of 1:20 all around. Joints between such paving and the building or structure, as well as any joints to control shrinkage/expansion, shall be suitably sealed. The ground surface shall be shaped to fall away from the building at a minimum slope of 1:20 for a further 1 m from the edge of the slab and shall thereafter fall continuously towards the closest drainage point.
- Water shall not be permitted to accumulate against boundary walls. Suitable drainage ports shall be incorporated in boundary walls, particularly at the lowest point of the site, to permit the passage of surface runoff water. Such ports shall be provided (on both the inlet and outlet sides of the wall or fence) with a concrete slab 1,0 m wide, 100 mm thick, and

extending 400 mm beyond the edges of the drainage port along the fence. The concrete slab shall have a minimum fall of 1:15 to ensure self-cleaning drainage characteristics. Any security outlet grids that are provided shall not impede the flow of water through the port.

- The type, size and pressure rating of the pipe to be used shall be specified by the competent person (engineer).

ROADS

Existing infrastructure

Currently there is a surfaced road running in a North-Easterly direction. All roads within the proposed development will connect to the main road through well designed intersections. It is proposed that a thorough traffic impact assessment is done by a specialist in order to design these intersections. Since there is an existing road there is no need for any new bulk road infrastructure.

4. DESCRIPTION OF THE PROPERTY

The property is located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

The site is located approximately 20 km northeast of Kuruman (Figure 6a and b); and is accessible via Seoding Road from Kuruman CBD. The village is named **Letlhokane** in most of available maps e.g. GPS maps, topographical map and on Google Earth. The town is commonly known as Churchill.

The northeastern portion of the site is built up with schools, playing fields, small business premises and residential houses. The southern part of the site is a Greenfield and is generally used for sheep and goats grazing. In places there are small borrow pits (See Photograph 1) for natural gravel material (calcrete) particularly towards the main road in the eastern boundary.



Photograph 1: Borrow pits on site.

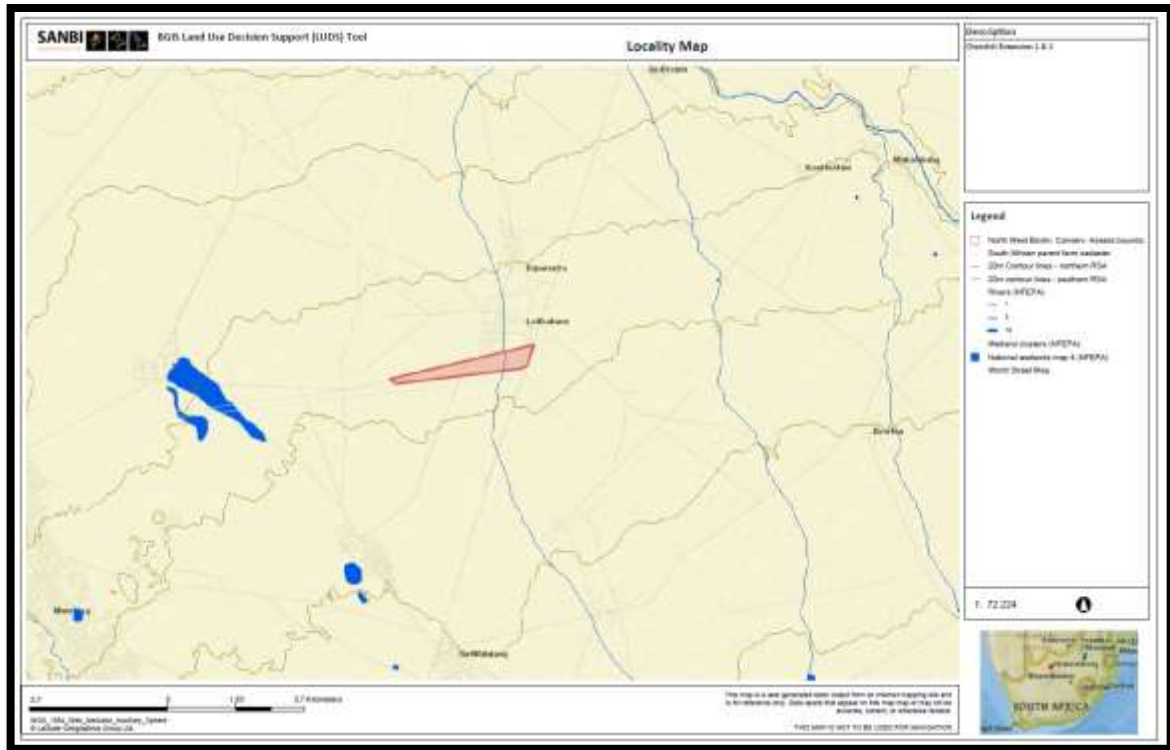


Figure 6a: Locality Map

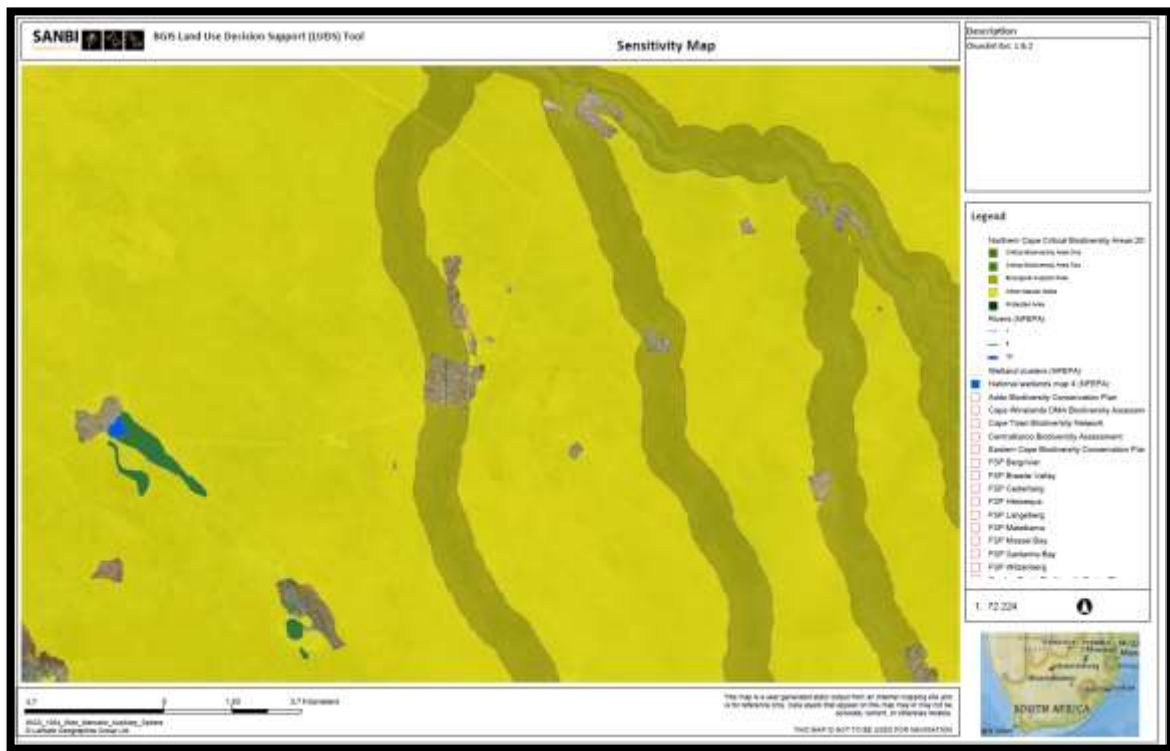


Figure 6b: Locality Map

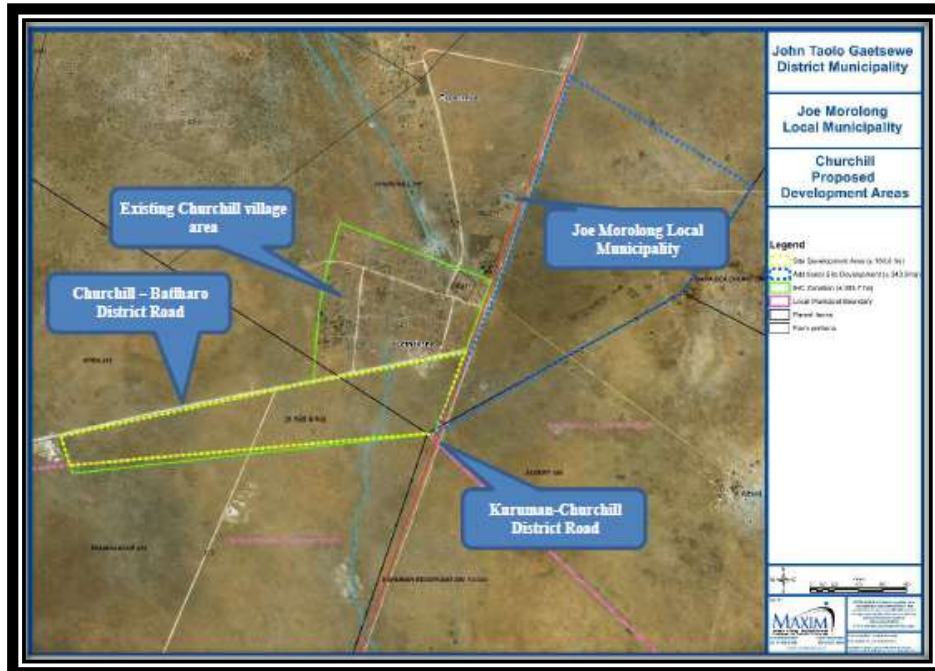
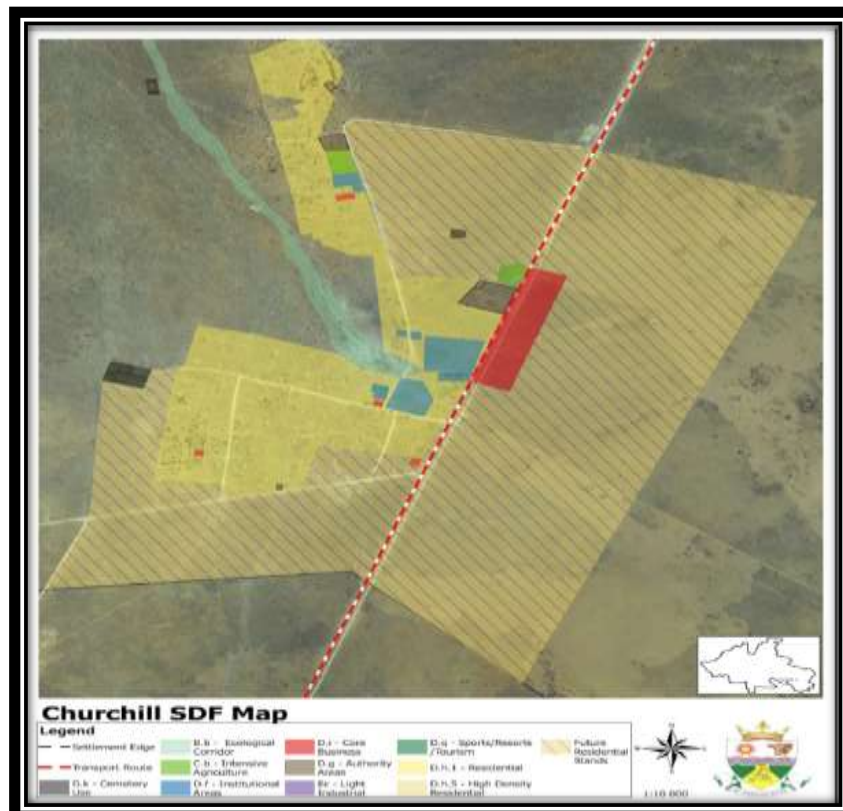


Figure 6c: Locality of development area in relation to the Churchill urban area.

In terms of the Spatial Development Framework of the Joe Morolong Local Municipality (2017), the proposed development area earmarked for the development is located within the demarcated urban edge of the Churchill urban area. The urban edge is reflected on the following map.



5. LEGAL AND OTHER REQUIREMENTS

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
<p><i>National Environmental Management Act No. 107 of 1998 as amended.</i></p>	<p>NEMA is South Africa's overall environmental legislation and has, as its primary objective to provide for co-operative governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state and to provide for matters connected therewith (Government Gazette, 1998).</p> <p>The Act provides for the right to an environment that is not harmful to the health and well-being of South African citizens; the equitable distribution of natural resources, sustainable development, environmental protection and the formulation of environmental management frameworks (Government Gazette, 1998).</p> <p>Section 30 (1, 3 and 4) of NEMA states that:</p> <p>(1)(a) "incident" means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed. (b) "responsible person" includes any person who; (i) Is responsible for the incident; (ii) Owns any hazardous substance involved in the incident; or (iii) Was in control of any hazardous substance involved in the incident at the time of the incident;</p> <p>(3) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means</p>	National & Provincial	27 November 1998

	<p>reasonably available (a) the nature of the incident; (b) any risks posed by the incident to public health, safety and property; (c) the toxicity of substances or by-products released by the incident; and (d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to;</p> <p>(i) the Director-General; (ii) the South African Police Services and the relevant fire prevention service; (iii) the relevant provincial head of department or municipality; and (iv) all persons whose health may be affected by the incident.</p> <p>(4)The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident; (a) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons; (b) undertake clean-up procedures; (c) remedy the effects of the incident; (d) assess the immediate and long-term effects of the incident on the environment and public health.</p>		
<p><i>The Bill of Rights, Constitution of South Africa, Section 27 (1)(b)</i></p>	<p>The Constitution of the Republic of South Africa is the legal source of all law, including environmental law, in South Africa. The Bill of Rights is fundamental to the Constitution of South Africa and in, section 24 of the Act, it is stated that:</p> <p>Everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p>	<p>National Government</p>	<p>1994</p>

	<p>Given that environmental management is founded partly on the principles of public participation, Section 195 of the Constitution is of primary relevance:</p> <p>(1) Public administration must be governed by the democratic values and principles enshrined in the constitution, including the following principles: (a) (b) (c) (d) (e) Peoples needs must be responded to, and the public must be encouraged to participate in policymaking. (f) Public administration must be accountable. (g) Transparency must be fostered by providing the public with timely, accessible and accurate information (Government Gazette, 1996).</p>		
<i>New Regulations 2017 in terms of NEMA</i>	<p>Legislation consulted during the environmental impact assessment process to determine whether any listed activities would be triggered. The Regulations were also consulted to determine inter alia the requirements regarding the contents of basic assessment reports and environmental management programmes and the public participation process that should be followed.</p>	National & Provincial	7 April 2017
<i>National Water Act (36 OF 1998)</i>	<p>National Water Act (NWA), 1998 (Act 36 of 1998) is the primary statute providing the legal basis for water management in South Africa and has to ensure ecological integrity, economic growth and social equity when managing and using water.</p> <p>The major objectives of the National Water Act are to:</p> <ul style="list-style-type: none"> •Aid in providing basic human needs; •Meet the growing demand of water in a sustainable manner; •Ensure equal access to water and use of water resources; •Protect the quality of water of natural resources; •Ensure integrated management of water resources; •Foster social and economic development; and •Conserve aquatic and related ecosystems. 	Department of water and sanitation	1998

	<p>Section 19 of the National Water Act states that the person responsible for land upon which any activity is or was performed which causes, has caused or is likely to cause, pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.</p> <p>Chapter 3 of the National Water Act (36 of 1998), deals with pollution of water resources following an emergency incident, such as an accident involving the spilling of a harmful substance that finds or may find its way into a water resource. In terms of Section 30 of NEMA and Section 20 of the National Water Act, the responsibility for remedying the situation rests with the person responsible for the incident or the substance involved. If there is a failure to act, the relevant Catchment Management Agency may take the necessary steps and recover the costs from every responsible person.</p>		
<p>National Environmental Management: Biodiversity Act (NEMBA) (ACT NO. 10 OF 2004)</p>	<p>The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004), provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith.</p> <p>In terms of Chapter 4 of the Above Act:</p> <p>52. (1) (a) The Minister may, by notice in the Gazette, publish a national list of ecosystems that are threatened and in need of protection.</p>	<p>National & Provincial</p>	<p>2004</p>

	<p>(b) An MEC for environmental affairs in a province may, by notice in the Gazette, publish a provincial list of ecosystems in the province that are threatened and in need of protection.</p> <p>(2) The following categories of ecosystems may be listed in terms of subsection:</p> <p>(a) critically endangered ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;</p> <p>(b) endangered ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;</p> <p>(c) vulnerable ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and</p> <p>(d) protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed in terms of paragraphs (a), (b) or (c).</p> <p>(3) A list referred to in subsection (1) must describe in sufficient detail the location of each ecosystem on the list.</p> <p>53 (1) The Minister may, by notice in the Gazette, identify any process or activity in a listed ecosystem as a threatening process.</p> <p>(2) A threatening process, identified in terms of subsection (1) must be regarded as a specified activity contemplated in section 24(2)(b) of</p>		
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	the National Environmental Management Act (1998) and a listed ecosystem must be regarded as an area identified for the purpose of that section.		
National Environmental Management: Protected Areas Act (ACT NO. 57 OF 2003)	<p>This Act aims to provide for a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity. The Protected Areas Act tries to ensure the protection of the entire range of biodiversity, referring to natural landscapes and seascapes. The Act makes express reference to the need to move towards Community Based natural Resource Management (CBNRM) as its objectives include promoting the participation of local communities in the management of protected areas. The purpose of the Act is:</p> <ul style="list-style-type: none"> •To protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes and their ecological integrity. •To conserve biodiversity in those areas; •To protect South Africa's rare species; •To protect vulnerable or ecologically sensitive areas; •To assist in ensuring the sustained supply of environmental goods and services; •To provide for the sustainable use of natural and biological resources; •To create or augment destinations for nature-based tourism; •To manage the interrelationship between natural environmental biodiversity, human settlement and economic development; •To contribute to human, social, cultural, spiritual and economic development; •To rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species. <p>This Act further stipulates various criteria which must be met before an area can be declared as a special nature reserve, national park, nature</p>	National & Provincial	2003

	<p>reserve and protected environment. It also prescribes a range of procedures, including consultation and public participation procedures which must be followed before any of the kinds of protected areas are declared.</p>		
<p><i>Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002</i></p>	<p>The Act distinguishes between mining permits and mining rights as follows:</p> <p>Mining Permit: Required where the activity will last less than two years and affects an area of less than 1.5ha in extent (valid for 3 years). In terms of the Act a mining permit requires a submission of an Environmental Management Plan (EMP to DME for approval prior to the onset of activities).</p> <p>Mining Right: Required for larger mining operations (renewable and valid for 30 years). In terms of the Act a mining right requires the submission of an Environmental Management Programme (EMProg) to DME for approval prior to the onset of activities.</p> <p>In light of their limited spatio-temporal extent, borrow pits (for the provision of construction material) and quarry operations would typically require a mining permit.</p> <p>The closure of borrow pits requires the submission of a closure application; this must be submitted within 180 days after ceasing operations. It is important to recognise that the mining right/permit holder's liability persists until such time as a Closure Certificate has been issued by DME.</p>	<p>Relevant Provincial Authorities.</p>	<p>2002</p>
<p><i>National Heritage Resources Act, Act No. 25 of 1999</i></p>	<p>Legislation consulted during the impact assessment process, to determine the legal requirements relating to the management of heritage resources that are present in and around the site.</p>	<p>SAHRA</p>	<p>1999</p>
<p><i>National Environmental Management: Waste Act, Act No. 59 of 2008, read together with</i></p>	<p>Legislation consulted to determine whether a waste licence will have to be obtained for the development.</p>	<p>National & Provincial</p>	<p>2008</p>

<i>the List of Waste Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment, GN No. 921 of 29 November 2013</i>	Should the old canal be demolished, <i>Category A: Activity number: 14</i> might be triggered. However, it is considered unlikely at this stage as it is envisaged that the existing canal will remain operational.		
<i>National Environmental Management: Air Quality Act (Act 39 of 2004)</i>	To protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social Development. Construction activities may cause some air pollution.	Relevant Authorities.	Provincial 2004
<i>The Conservation of Agricultural Resources Act (Act 43 of 1983)</i>	This Act regulates the flow pattern of runoff water, control of weeds and invader plants.	Relevant Authorities.	Provincial 1983
<i>National Veldt and Forest Fire Act (Act 101 of 1998)</i>	Chapter 4 places a duty on owners to prepare and maintain firebreaks.	Relevant Authorities.	Provincial 1998
<i>National Forests Act, Act 84 of 1998 (NFA) read with GN1602 of December 2016.</i>	During the construction phase of the development certain protected trees may be affected. Licences will have to be obtained from the Minister before the affected trees may be cut, disturbed, damaged or destroyed. GN1602 of December 2016 contains the list of protected trees.	National and Provincial authorities.	1998
<i>Northern Cape Nature Conservation Act, 2009 (Act. No. 9 of 2009)</i>	This Act contains schedules of protected and specially protected species (fauna and flora) that may not be disturbed without a valid fauna and flora Permit from Nature Conservation.	Northern Cape Provincial Authority.	2009
<i>Occupational Health and Safety Act (Act 85 of 1993)</i>	To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery and the protection of persons other than persons at work against hazards to health.	Relevant Authorities.	Provincial 1993
<i>National Heritage RESOURCES Act (Act 25 of 1999)</i>	Regulation 38. (1) states that any person who intends to undertake a development categorised as—(a) the construction of a canal exceeding 300m in length; must get authorization from SAHRA	Relevant Authorities.	Provincial 1999

The study is conducted in such a way as to comply with the instructions regarding such studies and reports (as contained within the above-mentioned documents).

The following aspects have been dealt with:

SCHEDULE

Actions	Timeframe
1. Project Initiation and Scoping Phase	
1.1 Communication with authorities and source and analyse relevant baseline information and undertake site inspections	5 days
1.2 Identify key interested and affected parties (I&APs)	1 day
1.3 Compilation of terms of reference for specialist studies	2 days
1.4 Commission specialist studies	1 day
1.5 Compile Environmental Application Form for the project and submit to the authorities	Once the Environmental Application form has been submitted, the scoping report which has been subject to public participation (30 days) needs to be submitted within 44 days
1.6 Compile draft Scoping Report (SR) and make available to the public for a 30 day commenting period	5 days for compilation and 30 days for commenting period
1.7 Prepare an Information Sheet (summary of the draft SR) and distribute to I&APs	1 day
1.8 Compile and publish media notices (for the EIA) in relevant newspapers	7 days
1.9 Compile and place poster/s along the boundary of the site	1 day
1.10 Receive and address first round of comments from public	3 days
1.11 Should the draft SR require substantial changes, these changes will be incorporated into the final SR and distributed	The competent authority must within 43 days of receipt of the scoping report accept / refuse the report with our without conditions
1.12 Address comments received on the SR, finalise Scoping Report and submit to authorities	As above
1.13 Compile a Plan of Study for the assessment phase and submit to authorities for approval	As above
The total time allowed for the Scoping phase of the application	87 days
2. Assessment Phase	
2.1 Undertake assessment phase by assessing and evaluating potential impacts identified in the Scoping phase.	5 days
2.2 Review and manage specialist studies required.	Ongoing
2.3 Compile a draft Environmental Impact Report (EIR).	5 days
2.4 Compile a draft Environmental Management Plan for the Construction phase.	Included above
2.5 Compile an Information Sheet (summary of EIR) and distribute to identified I&APs	1 day
2.6 Distribute DEIR to I&APs	1 day
2.7 Allow the identified public to provide comment within a 30 day period on above report.	3 days for compilation and 30 days for commenting period
2.8 Address comments received and finalise EIR	3 days
2.9 Should the draft EIR require substantial changes, these changes will be incorporated into the final EIR and distributed for a 21 day commenting	3 days plus 21 day commenting period
2.10 Finalise EIR and update comments and response table for submission to authorities	5 days
2.11 Submit EIR to authorities for a final decision	1 day (The department requires the submission of the Final EIR within 106 days of the approval of the Scoping report)
2.12 Once the decision is issued, all I&Ps must be formally informed of the decision	The Competent Authority has 107 days from the date of receipt of the EIR and EMPr to determine the application
Total number of days allowed for the compilation and consideration of the EIR	213 (may require additional 50 days public participation and consideration)
TOTAL NUMBER OF DAYS:	300-350 days

6. NEED AND DESIRABILITY

As in the rest of South Africa, there is a housing shortage in the area. This is totally unacceptable as informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty. Linking basic services such as water to health is viewed as a false separation as these services are 'intimately related to housing'. It becomes a housing issue if children playing outside the house contract diarrhoea via ingesting pathogens from fecal matter which contaminates the land on which they play. Otherwise, it is the house which provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

The new "Human Settlements Plan" promotes the achievement of a non-racial, integrated society through the development of sustainable human settlements and quality housing. Housing is to be utilized for the development of sustainable human settlements in support of spatial restructuring.

The aim is to move beyond the provision of basic shelter towards achieving the broader vision of sustainable human settlements and more efficient towns, cities and regions. The following factors will be taken into consideration in order to achieve this vision:

- Progressive Informal Settlement Eradication: These settlements must be integrated into the broader urban setup so as to overcome spatial, social and economic exclusion. The plan encourages the eradication of informal settlements through in-situ upgrading in desired locations coupled with the relocation of households where development is not possible or desirable.
- Promoting Densification and Integration: The aim is to integrate previously excluded groups into the city so as to enable them to enjoy the benefits it offers and to create more integrated, functional and environmentally sustainable human settlements, towns and cities.
- Enhancing Spatial Planning: Greater co-ordination and alignment of various planning instruments and economic policies lies at the heart of sustainable human settlements. This requires more than mere co-ordination between departments but there needs to be a single overarching planning authority and/or instrument to provide macro-level guidance to support the development of sustainable human settlements.
- Enhancing the location of New Housing Projects: The location of past housing projects was said to reinforce apartheid spatial settlement patterns. Spatial restructuring aims to achieve a more decisive intervention in land markets. The following interventions are envisaged viz. accessing well located state-owned and parastatal land: acquisition of well-located private land for housing development, funding for land acquisition and fiscal incentives.
- Supporting Urban Renewal and Inner-City Regeneration: Urban renewal and inner-city regeneration often result in the current inhabitants being excluded as a result of the construction of dwelling units they cannot afford. Some municipalities are trying to avoid this by promoting affordable inner-city housing. The "Human Settlements Plan" will support this by encouraging social housing.

- Developing Social and Economic Infrastructure: The need to move away from a housing-only approach towards a more holistic development of human settlements which includes the provision of social and economic infrastructure is emphasized.
- Enhancing the Housing Product: The aim is to develop more appropriate settlement layouts and housing products and to ensure appropriate housing quality.

In accordance with the policy guidelines contained in the Breaking New Ground (BNG) Principles it is indicated that new residential township areas should focus on the establishment of integrated human settlements focussing on the provision of erven not only for subsidized/low income households but also addressing the need for other housing typologies such as rental housing, bonded housing and FLISP projects.

A housing subsidy is a grant by government to qualifying beneficiaries for housing purposes. This is one of the Department of Human Settlement's areas of responsibility in the delivery of human settlements to the bottom-most end of the market, where it provides housing subsidies to the poor. This is where the bulk of the housing backlog exists, affecting mainly those who earn below R3500 a month. The following subsidy programmes are available from the Department of Human Settlements:

Integrated Residential Development Programme

The Integrated Residential Development Programme replaced the Project Linked Subsidy Programme. The programme provides for planning and development of integrated housing projects. Projects can be planned and developed in phases and provides for holistic development orientation:
Phase 1: Land, Services and Township Proclamation
Phase 2: Housing Construction (this also includes the sale of stands to non-qualifying beneficiaries and to commercial interests)

Individual Subsidy

This programme provides access to state assistance where qualifying households wish to acquire an existing house or a vacant serviced residential stand, linked to a house construction contract through an approved mortgage loan. These properties are available in the normal secondary housing market or have been developed as part of a project not financed through one of the National Housing Programmes.

Enhanced People's Housing Process

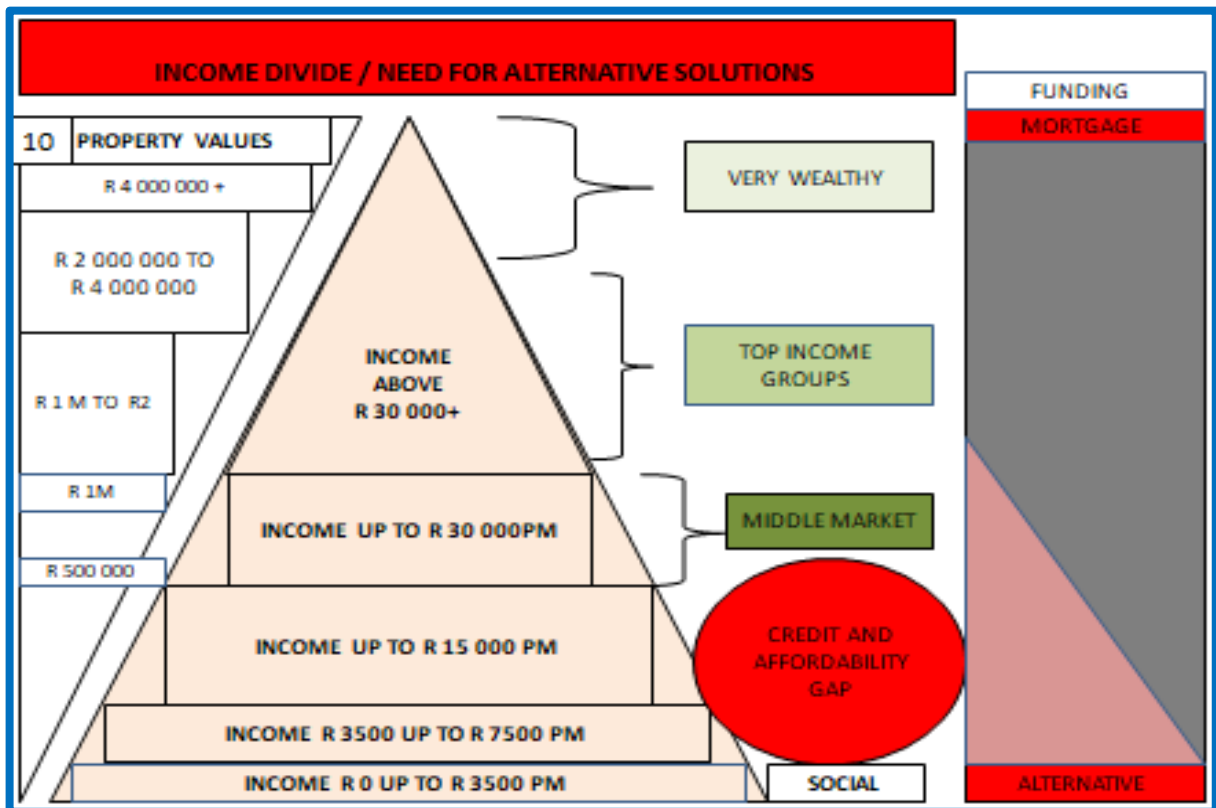
The Enhanced People's Housing Process aims to support households who wish to enhance their housing subsidies by funding their own homes. The Enhanced People's Housing process can be accessed through the Integrated Residential Development Programme, Project Linked Consolidation or Institutional Subsidies.

People's Housing Process

This subsidy is given to people who want to build or manage the building of their own homes. Unlike the Project Linked Subsidy where a contractor builds houses for a number of people, the People's Housing Process allows people or beneficiaries to build or organize the building of their homes.

Housing the poor was an ingredient of the Department of Human Settlement's three-part response to the State's Vision 2030 Strategy. "Gap housing" is a term that describes the shortfall or gap in the market between units supplied by the State and houses delivered by the private sector. The gap housing market comprises people who typically earn between R3500 and R15000 per month, which is too little to enable them to participate in the private property market, yet too much for state assistance. Gap housing is a policy that addresses the housing aspirations of people such as nurses, fire-fighters, teachers, SAPS members and member of the armed forces who earn between R3500 and R15000 per month and therefore do not qualify for RDP houses and do not earn enough to obtain home loans.

The following figure illustrates the income divide / Need for alternative solutions.



Income Divide / Need for alternative solutions

One of the subsidy programmes further available from the Department of Human Settlements includes the Finance Linked Individual Subsidy Programme (FLISP).

FLISP was developed to enable first time home-ownership to households in the "affordable or gap" market, that is, people earning between R3501 and R15000 per month. Individuals in these salary bands generally find it hard to qualify for housing finance; their income is regarded as low for mortgage finance, but too high to qualify for the government subsidy scheme available to households earning less than R3500 per month. Depending on the applicant's gross monthly income, their once-off FLISP subsidy qualifying amount may vary between R20 000 and R87 000, as defined in the FLISP Subsidy Quantum. Any residential property acquired with the FLISP subsidy may not exceed

the R300 000 price margin. FLISP assists qualifying beneficiaries who wish to obtain mortgage finance from a lender to:

- Acquire ownership of an existing residential property
- Obtain vacant serviced residential stands which are linked to house building contracts with the home builders registered with the National Home Builders Registration Council (NHBRC); or
- Build a new house with the assistance of a home builder registered with the National Home Builders Registration Council (NHBRC) on serviced residential stand that is already owned by the beneficiary.

The objective of the programme is to reduce the initial mortgage loan amount to render the monthly loan repayment instalments affordable over the loan payment term.

The Churchill integrated human settlement project from the onset aims at providing a proper integrated human settlement that ascribes to the BNG Principles set out above. This will be achieved as follows:

- This project makes provision for a variety of erven that can be utilized for various housing typologies. The largest proportion of the township areas will however be aimed at both the subsidized housing sector through the implementation of one of Government's subsidized housing programmes as well as the need that exists for people that does not qualify for a Government subsidy, due to either already owning other property or earning in excess of the threshold household income prescribed in respect of the various housing subsidy programmes, but who still wishes to acquire an affordable stand where they can construct their own home. This project will also aim at alleviating the plight of people that live in informal settlement areas and in squalid conditions.
- The location of the proposed township area directly adjacent to the existing urban area of Churchill further enhances integration and will offer inhabitants the opportunity to access the existing social and commercial facilities on offer within the existing village area whilst also providing social and business opportunities within the proposed development area itself that can in turn be utilized by and to the benefit of the inhabitants of the existing village area.

The development of the Churchill integrated human settlement represents a definitive move away from providing housing-only township areas and towards the provision of a proper integrated human settlement that offers a magnitude of social, educational and commercial support facilities and infrastructure in close proximity to the inhabitants

Skills development

The members of the Project Steering Committee will during the entire life-cycle of the project be involved with all processes and it anticipated that the capacity of the officials of the Joe Morolong Local Municipality as well as the relevant community structures will be broadened through the transfer of knowledge and skills specifically relating to the integrated human settlement planning process as well as the statutory processes associated with the township establishment process.

During the construction phase of the proposed development, jobs will be created and thus the unemployment rate of the area will be reduced.

7. ALTERNATIVES

One of the objectives of an EIA is to investigate alternatives to the proposed project. The IEM procedure stipulates that the environmental investigation needs to consider feasible alternatives for any proposed development. Therefore, a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. In order to ensure that the proposed development enables sustainable development, feasible alternatives must be explored (S. Cliff, 2015).

The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental scoping process. Alternatives should be considered as a norm within the Environmental Process (S. Cliff, 2015).

The alternatives considered for the proposed development includes land use alternatives (including the No-go option). The various alternatives will be assessed in the EIAR, in terms of environmental, social and technical feasibility.

7.1 Land Use Alternatives

7.1.1 Mixed land use township (Alternative 1)

Alternative Site layouts have been developed for the proposed development.

The appointed Town and Regional planner have produced the proposed layout plan.

The Applicant, the **Joe Morolong Local Municipality** has appointed **AB Enviro Consult CC**, an independent environmental consultancy, to undertake an Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

The site is influenced by a number of design factors that were considered for the proposed layout plan to be acceptable. These factors include the slope of the site, flood lines, environmental sensitivity, service provision, erf size, access, road layout and community facilities as well as the geotechnical features. To ensure that the proposed development do not infringe on any design principles and the environmental sensitive areas, development of residential units will only be allowed to take place according to the prescribed methods: subsequently no residential development is proposed to take place within the 1:100 year flood line.

The proposed Township will consist of the following (See Figure 1&2 for a copy of the Layout Plans):

Proposed township Churchill extension 1:

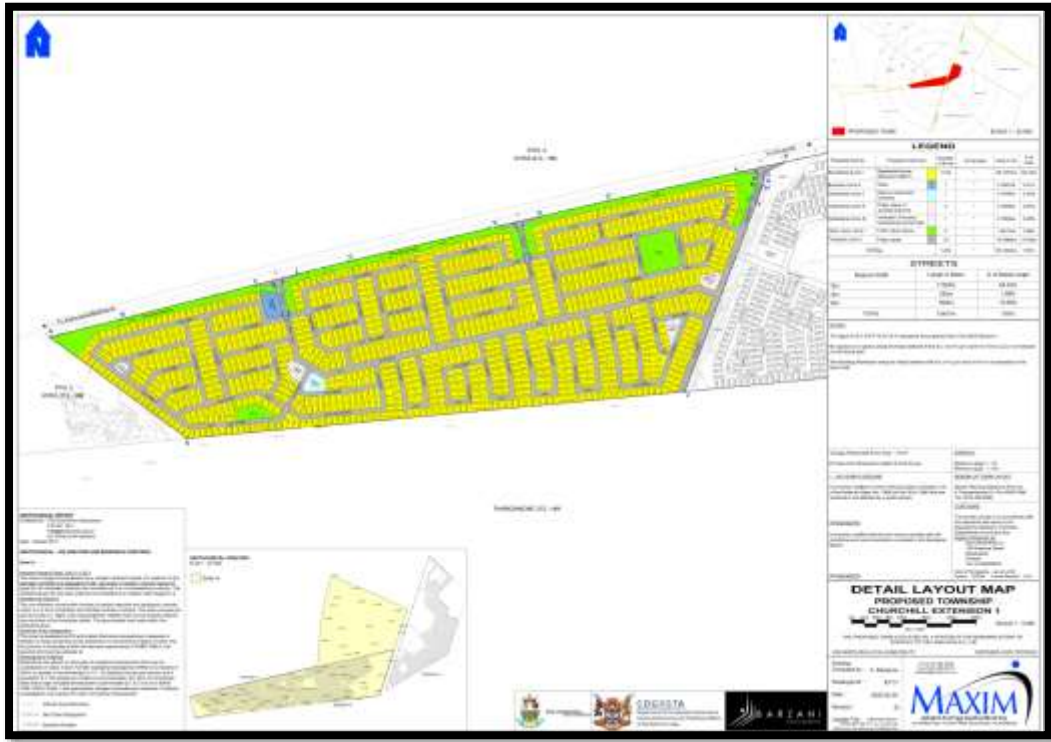


Figure 1: Proposed Churchill extension 1

Residential (Minimum 300 m ² erven)	1216 Stands
Business	1 Stands
Churches	3 Stands
Crèche	1 Stands
Community Facility	1 Stands
Parks	5 Stands
Area of township	60.7444 ha

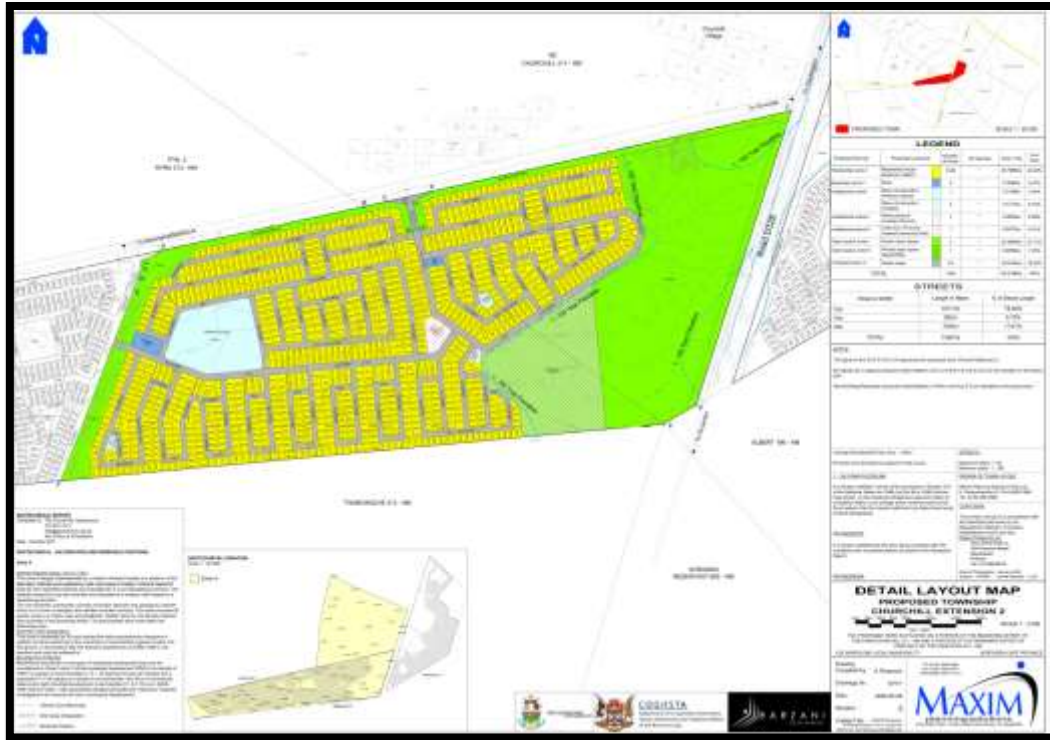


Figure 2: Proposed Churchill extension 2

Residential (Minimum 300 m ² erven)	1229 Stands
Business	2 Stands
Churches	1 Stands
Crèche	2 Stands
Primary School	1 Stand
Sports Field	1 Stand
Community Facility	1 Stands
Parks	3 Stands

Area of township **92.3198 ha**

Although the emphasis is on housing, complimentary land uses have been included in the township. People want easy access to job opportunities, shops, banking facilities, clinics, etc. and want their living environment, such as residential townships to be placed at strategic positions with good access routes in close proximity to these amenities.

A mixed land use development is *socially responsible* based on the following:

- It covers the mixed and lower income bracket by providing a higher density housing option;
- The development will inevitably support the use of public transport;
- The development will include supporting social infrastructure (schools), as well as some retail or commercial activities;

- The layout of the development must respond to the future road planning for the area, to facilitate and maximise pedestrianisation and public transport.
- Commercial erven can accommodate a shopping centre, to service the existing formalised and informal settlements in the area. The commercial node will:
 - Promote entrepreneurial services and products;
 - Be within walking distance to places of refreshment and trade for residents;
 - Provide Job opportunities; and
 - Improve neighbourhood quality.

7.1.2 Single land use: Housing only (Alternative 2)

By providing only one land use type (i.e., housing), mixed income development and social integration across race and income levels, cannot be achieved.

A Commercial node on site is commonly utilised as a “Multi-Purpose Community Centre/Rural Service Centre” which is defined as “a focal point at which a range of essential services can be obtained by people living in its vicinity”. In turn, a commercial node acts as a pool of human and physical resources from which the inputs necessary for development can be distributed efficiently, and from which a community can draw to promote their development”.

By restricting a township to one land use only, the above benefits to the local community, and subsequent council area, cannot be realised, and hence, is not a preferred land use option.

7.1.3 No-go Alternative

The only other alternative that exists for the proposed development is the “no-go” option which will imply that the status quo will prevail. This is unacceptable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty. Linking basic services such as water to health is viewed as a false separation as these services are ‘intimately related to housing’. It becomes a housing issue if children playing outside the house contract diarrhoea via ingesting pathogens from fecal matter which contaminates the land on which they play. Otherwise, it is the house which provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

8. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE PROJECT

8.1 BIO-PHYSICAL ASPECTS

According to the 1:250 000 scale, geological map, 2722 KURUMAN, the site is predominantly underlain by aeolian sands, calcrete and calcified pan dunes of Gordonia Formation. The area also hosts surface limestone of tertiary age.

The Ghaap Group outcrops are found within 10 kilometres from the study area. According to the Ghaap Group is subdivided into four subgroups of different depositional composition, namely; Schmidtdrift (siliclastic carbonates), Campbell Rand (dolomite and siliclastic mudstone), Asbestos Hill (banded and granular Banded Iron Formation) and Koegas (submarine fans) Subgroups (Kendal *et al*, 2012). The beds tend to dip 5° in a south westerly direction.

Dolomitic rock is composed mainly of the mineral dolomite, which is a carbonate of calcium and magnesium. Groundwater that is weakly acidic through enrichment with carbon dioxide, dissolves and removes the calcium and magnesium in the form of bicarbonates as it percolates through the network of joints, fractures and faults in the rock mass. This dissolution gives rise to karst features in the form of cave systems and voids. In many parts of South Africa, the karst landscape is buried beneath younger deposits and/or weathering products of the dolomitic formation, and these materials can either collapse or be transported into voids or cave systems, resulting in catastrophic ground movement at surface. Because of risks of sinkhole and subsidence development associated with the presence of these soluble dolomitic rocks, it is required that a dolomite stability assessment be conducted, in accordance with SANS 1936-2:2012. It is further stated that developments on such dolomitic land shall be in accordance with the Inherent Hazard Classes and the Dolomite Area Designations as determined by the geotechnical site investigations.

Summary of Dolomite Hazard

The hazard zonation is based on geophysical surveys and drilling results from 62 boreholes. An assessment of all these based on the method of scenario supposition, Buttrick *et. al.* (2001) favours the site being zoned into one (1) Inherent Hazard Zone as dictated by geological conditions revealed by the drilling results. Based on the percussion drilling results, geohydrological data and geological information, the dolomite stability of the site is described in terms of the following zones as:

Zone A

Inherent Hazard Class: 3/4 (1) // 3(1)

This zone is largely characterised by a medium inherent hazard of a medium (2-5 m diameter) sinkhole and subsidence (with sub areas of medium inherent hazard of large [5-15 m diameter] sinkhole and subsidence) in a non-dewatering scenario. The inherent hazard for any size sinkhole and subsidence is medium with respect to a dewatering scenario.

The non-dolomitic overburden consists of aeolian deposits and pedogenic calcrete which is in a form of hardpan and calcified nodules in places. This zone occupies all gravity zones (i.e. highs, lows and gradients). Neither wad nor low density material was recorded in the boreholes drilled. The groundwater level rests within the blanketing layer.

Dolomitic Area Designation

This zone is assessed as D3 and implies that extra precautionary measures in addition to those pertaining to the prevention of concentrated ingress of water into the ground, in accordance with the relevant requirements of SANS 1936-3, are required and must be adhered to.

Location

The zone covers the entire site boundary area.

If the proposed mitigation measures as described in the report is adhered to, it will ensure a sustainable development as far as this variable is concerned.

8.1.2 TOPOGRAPHY

The site topography is essentially flat but slightly undulating in places. The highest and lowest elevations within the site boundary are 1 287 m and 1 271 m above minimum sea level in the eastern and western boundaries respectively. The site generally slope towards south east with average slope of less than 2% (<1°). What appears to be a non-perennial and dry drainage course occurs in the eastern boundary and traverses the site from north to south. Site drainage is largely by sheet wash.

A detailed site survey has been carried out to establish levels. The Engineering report and the Layout plan will address issues regarding storm water. As the proposed development will be in close proximity to residential areas, safety of children and people need to be taken into consideration.

8.1.1. CLIMATE

A summer maximum rainfall and a dry winter is the norm. Extreme climatic events may have an influence on the project during the construction and operation phase and will have to be considered.

Frost is frequent in winter. Mean monthly maximum and minimum temperatures ranging from 35.9°C and -3.3°C for January and June, respectively (Mucina and Rutherford, 2006). Churchill receives about 300 – 450 mm of rain per year with most of its rainfall occurring during summer and autumn with very dry winters (Mucina and Rutherford, 2006). The climatic N-value for the area is greater than 5 indicating that the environment is more arid and the predominant mode of weathering is physical weathering.

Extreme climatic events may have an influence on the project during the construction and operational phase and will have to be taken into consideration.

Climate Change

According to: WIREs Climate Change 2014, 5605-620. Doi:10.1002/wcc.295: "Climate change is a key concern within South Africa. Mean annual temperatures have increased by at least 1.5 times the observed global average of 0.65°C over the past five decades and extreme rainfall events have increased in frequency. These changes are likely to continue. Climate change poses a significant threat to South Africa's water resources, food security, health, infrastructure, as well as its ecosystem services and biodiversity. Considering South Africa's high levels of poverty and

inequality, these impacts pose critical challenges for national development. In relation to water, impact studies for the water resources sector have begun to look beyond changes in streamflow to changes in the timing of flows and the partitioning of streamflow into base flows and stormflows, reservoir yields, and extreme hydrological events. Spatially the eastern seaboard and central interior of the country are likely to experience increases in water runoff. Higher frequencies of flooding and drought events are projected for the future. Complexities of the hydrological cycle, influences of land use and management and the linkages to society, health, and the economy indicate far higher levels of complexity in the water resources sector than in other sectors. What has emerged is that land uses that currently have significant impacts on catchment water resources will place proportionally greater demands on the catchment's water resources if the climate were to become drier. The influence of climate change on water quality is an emerging research field in South Africa, with assessments limited to water temperature and non-point source nitrogen and phosphorus movement. A critical interaction that has not been explored is between changes in water quality and quantity and the combined impacts, such changes might have impact on various types of water use, e.g., irrigation, domestic consumption, or aquatic ecosystems support".

Water availability and demand has been calculated by the consulting Civil Engineers, to enable a sustainable waterborne sewage system as well as potable water supply for both the existing and future developments in the area.

8.1.3. SURFACE DRAINAGE, WETLANDS AND RIPARIAN ZONES

Two poorly defined narrow non-perennial streambeds with indistinctive riparian zones are found at the north-eastern part and the central-eastern part of the site respectively.

The narrow poorly defined non-perennial streambeds should be viewed as important conservation corridors in the larger area. If the development is approved careful planning should take place to conserve the functioning of non-perennial streambeds. The riparian areas are likely to be degraded by overgrazing and are overall largely indistinctive. The scope for large buffer zones at the site is small and probably not practical. A 10 m buffer zone from the outer edge of the active channels are recommended. Proper planning of stormwater as well as the cultivation of indigenous tree species are key to sustainable functioning of the active channels and riparian zones.



Figure 4 Indications of important aspects relevant to watercourses at the site.

- Light blue outline and shading Wetlands at the site
- Blue outline and shading Artificial waterbodies (with groundwalls; dams)

Two streams were identified where flood lines will develop that may have an effect on developments on each site.

The main stream in this study area is **Stream 1** with a catchment of **51,9 km²** at the study area. **Stream 2** will form along the tarred road (no number) and will drain partially underneath the tarred road at an existing installed culvert.

Figure 6 illustrates the calculated 1:100 year flood lines.



Figure 5: Streams in the area.



Figure 6: 1:100 year flood lines

The poorly defined drainage lines at the site are anticipated to comprise a low\ moderate risk. If the development is approved the surface flow and erosion of the wetland are likely to be limited. There

is no distinct indication that interflow play of the wetlands would be impacted significantly by the proposed developments. The geomorphological setting and flow regime likely to be similar post development, if the development is approved according to the mitigation measures stated. Loss of any wetland animal or plant species of particular conservation importance are not expected.

In summary the Wetland Specialist Concluded the following:

- Two poorly defined narrow non-perennial streambeds with indistinctive riparian zones are found at the northeastern part and the central-eastern part of the site respectively.
- Site is situated at the Lower Vaal Water Management Area (WMA 10). Site falls outside any FEPA (Freshwater Ecosystem Priority Area) (Nel et al., 2011a, 2011b). The site is part of an Upstream Management Area which are sub-quaternary catchments in which human activities need to be managed to prevent degradation of downstream river FEPAs and Fish Support Areas.
- The narrow poorly defined non-perennial streambeds should be viewed as important conservation corridors in the larger area. If the development is approved careful planning should take place to conserve the functioning of non-perennial streambeds. The riparian areas are likely to be degraded by overgrazing and are overall largely indistinctive. The scope for large buffer zones at the site is small and probably not practical. A 10 m buffer zone from the outer edge of the active channels are recommended. Proper planning of stormwater as well as the cultivation of indigenous tree species are key to sustainable functioning of the active channels and riparian zones.
- Impacts on the poorly defined drainage lines at the site are anticipated to comprise a low/moderate risk. If the development is approved the surface flow and erosion of the wetland are likely to be limited. There is no distinct indication that interflow play of the wetlands would be impacted significantly by the proposed developments. The geomorphological setting and flow regime likely to be similar post development, if the development is approved according to the mitigation measures stated. Loss of any wetland animal or plant species of particular conservation importance are not expected.
- A key issue at the site that emerged from the risk and impact assessment is the implementation of efficient control of alien invasive plant species. Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate or low.

8.1.4. GROUND WATER

The Engineering Geoscience and Geohazard Report's findings in relation to groundwater were as follows: The groundwater scenario is a key risk assessment factor in the engineering-geological characterisation of dolomitic environments. According to a 1:500 000 hydrogeological Map 2722 KIMBERLERY, the principal groundwater occurrence system is a fractured, karstic and fissured dolomite aquifer type. The borehole yield (i.e. groundwater potential) class is >2.0 (median l/sec). The probability of such borehole for this yield class is between 50% and 60%. The municipality exclusively relies on groundwater resources for domestic, agricultural and business water supply. According the Department of Water Affairs' (DWA) National Groundwater Archive (NGA), there are 4 groundwater monitoring boreholes in close proximity of the site. They fall under Lower Vaal Water Management Areas and D41L drainage region. According to DWA records the water rest level ranges from 1.3 m to 2.51 m.

During percussion drilling of this investigation water strikes were encountered and water rest levels readings were taken using a dip meter after 24 hours as per SANS1936-1(2012). Water rest level measurements indicated that water rest levels were around 10 m in most of drilled boreholes. Recorded water rest levels varied between 2.5 m and 58.7 m in boreholes CH57 and CH55 respectively as shown in Figure 4. This shows a drawdown fluctuation of at least 8 m when comparing the current average of 10 m to that of 3 m measured by Breytenbach (2012) study, where water rest levels in all three (3) boreholes drilled were around 3 m. Breytenbach (2012) stated that, there was very little additional information of significance for this area and he deduced that the area has historically not been dewatered extensively. He added that, the last observation (monitoring) in this area was made in 2003, with observation supposed to have continued to 2007.

The drop in water rest level from 3 m in 2012 to more than 10 m in 2017, shows that the compartment may have been impacted by excessive extraction. In terms of dolomite stability for a dewatering scenario, the risk of sinkhole and subsidence to form is medium as the groundwater generally rests within the overburden which is calcrete in this case. Accordingly, as an additional precautionary measure 2 monitoring boreholes were drilled and equipped for continuous groundwater level monitoring.

Possible infiltration into the groundwater have been taken into account. During the construction phase, no spills of lubricants or construction worker sewage should be allowed to pollute the ground water. Special care must be taken to ensure adequate surface drainage to prevent the accumulation of water next to structures, especially within these relative flat areas.

8.1.5. FLORA

The study area is at the proposed Churchill, 19 km north of Kuruman, South Africa (elsewhere referred to as the site). Site is part of the Savanna Biome which is represented by the Kuruman Thornveld vegetation type at the central and eastern parts of the site as well as the Kuruman Vaalbosveld at the eastern parts of the site (Mucina & Rutherford 2006).

To serve as local context for the landscape and vegetation at the site an outline of the Kuruman Vaalbosveld and Kuruman Thornveld from Mucina and Rutherford (2006) follows.

SVk 8 Kuruman Vaalbosveld

Distribution: North-West and Northern Cape Provinces. East of Kuruman to Lykso, south of Bendell towards Good Hope. Altitude: 1300-1500 m.

Vegetation and landscape features: Open tree layer characterised by *Acacia erioloba*, *Acacia karroo*, *Searsia lancea* and *Ziziphus mucronata*. Shrub layer poorly developed, with *Grewia flava* and *Tarchonanthus camphoratus* and grass layer open, with much bare soil in places.

Geology and soils: Carbonates and chert of the Vaalian Griqualand West Supergroup and Kalahari sediments from flat, rocky sandy plains with shallow (0.1-0.6 m) red aeolian sands, stony and underlain by rock. Dominant land types Ae and Fc, with Hutton, Clovelly and Mispah soil forms common.

Important taxa: Tall Tree: *Acacia erioloba*. Small Trees: *Acacia karroo*, *Ziziphus mucronata*, *Searsia lancea*. Tall Shrubs: *Tarchonanthus camphoratus*, *Cadaba aphylla*, *Diospyros austro-africana*, *Diospyros lycioides* subsp. *lycioides*, *Grewia flava*, *Gymnosporia buxifolia*. Low Shrubs: *Amphiglossa triflora*, *Anthospermum rigidum* subsp. *pumilum*, *Anthospermum rigidum* subsp. *rigidum*, *Helichrysum zeyheri*. Geoxylic Suffrutex: *Elephantorrhiza elephantina*. Succulent Shrub: *Ebracteola wilmaniae*. Herbaceous Climber: *Rhynchosia holosericea*. Graminoids: *Anthehora pubescens*, *Aristida meridionalis*, *Eragrostis lehmanniana*, *Stipagrostis uniplumis*, *Aristida stipitata* subsp. *spicata*, *Cymbopogon caesius*, *Digitaria eriantha* subsp. *eriantha*, *Fingerhuthia africana*, *Pogonarthria squarrosa*, *Schmidtia pappophoroides*, *Themeda triandra*, *Tragus koelerioides*. Herbs: *Acrotome inflata*, *Dicoma schinzi*, *Geigeria ornativa*, *Heliotropium strigosum*, *Stachys spathulata*, *Triptaris aghillana*.

SVk 9 Kuruman Thornveld

Distribution: In South Africa the Kuruman Thornveld is found at the North West and Northern Cape Provinces. Kuruman Thornveld occurs on the flats from the vicinity of Postmasburg and Danielskuil (here west of the Kuruman Hills) in the south extending via Kuruman to Tsineng and Dewar in the north. Altitude is 1100 – 1500 m (Mucina & Rutherford, 2006).

Vegetation and landscape features: Flat rocky plains and some sloping hills with very well-developed, closed shrub layer and well-developed open tree stratum consisting of *Acacia erioloba* (Mucina & Rutherford, 2006).

Geology and soils: Some Campbell Group dolomite and chert and mostly younger, superficial Kalahari Group sediments, with red wind-blown (0.3 – 1.2 m deep) sand. Locally, rocky pavements are formed in places. Most important land types Ae, Ai, Ag and Ah, with Hutton soil form (Mucina & Rutherford, 2006).

Important taxa: Tall tree: *Acacia erioloba*. Small trees: *Acacia mellifera* subsp. *detinens*, *Boscia albitrunca*. Tall Shrubs: *Grewia flava*, *Lycium hirsutum*, *Tarchonanthus camphoratus*, *Gymnosporia buxifolia*. Low Shrubs: *Acacia hebeclada* subsp. *hebeclada*, *Monechma divaricatum*, *Gnidia polycephala*, *Helichrysum zeyheri*, *Hermannia comosa*, *Pentzia calcarea*, *Plinthus sericeus*. Geoxylic Suffrutex: *Elephantorrhiza elephantina*. Graminoids: *Aristida meridionalis*, *Aristida stipitata* subsp. *stipitata*, *Eragrostis lehmanniana*, *Eragrostis echinochloidea*, *Melinis repens*. Herbs: *Dicoma schinzii*, *Gisekia africana*, *Harpagophytum procumbens* subsp. *procumbens*, *Indigofera daleoides*, *Limeum fenestratum*, *Nolletia ciliaris*, *Seddera capensis*, *Triptaris aghillana*, *Vahlia capensis* subsp. *vulgaris*.

Note: Though some plant species of the above listed vegetation type are present at the site, not necessarily all of the plant species listed above are present at the site.

Most of the site has been cultivated in the past. Areas with noticeable densities of alien invasive *Eucalyptus* trees are found at the central-western and southwestern parts of the site. Few trees and some diversity of grasses and forbs remain at the site.

Terrestrial vegetation at the site is an open savanna with few trees that are taller than shrub-height. Patches of shrub-height *Diospyros lycioides* subsp. *lycioides* are present in some areas. Other indigenous tree species at the site include *Vachellia hebeclada* subsp. *hebeclada*, *Senegalia mellifera* subsp. *detinens* (Black Thorn), *Ziziphus mucronata* (Buffalo-thorn), *Tarchonanthus camphoratus* (Camphor Bush), *Grewia flava* (Velvet Raisin Bush) and *Searsia lancea* (Karee). *Vachellia erioloba* (Camel Thorn) is sparsely distributed across the site. Shrublets such as *Gnidia polycephala*, *Elephantorrhiza elephantina* and *Lycium horridum* are found at the site.

Herbaceous plant species include *Hermannia tomentosa*, *Heliotropium ciliatum*, *Barleria macrostegia*, *Hermbsaedia odorata*, *Gazania krebsiana* and *Acrotome inflata*. Indigenous grass species at the site include *Eragrostis lehmanniana*, *Eragrostis rigidior*, *Eragrostis superba*, *Schmidtia pappophoroides*, *Enneapogon cenchroides* and *Aristida congesta* subsp. *barbicollis*.

Some of the alien invasive weed species at hitherto bare ground or ecologically disturbed areas are *Nicotiana glauca* (Tree Tobacco), *Argemone ochroleuca* (Mexican Poppy), *Schkuhria pinnata* (Dwarf Marigold), *Xanthium spinosum* (Spiny Cocklebur), *Chenopodium album* (White Goosefoot), *Alternanthera pungens* (Paper Thorn) and *Verbesina encelioides* (Wild Sunflower). Conspicuous alien invasive tree species at the site are *Prosopis glandulosa* (Mesquite), *Agave americana* and *Opuntia ficus-indica* (Prickly Pear).

Typical wetland plant species are sparse at a small pan (wetland depression) at the site. The grass species *Cynodon dactylon* (Couch Grass) and the sedge *Scirpoides dioecus* are found at the pan at the site. Encroachment by terrestrial plant species such as the exotic *Opuntia ficus-indica* and *Vachellia hebeclada* subsp. *hebeclada* occurs at the pan (wetland depression).

The Ecological Specialist Concluded in relation to the Flora on site the following:

- Terrestrial vegetation at the site is an open savanna with few trees that are taller than shrub-height. Patches of shrub-height *Diospyros lycioides* subsp. *lycioides* are present in some areas. Other indigenous tree species at the site include *Vachellia hebeclada* subsp. *hebeclada*, *Senegalia mellifera* subsp. *detinens*, *Ziziphus mucronata*, *Tarchonanthus camphoratus*, *Grewia flava* and *Searsia lancea*. *Vachellia erioloba* (Camel Thorn) is sparsely distributed across the site. Some indigenous shrublets, herbaceous plant species and grass species remain at the visibly degraded savanna.
- Alien invasive weed species are conspicuous are hitherto bare ground or ecologically disturbed areas. Noticeable alien invasive tree species at the site are *Prosopis glandulosa* (Mesquite), *Agave americana* and *Opuntia ficus-indica* (Prickly Pear).
- Site appears trampled and overgrazed in many areas. Numerous tracks and some diggings are found at the site. Some old dirt roads at the site are deeply eroded. Numbers of free roaming goats, cattle and donkeys are likely cause of overgrazing. Site is, for large parts, surrounded by settlements, roads, scraped areas and fences. Informal dumping occurs at some parts.
- No Threatened or Near Threatened plant species appear to be present at site.
- None of the protected plant species according to Northern Cape Nature Conservation Act No. 9 of 2009 (Updated in Provincial Gazette No. 1566, December 2011 with date of commencement 1 January 2012) have been found at the site.

- One plant species that is not threatened but listed as Protected tree species (and also Declining species), *Vachellia erioloba* (Camel Thorn) occurs at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.
- If avoidance of any *Vachellia erioloba* (Camel Thorn tree) at the site is not practical, application for a permit to remove the tree would be imperative because in terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.
- The vegetation types representing the Savanna Biome at the site are Kuruman Vaalbosveld (SVk 8) Kuruman Thornveld (SVk 9). Kuruman Vaalbosveld and Kuruman Thornveld are not listed as threatened according to the National List of Threatened Ecosystems (2011).
- Ecological sensitivity at the terrestrial zone of the site is medium. Ecological sensitivity at the two poorly defined narrow non-perennial streambeds and their buffer zones are medium based on their importance to connectivity of watercourses in the larger area .
- Ecological sensitivity is medium-high at the pan (wetland depression) and its buffer zone (30 m). Kindly also see Wetland Assessment report which accompanies this Ecological Habitat Survey Report.
- Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate or low.
- Establishment of exotic weeds should be monitored and exotic weeds at the site should be eradicated. A declared invader such as the mesquite tree (*Prosopis* species), should not be planted or allowed to spread from adjacent areas to the proposed footprint.

8.1.6. FAUNA

ASSESSMENT OF VERTEBRATE SPECIES OF PARTICULARLY HIGH CONSERVATION PRIORITY

Mammals of particular high conservation priority

Threatened mammal species of the North West Province and Northern Cape Province. Literature sources: Friedman & Daly, (2004), Skinner & Chimimba (2005), Wilson & Reeder (2005). With mammal species which normally needs a large range their residential status does not implicate that they are exclusively dependent on the site or use the site as important shelter or for reproduction. No = Not recorded at site/ Unlikely to be resident at the site. Yes: Recorded at the site/ Likely to be resident at the site.

Species	Threatened Status	Site is part of range	Recorded at site during survey	Likely to be found based on habitat assessment

<i>Bunolagus monticularis</i> Riverine Rabbit	Critically Endangered	No	No	No
<i>Chrysothalax villosus</i> Rough-haired golden mole	Vulnerable	No	No	No
<i>Chrysochloris visagiei</i> Visagie's Golden Mole	Critically Endangered	No	No	No
<i>Cryptochloris wintoni</i> De Winton's Golden Mole	Vulnerable	No	No	No
<i>Chrysochloris zyli</i> Van Zyl's Golden Mole	Critically Endangered	No	No	No
<i>Cloeotis percivali</i> Short-eared Trident Bat	Vulnerable/ Near- threatened	No	No	No
<i>Cistugo lesueuri</i> Lesueur's Hairy Bat	Vulnerable	No	No	No
<i>Diceros bicornis</i> Black rhinoceros	Critically Endangered	No	No	No
<i>Eremitalpa granti</i> Grant's Golden Mole	Vulnerable	No	No	No
<i>Felis nigripes</i> Black-footed Cat	Vulnerable	No	No	No
<i>Lycaon pictus</i> African wild dog	Endangered	No	No	No
<i>Loxodonta africana</i> African elephant	Vulnerable	No	No	No
<i>Mystromys albicaudatus</i> White-tailed mouse	Endangered	Yes	No	No
<i>Neamblysomus julianae</i> Juliana's Golden Mole	Critically Endangered	No	No	No
<i>Panthera leo</i> Lion	Vulnerable	No	No	No
<i>Rhinolophus blasii</i> Blasi's Horseshoe Bat	Vulnerable	No	No	No
<i>Smutsia temminckii</i> Ground Pangolin	Near threatened	No	No	No

Near threatened mammal species known to occur in the North West Province and Northern Cape Province. Literature sources: Skinner & Chimimba (2005). No = Not recorded at site/ unlikely to be resident at the site. Yes: Recorded at the site/ Likely to be resident at the site.

Species	Threatened Status	Site is part of range	Recorded at site during survey	Likely to be found based on habitat assessment
<i>Ceratotherium simum</i> White Rhinoceros	Near threatened	No	No	No
<i>Cistugo seabrai</i> Angolan Hairy Bat	Near Threatened	No	No	No
<i>Rhinolophus capensis</i> Cape Horseshoe Bat	Near Threatened	No	No	No

Data deficient (or uncertain) mammal species of the North West Province and Northern Cape Province. Literature sources: Skinner & Chimimba (2005). No = Not recorded at site/ unlikely to be resident at the site. Yes: Recorded at the site/ Likely to be resident at the site.

Species	Threatened Status	Recorded at site during survey	Likely be a resident at the site
<i>Myosorex varius</i> Forest shrew	Uncertain	No	No
<i>Rhinolophus denti</i> Dent's Horseshoe Bat	Data Deficient	No	No

Birds of particular high conservation priority

Threatened bird species of the North West Province and Northern Cape Province. Literature sources Barnes (2000), Hockey, Dean & Ryan, P.G. (2005) and Chittenden (2007). No = Not recorded at site/ Unlikely to use site as breeding area or particular habitat on which the species depends. Yes = Recorded at site/ Likely to use site as breeding area or particular habitat on which the species depends.

Species	Common name	Threatened Status	Recorded at site during survey	Likely to use site as breeding area or habitat
<i>Aegypius tracheliotos</i>	Lappet-faced Vulture	Vulnerable	No	No
<i>Anthropoides paradiseus</i>	Blue Crane	Vulnerable	No	No
<i>Aquila rapax</i>	Tawny Eagle	Vulnerable	No	No
<i>Ardeotis kori</i>	Kori Bustard	Vulnerable	No	No

<i>Balearica regulorum</i>	Grey Crowned Crane (Mahem)	Vulnerable	No	No
<i>Botaurus stellaris</i>	Eurasian Bittern	Critically Endangered	No	No
<i>Calendulauda burra</i>	Red Lark	Vulnerable	No	No
<i>Circus ranivorus</i>	African Marsh- Harrier	Vulnerable	No	No
<i>Crex crex</i>	Corn Crake	Vulnerable	No	No
<i>Eupodotis senegalensis</i>	White-bellied Korhaan	Vulnerable	No	No
<i>Falco naumanni</i>	Lesser Kestrel	Vulnerable	No	No
<i>Geronticus calvus</i>	Southern Bald Ibis	Vulnerable	No	No
<i>Gorsachius leuconotus</i>	White-backed Night-heron	Vulnerable	No	No
<i>Gypaetus barbatus</i>	Bearded Vulture	Endangered	No	No
<i>Gyps africanus</i>	White-backed Vulture	Vulnerable	No	No
<i>Gyps coprotheres</i>	Cape Vulture	Vulnerable	No	No
<i>Neophron percnopterus</i>	Egyptian Vulture	Regionally almost extinct	No	No
<i>Neotis ludwigii</i>	Ludwig's Bustard	Vulnerable	No	No
<i>Pelecanus rufescens</i>	Pink-backed Pelican	Vulnerable	No	No
<i>Polemaetus bellicosus</i>	Martial Eagle	Vulnerable	No	No
<i>Rhynchops flavirostris</i>	African Skimmer	Endangered	No	No
<i>Sagittarius serpentarius</i>	Secretarybird	Vulnerable	No	No
<i>Sarothrura ayresi</i>	White-winged Flufftail	Critically Endangered	No	No
<i>Therathopius ecaudatus</i>	Bateleur	Vulnerable (in South Africa)	No	No
<i>Tyto capensis</i>	African Grass-Owl	Vulnerable	No	No

* Though some of the above bird species that roams over large areas may occasionally be found at the site, the site does not appear to be a habitat of particular importance to these birds, and these birds also do not use the site as breeding area.

Near threatened bird species of the North West Province and Northern Cape Province. Literature sources Barnes (2000), Hockey, Dean & Ryan, P.G. (2005) and Chittenden (2007). No = Not recorded at site/ Unlikely to be particularly dependent on the site as breeding area or habitat. Yes = Recorded at site/ Likely to be particularly dependant on the site as breeding area or habitat.

Species	Common name	Threatened Status	Recorded at site during survey	Likely to use site breeding area or habitat
<i>Buphagus erythrorhynchus</i>	Red-Billed Oxpecker	Near threatened	No	No
<i>Certhilauda chuana</i>	Short-clawed Lark	Near threatened	No	No

<i>Calendulauda barlowi</i>	Barlow's Lark	Near Threatened	No	No
<i>Charadrius pallidus</i>	Chestnut-banded Plover	Near threatened	No	No
<i>Ciconia nigra</i>	Black Stork	Near threatened	No	No
<i>Circus macrourus</i>	Pallid Harrier	Near threatened	No	No
<i>Circus maurus</i>	Black Harrier	Near threatened	No	No
<i>Eupodotis caerulescens</i>	Blue Korhaan	Near threatened	No	No
<i>Falco biarmicus</i>	Lanner Falcon	Near threatened	No	No
<i>Falco peregrinus</i>	Peregrine Falcon	Near threatened	No	No
<i>Glareola nordmanni</i>	Black-winged Pratincole	Near threatened	No	No
<i>Leptoptilos crumeniferus</i>	Marabou Stork	Near threatened	No	No
<i>Mirafra cheniana</i>	Melodious lark	Near threatened	No	No
<i>Mycteria ibis</i>	Yellow-billed Stork	Near threatened	No	No
<i>Pelecanus onocrotalus</i>	Great White Pelican	Near threatened	No	No
<i>Phoenicopterus minor</i>	Lesser Flamingo	Near threatened	No	No
<i>Phoenicopterus ruber</i>	Greater Flamingo	Near threatened	No	No
<i>Rostratula benghalensis</i>	Greater Painted-snipe	Near threatened	No	No
<i>Spizocorys sclateri</i>	Sclater's Lark	Near Threatened	No	No
<i>Sterna caspia</i>	Caspian Tern	Near threatened	No	No

** Though some of the above bird species that roams over large areas may occasionally be found at the site, the site does not appear to be a habitat of particular importance to these birds, and these birds also do not use the site as breeding area.

Reptiles of particular high conservation priority

Threatened reptile species in North West Province and Northern Cape Province. Main Source: (Bates, Branch, Bauer, Burger, Marais, Alexander & de Villiers, 2014). No = Reptile species is not a resident on the site; Yes = Reptile species is found to be resident on the site.

Species	Threatened Status	Resident at site	Recorded at site during survey	Likely to be found based on habitat assessment
<i>Crocodylus niloticus</i> Nile Crocodile	Vulnerable	No	No	No
<i>Homopus signatus</i>	Vulnerable	No	No	No

Speckled Dwarf Tortoise				
<i>Pachydactylus goodi</i> Good's Gecko	Vulnerable	No	No	No
<i>Pachydactylus rangei</i> Namib Web-footed Gecko	Critically Endangered (Regionally)	No	No	No

Near threatened reptile species in North West Province and Northern Cape Province. Main Source: Bates, Branch, Bauer, Burger, Marais, Alexander & de Villiers (2014). Though *Homoroselaps dorsalis* has not yet been recorded from the North West Province, its presence in some areas of the Province is anticipated. No = Reptile species is not a resident on the site; Yes = Reptile species is found to be resident on the site.

Species	Threatened Status	Resident at site	Recorded at site during survey	Likely to be found based on habitat assessment
<i>Cordylus imkeae</i> Rooiberg Girdled Lizard	Near Threatened	No	No	No
<i>Cordylus macropholis</i> Large-scaled Girdled Lizard	Near Threatened	No	No	No
<i>Goggia gemmula</i> Richtersveld Pygmy Gecko	Near Threatened	No	No	No
<i>Homopus boulengeri</i> Karoo Dwarf Tortoise	Near Threatened	No	No	No
<i>Homoroselaps dorsalis</i> Striped Harlequin Snake	Near threatened	No	No	No
<i>Typhlosaurus lomiae</i> Lomi's Blind Legless Skink	Near Threatened	No	No	No

Amphibian species of particular high conservation priority

Threatened amphibian species in Northern Cape Province. Sources: Du Preez & Carruthers (2009), Carruthers & Du Preez (2011). No = Reptile species is not a resident on the site; Yes = Reptile species is found to be resident on the site.

Species	Red Listed Status	Resident at site	Recorded at site during survey	Likely to be found based on habitat assessment
<i>Breviceps macrops</i> Desert Rain Frog	Vulnerable	No	No	No

Near threatened (currently least concern) amphibian species in North West Province and Northern Cape Province. No = Amphibian species is not a resident on the site; Yes = Amphibian species is found to be resident on the site.

Species	Threatened Status	Resident at site	Recorded at site during survey	Likely to be found based on habitat assessment
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<i>Pyxicephalus adspersus</i> Giant Bullfrog	Near threatened (Currently Least Concern)	No	No	No
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ASSESSMENT OF INVERTEBRATE SPECIES OF PARTICULAR HIGH CONSERVATION PRIORITY

Butterflies of particular conservation priority

Threatened butterfly species in North West Province, northern Northern Cape Province and Gauteng Province. Sources: Henning, Terblanche & Ball (2009), Mecenero *et al.* (2013). Invertebrates such as threatened butterfly species are often very habitat specific and residential status imply a unique ecosystem that is at stake.

Species	Threatened Status	Recorded at site during survey	Residential status at the site: Yes confirmed, Highly likely, Likely, Medium possibility, Unlikely, Highly unlikely
<i>Aloeides dentatis dentatis</i> Roodepoort Russet	Endangered	No	Highly unlikely
<i>Anthene lindae</i> Kalahari Hairtail	Vulnerable	No	Unlikely
<i>Chrysochrysis aureus</i> Golden Opal	Endangered	No	Highly unlikely
<i>Chrysochrysis trimeni</i> Diamond Opal	Vulnerable	No	Highly unlikely
<i>Lepidochrysis praeterita</i> Highveld Blue	Endangered	No	Highly unlikely
<i>Orachrysis mijburghi</i> Mijburgh's Blue	Endangered	No	Highly unlikely

Butterfly species of the Gauteng Province, North West Province and Northern Cape Province that are not threatened and not near threatened but of which are of particular conservation concern and listed as **Critically Rare/ Rare/ Data Deficient** category (Mecenero *et al.*, 2013). No = Butterfly species is unlikely to be a resident at the study area; Yes = Butterfly species is a resident at the study area.

Species	Threatened Status	Recorded at site during survey	Residential status at the site: Yes confirmed, Highly likely, Likely, Medium possibility, Unlikely, Highly unlikely
<i>Chrysochrysis beaufortia charlesi</i> Roggeveld Opal	Rare (Restricted Range)	No	Highly unlikely
<i>Chrysochrysis beaufortia stepheni</i> Hantam Mountain Opal	Rare (Habitat Specialist)	No	Highly unlikely

<i>Chrysoritis turneri wykehami</i> Hantam Opal	Rare (Habitat Specialist)	No	Highly unlikely
<i>Chrysoritis violescens</i> Violescent Opal	Rare (Habitat Specialist)	No	Highly unlikely
<i>Colotis celimene amina</i> Lilac Tip	Rare (Low density)	No	Highly unlikely
<i>Lepidochrysops jamesi claassensi</i> Hantamsberg Nimble Blue	Rare (Habitat Specialist)	No	Highly unlikely
<i>Lepidochrysops jamesi jamesi</i> Karoobush Nimble Blue	Rare (Habitat Specialist)	No	Highly unlikely
<i>Lepidochrysops mcgregori</i> Copper-brown Nimble Blue	Rare (Habitat Specialist)	No	Highly unlikely
<i>Lepidochrysops penningtoni</i> Arid Nimble Blue	Data Deficient	No	Highly unlikely
<i>Lepidochrysops procera</i> Savanna Blue	Rare (Habitat specialist)	No	Highly unlikely
<i>Metisella meninx</i> Marsh Sylph	Rare (Habitat specialist)	No	Highly unlikely
<i>Platylesches dolomitica</i> Hilltop Hopper	Rare (low density)	No	Highly unlikely
<i>Pseudonympha southeyi kamiesbergensis</i> Kamiesberg Pepperbrown	Rare (Habitat Specialist)	No	Highly unlikely
<i>Thestor calviniae</i> Calvinia Skolly	Rare (Restricted Range)	No	Highly unlikely
<i>Tuxentius melaena griqua</i> Griqua Black Pie	Data Deficient	No	Highly unlikely

Beetles of particular conservation priority

Fruit chafer species (Coleoptera: Scarabaeidae: Cetoniinae) in the Gauteng Province and North-West Province which are of known high conservation priority.

Species	Threatened Status	Recorded at site during survey	Likely to be resident based on habitat assessment
<i>Ichneustoma stobbiai</i>	Uncertain	No	No
<i>Trichocephala brincki</i>	Uncertain	No	No

Scorpion species of particular conservation priority

Rock scorpion species (Scorpiones: Ischnuridae) species that are of known high conservation priority in the Gauteng Province and North-West Province.

Species	Threatened Status	Recorded at site during survey	Likely to be resident at site based on habitat assessment
<i>Hadogenes gracilis</i>	Uncertain	No	No
<i>Hadogenes gunningi</i>	Uncertain	No	No

8.2 SOCIO ECONOMIC FACTORS

8.2.1 SOCIAL AMENITIES

As in the rest of South Africa, there is a housing shortage in the area. This is totally unacceptable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty. Linking basic services such as water to health is viewed as a false separation as these services are 'intimately related to housing'. It becomes a housing issue if children playing outside the house contract diarrhea via ingesting pathogens from fecal matter which contaminates the land on which they play. Otherwise, it is the house which provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

The development guidelines from the Guidelines for human settlement planning and design were taken into account to develop a sustainable area for people to have job opportunities and public facilities close to home. This will encourage a sustainable community and by implementing these guidelines, will help contribute to the upliftment of the community as a whole.

The proposed development also conforms to the following principals and guidelines for development:

- Correction of historically distorted spatial patters
- Discouragement of land invasion and ensuring equitable access to land
- Discouragement of urban sprawl and the promotion of more compact towns
- Promotion of a diverse combination of land use, also at a detailed level
- Optimization of the use of existing resources, including bulk infrastructure
- Sustainable land development patterns and practices
- Promotion of spatial integration

All of the above conclude that there is a need for residential development, and that the proposed township is favorable by the counsel as well as the community.

During the construction phase, temporary employment will be created. The increased employment in the area during the construction phase will also result in increased expenditure, which, in addition, will mean that more than just the proposed jobs required for the construction on the site will be created due to economic spin-offs that will result.

8.2.2. AIR QUALITY

Air quality will have no influence on the project. The project will however create a certain amount of dust during the construction phase. If proper dust suppression measures are implemented this variable will have very little impact (low in intensity and significance during the construction phase).

8.2.3 NOISE

It is a fact that a certain amount of noise will be generated during the construction phase of the project. Noise levels should however rarely exceed the allowable limits. It is unlikely that the project will create any more noise during the operational phase than that already experienced on site.

8.2.4.1 ARCHAEOLOGY AND CULTURAL SITES

A number of known cultural heritage sites (archaeological and/or historical) exist in the larger geographical area within which the study area falls. There are no known sites on the specific land parcel. Besides a few Stone Age objects identified in one area, no other sites, features or material of cultural heritage (archaeological and/or historical) origin or significance were identified in the study area during the assessment. This includes graves and the ruins of earlier homesteads and related structures.

The Stone Age-related site identified and recorded consisted of a few pieces of flakes and possible core material from which stone tool were manufactured. The objects were found in an area exposed by trenching for a possible pipeline and occur on top of calcrete levels underlying the sands covering the study area. It is therefore possible that similar finds could be situated in undisturbed sections of the development area and that it will get exposed during development activities (such as trenching, the digging of foundations).

In isolation the site and material recorded is not of high significance as the scatter of Stone Age material is not dense and not in situ. However the possibility of in situ deposits and sites do exist and the following is therefore recommended:

“Once the final layout of the proposed township development has been determined and the installation of services (sewerage, water, roads) commences an archaeologist should be contracted to undertake a watching brief so that if any sites or material are exposed by the development activities that the finds can be investigated and recommendations on the way forward be provided.”

It should be noted that although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed as a result of grass cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.

From a cultural heritage point of view the proposed Churchill Township Development can therefore continue, taking cognizance of the above recommendations.

8.2.4.2 PALEONTOLOGICAL DESKTOP STUDY

The entire study area is deeply underlain by rocks of the Precambrian Transvaal Supergroup and more superficially by late Caenozoic wind-blown sand of the Kalahari Group. Dolomites of the Transvaal Supergroup are known to contain fossil stromatolites, and there is a slight, but unlikely, possibility that the unconsolidated wind-blown sand of the Tertiary-Quaternary Kalahari Group could contain fossils.

As the Precambrian Transvaal Supergroup rocks are overlain by thick Tertiary-Quaternary sands and are not exposed in the study area no stromatolites are evident and it is highly unlikely that palaeontological heritage will be affected by the proposed township development. The overlying Caenozoic sediments are not consolidated and it is very unlikely that any fossils will be present.

This desktop study has indicated that no stromatolites are exposed, and if deep excavations are undertaken for the development it could expose fossil stromatolites and could create an opportunity for further study. It is thus recommended that if in the unlikely event that fossils are exposed in the Precambrian Transvaal Supergroup rocks or Caenozoic sediments during the proposed development, a qualified palaeontologist must be contacted to assess the exposure for fossils so that the necessary rescue operations are implemented.

8.2.5 AESTHETICS

Aesthetics have very little influence as the area is already highly disturbed.

9. ENVIRONMENTAL IMPACT ASSESSMENT

9.1 ASSESSMENT CRITERIA

Impacts were rated using the following methodology:

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
Duration (time scale)	Short term	Up to 5 years
	Medium term	6 – 15 years
	Long term	More than 15 years
Extent (area)	Local	Confined to study area and its immediate surroundings
	Regional	Region (cadastral, catchment, topographic)
	National	Nationally (The country)
	International	Neighboring countries and the rest of the world.
Magnitude (Intensity)	Low	Site-specific and wider natural and/or social functions and processes are negligibly altered. ((A low intensity impact will not affect the natural, cultural, or social functions of the environment).
	Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way. (Medium scale impact will alter the different functions slightly).

Nature of the potential impact		Description of the effect, and the affected aspect of the environment
	High	Site-specific and wider natural and/or social functions and processes are severely altered. (A High intensity impact will influence these functions to such an extent that it will temporarily or permanently cease to exist).
Probability	Improbable	Possibility of occurrence is very low. (Such an impact will have a very slight possibility to materialise, because of design or experience).
	Possible	There is a possibility that the impact will occur
	Probable	It is most likely that the impact will occur
	Definite	The impact will definitely occur
Significance	Insignificant	Impact is negligible and will not have an influence on the decision regarding the proposed activity (No mitigation is necessary)
	Very Low	Impact is very small and should not have any meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Low	The impact may not have a meaningful influence on the decision regarding the proposed activity (No mitigation is necessary)
	Medium	The impact should influence the decision regarding the proposed activity (The project can only be carried through if certain mitigatory steps are taken)
	High	The impact will influence the decision regarding the proposed activity
	Very High	The proposed activity should only be approved under special circumstances
Reversibility	Low	There is little chance of correcting the adverse impact
	Medium	There is a moderate chance of correcting the adverse impact
	High	There is a high chance in correcting the adverse impact
Risk	Low	Assessing a risk involves an analysis of the consequences and likelihood of a hazard being realized. In decision-making, low-consequence / low-probability risks (green) are typically perceived as acceptable and therefore only require monitoring.
	Medium	Other risks (amber) may require structured risk assessment to better understand the features that contribute most to the risk. These features may be candidates for management
	High	High-consequence / high-probability risks (red) are perceived as unacceptable and a strategy is required to manage the risk.

Attributes associated with the alternatives were assessed and is outlined below:

Geographical attributes

The Geographical attributes of an area relates to the characteristics of a particular region, area or place. It influences the determination of site alternatives as it relates to the location of a site in relation to relevant features in the area.

Physical attributes

Physical attributes of an area relates to the processes and patterns in the natural environment. For the purpose of this assessment, the following processes and patterns have been investigated. Geology, soil, topography and landforms, climate and meteorology, surface water and ground water.

Biological attributes

Biological attributes for the purpose of this study includes the distribution of species and ecosystems in geographic space and through geological time. Organisms and biological communities often vary in a regular fashion along geographic gradients of latitude, elevation, isolation and habitat area. The two main branches assessed will be:

Phytogeography is the branch of biogeography that studies the distribution of plants.

Zoogeography is the branch that studies distribution of animals.

Social attributes

Social attributes is closely related to social theory in general and sociology in particular, dealing with the relation of social phenomena and its spatial components.

Economic attributes

Economic attributes includes the location, distribution and spatial organization of economic activities and also takes into account social, cultural, and institutional factors in the spatial economy of the development.

Heritage attributes

The broad generic term Cultural Heritage Resources refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of paleontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural attributes

Cultural attributes relates to the specific characteristics such as language, religion, ethnic and racial identity, and cultural history & traditions of people. These attributes influences family life, education, economic and political structures, and, of course, business practices.

It should be noted that the above mentioned attributes do not occur in isolation and it is not uncommon for an identified impact to overlap with two or more of these attributes. Also note, not all risks require comprehensive and detailed assessment. Solid problem formulation should allow decision-makers to evaluate the extent of subsequent analysis required. The level of effort put into assessing each risk should be proportionate to its significance and priority in relation to other risks, as well as its complexity, by reference to the likely impacts. Consideration should be given to stakeholders' perceptions of the nature of the risk.

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
DIRECT IMPACTS:					
Geographical Physical Social Economic	127,5 hectares of indigenous vegetation will be eradicated in order to establish the development. Of this area, 600	Duration	Long term	Obtain the necessary environmental authorization for the development and conduct the Geological Dolomitic Stability Investigation	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)

ALTERNATIVE 1: Mixed land use township (Preferred Alternative)

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)	
	000 square meters of indigenous vegetation situated with an Ecological Support Area and the remainder in 'other natural areas'.	Probability	Definite	Conduct a Fauna and Flora Habitat survey to determine the sensitivity of the area.	Definite	
		Significance	Medium		Medium	
		Reversibility	Low		Low	
		Risk	Low		Medium	
	The protected tree species <i>Vachellia erioloba</i> (Camel Thorn) is found at the site		Extent	Local	In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for	Local
			Magnitude (Intensity)	Medium		Medium
			Probability	Definite		Definite
			Significance	High		High
			Reversibility	Low		Low
			Risk	Medium		Medium
	Plan for the provision of services for the development.		Duration	Long term	Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development.	Long term
			Extent	Local		Local
			Magnitude (Intensity)	High		High
			Probability	Definite		Definite
			Significance	Medium		Medium
			Reversibility	Low		Low
	Risk	Medium	Medium			
	Plan to rehabilitate disturbed surfaces which can lead to erosion and dust pollution. Prepare method statements to this effect.		Duration	Short term	Start the rehabilitation of disturbed surfaces as soon as possible. Spray bare surfaces with water to prevent dust pollution.	Medium term
			Extent	Local		Local
			Magnitude (Intensity)	Low		Medium
Probability			Definite	Definite		
Significance			Medium	Medium		
Reversibility			High	High		
Risk	Low	Medium				
Plan for the eradication of foreign and invader plant species which are likely to invade disturbed areas.		Duration	Short term	Start the extermination of any invasive species as soon as possible and maintain the eradication programme.	Medium term	
		Extent	Local		Local	
		Magnitude (Intensity)	Low		Low	
		Probability	Definite		Definite	
		Significance	Medium		Medium	
		Reversibility	High		High	

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)

ALTERNATIVE 1: Mixed land use township (Preferred Alternative)

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
		Risk	Low		Medium
	Plan for the provision and maintenance of ablation facilities for construction workers to prevent pollution of surface and underground water.	Duration	Short term	Provide portable ablation facilities that will not cause pollution during the construction phase. There should be 1 Chemical toilet for every 30 workers on site.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to manage possible impacts that the project can have on the soil and geology.	Duration	Long term	Properly plan the construction phase in such a manner that impacts on the soil and geology of the area can be minimised. The findings of the Geotechnical Engineer must be incorporated into the design of the project. Plan to prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan for the removal of vegetation (which will lead to the destruction of faunal and floral habitats) during the construction phase.	Duration	Short term	Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants. The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible. No snares may be set.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to safeguard open trenches in order to alleviate the danger of collapse on people or on equipment and people- especially small children who may fall into it.	Duration	Short term	Ensure that the trenches are dug according to specifications as prescribed by the Civil Engineer. Ensure that the trenches stay open for as short a time as possible. Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
Indirect impacts:					
Geographical Physical Social Economic	Plan to control dust generation from the proposed project which could impact on the surrounding area.	Duration	Short term	Spray water on open surfaces to ensure that dust does not cause air pollution during construction. Start the rehabilitation of disturbed surfaces as soon as possible	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
		Extent	Local		Local

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)

ALTERNATIVE 1: Mixed land use township (Preferred Alternative)

Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
	Plan and compile method statements to implement measures for the prevention and or handling of spills of lubricants / oils that can take place on bare soil.	Magnitude (Intensity)	Low	Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to provide method statements on the handling of waste materials such as glass, plastic, metal or paper which may present a possible pollution hazard	Extent	Local	Implement the management plan to ensure that: All construction rubble is disposed of in a safe and environmentally acceptable manner. NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase. All cement is housed as to prevent spills (due to rain and or handling errors). NO glass, plastic, metal, or paper shall be allowed to pollute the area.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
	Risk	Low	Medium		
	Plan to ensure all involved is aware of the possible social and environmental problems that may be experienced as a result of non- compliance to the relevant legislation.	Extent	Local	Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act. Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
	Risk	Low	Medium		
	Plan to create new employment opportunities. Plan to use local labour to ensure local skills development will take place.	Extent	Local	No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
Significance		Medium	Medium		
Reversibility		Medium	Medium		
Risk	Low	Medium			
Cumulative impacts:					
Geographical Physical Social Economic	Plan the development to ensure the social well-being of the community for which the development is intended	Extent	Local	Ensure that the development is constructed as planned. The demand for housing will be partially addressed in the area.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
	Risk	Low	Medium		
	Plan to ensure that the services (Solid waste, bulk water supply water, sewage,	Extent	Local	Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development.	Local
		Magnitude (Intensity)	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
	electricity and storm water) are designed and constructed in such a manner that it will not cause Environmental degradation.	Probability	Definite	Ensure that the development is constructed as planned.	Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low		Medium
	Plan for the increase in traffic volumes that will result from the proposed development	Extent	Local	The Town and Regional Planner will have to design the layout of the development in such a way that accessibility will not become a problem.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		High
		Reversibility	Low		Low
		Risk	Medium		Medium
	Loss of indigenous vegetation.	Extent	Local	No mitigation measures possible.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
Risk		Medium	Medium		

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 2: Single land use: Housing only					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
DIRECT IMPACTS:					
Geographical Physical Social Economic	127.5 hectares of indigenous vegetation will be eradicated in order to establish the development. Of this area, 600 000 square meters of indigenous vegetation situated with an Ecological Support Area and the remainder in 'other natural areas'.	Duration	Long term	Obtain the necessary environmental authorization for the development and conduct the Geological Dolomitic Stability Investigation	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Low		Medium
	The protected tree species <i>Vachellia erioloba</i> (Camel Thorn) is found at the site	Extent	Local	In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium
		Extent	Local		Local

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 2: Single land use: Housing only					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
				person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. If developments are approved, such a permit should be applied for	
	Plan for the provision of services for the development.	Duration	Long term	Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Medium		Medium
	Plan to rehabilitate disturbed surfaces which can lead to erosion and dust pollution. Prepare method statements to this effect.	Duration	Short term	Start the rehabilitation of disturbed surfaces as soon as possible.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low	Spray bare surfaces with water to prevent dust pollution.	Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan for the eradication of foreign and invader plant species which are likely to invade disturbed areas.	Duration	Short term	Start the extermination of any invasive species as soon as possible and maintain the eradication programme.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan for the provision and maintenance of ablation facilities for construction workers to prevent pollution of surface and underground water.	Duration	Short term	Provide portable ablation facilities that will not cause pollution during the construction phase.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to manage possible impacts that the project can have on the soil and geology.	Duration	Long term	Properly plan the construction phase in such a manner that impacts on the soil and geology of the area can be minimised.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite	The findings of the Geotechnical Engineer must be incorporated into the design of the project.	Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
					Plan to prevent spills of lubricants/oils that can take place on bare soil. This

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 2: Single land use: Housing only					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
				will include the use of drip trays for vehicles that are standing for more than 24 hours. The findings of the Geotechnical Engineer must be incorporated into the design of the project. Plan to prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	
	Plan for the removal of vegetation (which will lead to the destruction of faunal and floral habitats) during the construction phase.	Duration	Short term	Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants. The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible. No snares may be set.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to safeguard open trenches in order to alleviate the danger of collapse on people or on equipment and people- especially small children who may fall into it.	Duration	Short term	Ensure that the trenches are dug according to specifications as prescribed by the Civil Engineer. Ensure that the trenches stay open for as short a time as possible. Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
Indirect impacts:					
Geographical Physical Social Economic	Plan to control dust generation from the proposed project which could impact on the surrounding area.	Duration	Short term	Spray water on open surfaces to ensure that dust does not cause air pollution during construction. Start the rehabilitation of disturbed surfaces as soon as possible	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan and compile method statements to implement measures for the prevention and or handling of spills of lubricants / oils that can take place on bare soil.	Extent	Local	Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours. Ensure that all construction vehicles are in good working order and not leaking oil and or fuel. No vehicles may be serviced on site.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Plan to provide method statements on the handling of waste materials such as glass, plastic, metal or paper which	Extent	Local	Implement the management plan to ensure that:	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)						
ALTERNATIVE 2: Single land use: Housing only						
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)	
	may present a possible pollution hazard	Significance	Medium	All construction rubble is disposed of in a safe and environmentally acceptable manner. NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase. All cement is housed as to prevent spills (due to rain and or handling errors). NO glass, plastic, metal, or paper shall be allowed to pollute the area.	Medium	
		Reversibility	High		High	
		Risk	Low		Medium	
	Plan to ensure all involved is aware of the possible social and environmental problems that may be experienced as a result of non-compliance to the relevant legislation.	Extent	Local		Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act. Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).	Local
		Magnitude (Intensity)	Medium			Medium
		Probability	Probable			Probable
		Significance	Medium	Medium		
		Reversibility	High	High		
	Risk	Low	Medium			
	Plan to create new employment opportunities. Plan to use local labour to ensure local skills development will take place.	Extent	Local	No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.	Local	
		Magnitude (Intensity)	Medium		Medium	
		Probability	Definite		Definite	
		Significance	Medium		Medium	
		Reversibility	Medium		Medium	
	Risk	Low	Medium			
	Cumulative impacts:					
	Geographical Physical Social Economic	Plan the development to ensure the social well-being of the community for which the development is intended	Extent	Local	Ensure that the development is constructed as planned. The demand for housing will be partially addressed in the area.	Local
			Magnitude (Intensity)	Medium		Medium
Probability			Definite	Definite		
Significance			Medium	Medium		
Reversibility			Medium	Medium		
Risk			Low	Medium		
Plan to ensure that the services (Solid waste, bulk water supply water, sewage, electricity and storm water) are designed and constructed in such a manner that it will not cause Environmental degradation.		Extent	Local	Appoint a Civil Engineer to assess the availability and design of services to ensure a sustainable development. Ensure that the development is constructed as planned.	Local	
		Magnitude (Intensity)	Medium		Medium	
		Probability	Definite		Definite	
		Significance	High		High	
		Reversibility	High		High	
Risk		Low	Medium			
Plan for the increase in traffic volumes that will result from the proposed development		Extent	Local	The Town and Regional Planner will have to design the layout of the development in such a way that accessibility will not become a problem.	Local	
		Magnitude (Intensity)	Medium		Medium	
		Probability	Definite		Definite	
		Significance	Medium		High	
		Reversibility	Low		Low	

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 2: Single land use: Housing only					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
	Loss of indigenous vegetation.	Risk	Medium	No mitigation measures possible.	Medium
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 3: (No-Go Option)					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
DIRECT IMPACTS:					
Geographical Physical Social Economic Cultural	No indigenous vegetation will be removed.	Duration	Long term	No mitigation measures required.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium
	No impact on the watercourses in the area.	Duration	Long term	No mitigation measures required.	Long term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium
Indirect impacts:					
Geographical Physical Social Economic Cultural	No new employment opportunities will be created during the planning and design phase. No skills enhancement will take place If this option is implemented, the projected boost to the local and regional economy will not take place.	Extent	Local	Ensure that the development is constructed and operated as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	High		High
Cumulative impacts:					
Geographical Physical Social Economic Cultural	If this option is implemented, the projected boost to the local and regional economy will not take place.	Extent	Local	Ensure that the development is constructed and operated as planned.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High

ENVIRONMENTAL IMPACT ASSESSMENT (Planning and design phase)					
ALTERNATIVE 3: (No-Go Option)					
Environmental Attribute	Potential impacts and risks	Assessment criteria	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
	No new employment opportunities will be created. No improvement to local skills development will take place. No broadened Tax base for the Lesedi Local Municipality .	Reversibility	High		High
		Risk	Medium		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute
DIRECT IMPACTS:					
Geographical Physical Social Economic	127.5 hectares of indigenous vegetation will be eradicated in order to establish the development. Of this area, 600 000 square meters of indigenous vegetation situated with an Ecological Support Area and the remainder in 'other natural areas'.	Duration	Long term	Implement the mitigation measures as described in the Environmental Management Plan and the Geological Dolomitic Stability Investigation's Findings	Long term
		Extent	Local		Local
		Magnitude (Intensity)	High		High
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Low		Low
		Risk	Low		Medium
	Un-rehabilitated, disturbed surfaces can lead to erosion and dust pollution.	Duration	Short term	Start the rehabilitation of disturbed surfaces as soon as possible. Spray bare surfaces with water to prevent dust pollution.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Foreign plant species are likely to invade disturbed areas.	Duration	Short term	Start the extermination of any invasive species as soon as possible and maintain the eradication programme.	Medium term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Poorly planned ablution facilities for construction workers may cause pollution of surface and underground water.	Duration	Short term	Provide portable ablution facilities that will not cause pollution during the construction phase.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
The proposed project can impact on the soil and geology.	Duration	Long term	Implement the findings of the Geo-Technical Engineer.	Long term	
	Extent	Local		Local	
	Magnitude (Intensity)	Low		Medium	

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)

ALTERNATIVE 1: Mixed land use township (Preferred Alternative)

Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute
		Probability	Definite	Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	The vegetation of the area will be removed during the construction phase, which will destroy floral and faunal habitats.	Duration	Short term	Start with the rehabilitation of vegetation to minimize the negative effects of the removal of plants.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite	The rule must be to minimize the disturbance of animal life by keeping the footprint as small as possible.	Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Open trenches can be dangerous as they can either collapse on people or on equipment and people- especially small children, can fall into them.	Duration	Short term	Ensure that the trenches are dug according to specifications as prescribed by the Civil Engineer.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite	Ensure that the trenches stay open for as short a time as possible.	Definite
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
				Ensure that open trenches are demarcated as required by the Occupational Health and Safety Act.	

Indirect impacts:

Geographical Physical Social Economic	Dust generation from the proposed project could impact on the surrounding area.	Duration	Short term	Spray water on open surfaces to ensure that dust does not cause air pollution during construction.	Short term
		Extent	Local		Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable	Start the rehabilitation of disturbed surfaces as soon as possible	Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Spills of lubricants / oils can take place on bare soil.	Extent	Local	Prevent spills of lubricants/oils that can take place on bare soil. This will include the use of drip trays for vehicles that are standing for more than 24 hours.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium	Medium	
		Reversibility	High	High	
		Risk	Low	Medium	

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)

ALTERNATIVE 1: Mixed land use township (Preferred Alternative)

Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute
				Ensure that all construction vehicles are in good working order and not leaking oil and or fuel. No vehicles may be serviced on site.	
	Waste materials such as glass, plastic, metal or paper present a possible pollution hazard	Extent	Local	Implement the management plan to ensure that: All construction rubble is disposed of in a safe and environmentally acceptable manner. NO concrete, gravel or other rubbish will be allowed to remain on site after the construction phase. All cement is housed as to prevent spills (due to rain and or handling errors). NO glass, plastic, metal, or paper shall be allowed to pollute the area.	Local
		Magnitude (Intensity)	Low		Low
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	Non-compliance to the relevant legislation may cause social and environmental problems.	Extent	Local	Ensure that contractors (construction phase) abide by all the requirements of the Occupational Health and Safety Act. Ensure that all contractors are aware of the consequences of non-compliance to the relevant legislation regarding the above-mentioned act as well as with regard to the environment (acts, regulations, and special guidelines).	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Probable		Probable
		Significance	Medium		Medium
		Reversibility	High		High
		Risk	Low		Medium
	New employment opportunities will be created. Local skills development will take place.	Extent	Local	No mitigation measures needed apart from the fact that contractors will have to ensure that they abide to the requirements of the Occupational Health and Safety Act and the Employment Equity Act.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium

ENVIRONMENTAL IMPACT ASSESSMENT (Construction phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute	Environmental Attribute
Cumulative impacts:					
Geographical Physical Social Economic	Enhancement of the social well-being of the local communities for which the development is intended	Extent	Local	Ensure that the development is constructed as planned. The demand for housing will be partially addressed in the area.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		Medium
		Reversibility	Medium		Medium
		Risk	Low		Medium
	Solid waste: The proposed development will add additional solid waste into the existing waste stream of the Local Municipality. Sewage: The proposed development will add additional sewage into the existing sewage stream of the Local Municipality. Water supply: The proposed development will add pressure to the water supply of Local Municipality's Water.	Extent	Local	Ensure that the development is constructed as planned by the Civil Engineer.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Low		Medium
	Traffic: The proposed development will result in an increase in traffic in the immediate surroundings of the proposed development.	Extent	Local	Ensure that the development is constructed as planned by the Town and Regional Planner	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium		High
		Reversibility	Low		Low
		Risk	Medium		Medium
	Indigenous vegetation will be removed.	Extent	Local	No mitigation measures possible.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	Low		Low
		Risk	Medium		Medium
		Extent	Local		Local

ENVIRONMENTAL IMPACT ASSESSMENT (Operational Phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	Environmental Attribute	Environmental Attribute	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
DIRECT IMPACTS:					
Geographical Physical Social Economic Cultural	Poorly maintained and serviced infrastructure may cause environmental problems. Dolomitic Stability	Extent	Local	It will be the responsibility of the Local Municipality to maintain the infrastructure. Monitor Dolomitic Stability as	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium- high		High

ENVIRONMENTAL IMPACT ASSESSMENT (Operational Phase)					
ALTERNATIVE 1: Mixed land use township (Preferred Alternative)					
Environmental Attribute	Environmental Attribute	Environmental Attribute	Assessment rating (With mitigation)	Proposed mitigation	Assessment rating (Without mitigation)
		Reversibility	High	described in the Geological Dolomitic Stability Report Recommendations	Medium
		Risk	High		High
Indirect impacts:					
Geographical Physical Social Economic Cultural	Lack of rehabilitation may cause problems	Extent	Local	It will be the responsibility of the Local Municipality to ensure that the rehabilitation plan is implemented	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	Medium- high		High
		Reversibility	High		Medium
		Risk	High		High
Cumulative impacts:					
Geographical Physical Social Economic Cultural	Enhancement of the social well-being of the local communities for which the development is intended	Extent	Local	No mitigation measures required.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Medium		Medium
Geographical Physical Social Economic Cultural	Broadened tax base: The proposed development will generate more income for the Local Municipality .	Extent	Local	No mitigation measures required.	Local
		Magnitude (Intensity)	Medium		Medium
		Probability	Definite		Definite
		Significance	High		High
		Reversibility	High		High
		Risk	Medium		Medium

10. PUBLIC PARTICIPATION
10.1 ADVERTISEMENT AND NOTICE

Publication name	Stellalander	
Date published	13/01/2021	
Site notice position	27°17'6.50"S	23°28'45.33"E
	27°17'31.05"S	23°26'45.61"E
Date placed	08/12/2020	

Police tighten grip during operation

Stellalander-Kuruman - The Northern Cape Police yielded overwhelming results in all five policing districts during the Festive Season Operation.

Strategical police deployments were done in John Thole Gasetsewa, Puxley Ka Sema, Frances Baard, Namakwa, and ZF Mgcawu.

Senior police management including junior members was on the ground to ensure that public members adhere to the Covid-19 Disaster Management Regulation Act.

According to police, no stores were left unarmoured as parks were continuously visited and inspected for compliance.

Static roadblocks, vehicle checkpoints, stop, and searches were also conducted.

During roadblocks and vehicle checkpoints, motorists were stopped and searched for illegal transportation of alcohol, illegal firearms, illicit goods, and stolen livestock. Also to ensure that vehicles traveling on the public roads were roadworthy and the drivers were not driving while under the influence of alcohol.

Compliance inspections were also conducted on tuck-shops, second-hand goods dealers, taverns and shut down shebeens.

*Several shebeens and taverns were closed down and owners were arrested for

breaching the Adjusted Level three LockDown Regulations.

*Fines were issued to 100 persons who failed to confine themselves to their residence between 21:00 and 06:00 curfew hours including

*Fines issued to those who failed to wear a face in public spaces.

*More than six persons were arrested after being found to be in possession or transporting liquor or illegally dealing in liquor.

*Several illegal religious, social, cultural gatherings were diffused as any gathering of any sort is not allowed during Adjusted Level three LockDown Regulations;

*Firecrackers were confiscated as compliance inspections were conducted to ensure that no retailers were selling or dealing in firecrackers whilst not in possession of valid permits. The Acting Provincial Commissioner of the Northern Cape, Major General De Wael commended operational members for displaying a high level of dedication during this time of the season.



Vullisterrein bly seeroog

Die vullisterrein op die Taungpad net buite Vryburg. Dit is die prentjie wat motoriste van buite sien wanneer hulle na of van Vryburg reis. Dit is duidelik dat vullis nie na binne geneem word waar dit veronderstel is om afgelaai te word nie. Dit word slegs 'n paar meter van die hoofpad afgelaai. Volgens persone wat die terrein gereeld besoek is dit oorvol en is daar geen omdraai spasie vir voertuie nie. Kinders wat in die omgewing bly, speel glo ook op die vullishope, en gaan deur die dat rommel die wêreld vol waai. (Foto: Verskaf)

Man wat meisie beroof, aangekeer



(Foto: Verskaf)

Stellalander-Delareyville - Tankombong Methobi (21), Matimba Mmokra (18) en 'n 17-jarige beskuldigde het in die plaaslike laandroef hier verskyn op aanklag van gewone roof.

Die hoërverkyning het op 31 Desember plaasgevind. Methobi staan tereg op 'n bykomende klag van die besit van 'n ongelisensieerde vuurwapen en ammunisie. Die beskuldigdes het in aanhouding gebly en daarna weer op 4 Januarie in die hoërverkyning. Volgens die polisie het die verdagtes na bewysing 'n 17-jarige meisie, van haar selfoon beroof terwyl sy saam met haar broer huis toe gelaap het. Die meisie se haar broer is glo met 'n mes gedreig. Methobi is bekend aan die broer van die meisie. Lt gen Sallo Kwana het die polisie vir hul ywer bedank. Hy blytans die publiek weer aan die ammenesiedepark vir vuurwapens wat op 31 Januarie in die hande is.

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIR AND SCOPING)
DENC REF. NO: NC/EIA/19/JTG/JOE/MOT1/2020

Notice is hereby given of an Environmental Impact Assessment Process to be conducted. This process will be undertaken in terms of Section 24(M) and 44 made under section 24(5) of the National Environmental Management Act (Act No. 107 of 1998) (Amended Regulations promulgated on 07 April 2017). The proposed project is classified as, and will be conducted in terms of Government Notice No. R.326 of 2017 (Government Notice No. R.325 Laying Notice 2; Activity no 15). This advertisement complies with the instructions regarding such notices. National Environmental Management Act (Act No. 107 of 1998, as amended) (Amended Regulations promulgated on 17 April 2017) (Government Notice No. R.326 of 2017) (Regulation 41(2)(c)(d)). The competent authority is the Northern Cape Province Department: Environment and Nature Conservation and the responsible officer is: Ms. N Makonopi. Tel: 053 773 1239.

PROJECT NAME:
 Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchil 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

PROJECT DESCRIPTION:
 The proposed clearance of 127.5 ha of indigenous vegetation, to establish a mixed use township (consisting of residential, business, community facility, sports field, primary school, church, crèches and parks).

CLIENT:
 Joe Morolong Local Municipality

CONSULTANT AND CONTACT PERSON:
 Mrs. J.E. (Hannie) Du Plooy of AB Enviro Consult cc.
 7 Louis Leipoldt Street, Potchefstroom, 2531
 Tel: 071 202 4027
 Fax: 018 293 0671
 E-mail: hannieduplooy@abenviro.co.za

Parties wishing to formally object to and / or comment on the proposed development are requested to forward their objections and comments (with reasons) to AB Enviro Consult, no later than 14th February 2021. An electronic copy of the draft Scoping Report is also available from AB Enviro Consult on request.

BONSMARA
Kanteelweiding

omgebied deur Mara Plase Boardery van Freddie MacDonald
3 FEBRUARIE 2021
 11h00 in Piet Theron Volingskampies, Vryburg skoupronde

AANBOD: 760 Aanteeldiere
 200+200 Koeie en kalwers
 100 Draughte koeie
 100 Draughte verse
 100 Dyp verse
 60 Charolais kruis vrugtelike diere
 8 Jong Charolais bulle

HAVRAE:
 KAROO-OSKSE + 053 927 2311
 WINDU OSKSE + 053 213 0838
 WINDU WEDDINGS/VERBODINGS +053 200 1239

Karoo-Oskse
 VRYBURG: 053 927 2311

WINDU
 WINDU WEDDINGS/VERBODINGS +053 200 1239

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
(EIR AND SCOPING)

DENC REF. NO: NC/EIA/19/JTG/JOE/MOT1/2020

Notice is hereby given of an Environmental Impact Assessment Process to be conducted. This process will be undertaken in terms of Section 24(M) and 44 made under section 24(5) of the National Environmental Management Act (Act No. 107 of 1998) (Amended Regulations promulgated on 07 April 2017). The proposed project is classified as, and will be conducted - in terms of Government Notice No. R.326 of 2017 (Government Notice No. R.325 Listing Notice 2; Activity no 15). This advertisement complies with the instructions regarding such notices, National Environmental Management Act (Act No. 107 of 1998, as amended) (Amended Regulations promulgated on 17 April 2017) (Government Notice No. R.326 of 2017) (Regulation 41(2)(c)(d)). The competent authority is the Northern Cape Province Department: Environment and Nature Conservation and the responsible officer is: Ms. N Mokonopi; Tel: 053 773 1239.

PROJECT NAME:

Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

PROJECT DESCRIPTION:

The proposed clearance of 127.5 ha of indigenous vegetation, to establish a mixed use township (consisting of residential, business, community facility, sports field, primary school, church, crèches and parks)

CLIENT:

Joe Morolong Local Municipality

CONSULTANT AND CONTACT PERSON:

Mrs. J.E. (Hannie) Du Plooy of AB Enviro Consult cc.
7 Louis Leipoldt Street, Potchefstroom, 2531

Tel: 071 202 4027

Fax: 018 293 0671

E-mail: hannieduplooy@abenviro.co.za

Parties wishing to formally object to and / or comment on the proposed development are requested to forward their objections and comments (with reasons) to AB Enviro Consult, no later than 14th February 2021. An electronic copy of the draft Scoping Report is also available from AB Enviro Consult on request.

PROOF OF PUBLIC PARTICIPATION IN LINE WITH COVID-19 PROTOCOL (SANITIZATION, MASK AND GLOVES):



ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (EIA AND SCOPING)
DENC REF. NO. NCIEN/INT/GOJEN/02/2021

is hereby given an Environmental Impact Assessment Process to be conducted in accordance with the provisions of the Environmental Impact Assessment Act (Act No. 107 of 1996) (Amended Regulation No. 412/2017) promulgated on 17 April 2017. The proposed project is classified as a Category 2 Activity in terms of Government Notice No. R.125 of 2017. The advertisement complies with the instructions regarding the Environmental Impact Assessment process promulgated on 17 April 2017 (Government Notice No. R.125 of 2017) and (Kjaka). The competent authority is the Northern Cape Province Department of Environment and Nature Conservation and the responsible officer is M. Mokoena; Tel: 051 773 1239

PROJECT NAME:
 Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township subdivision to be located on a Portion of the remaining extent of the Farm Church 211-188 and a Portion of the remaining extent of Portion 2 of the Farm No. 213-188, Joe Mooking Local Municipality, Northern Cape Province.

PROJECT DESCRIPTION:
 The proposed clearance of 127.5 ha of indigenous vegetation, to establish a mixed-use township (consisting of residential, business, community facility, sports field, primary school, church, vetshop and parks).

CLIENT:
 Joe Mooking Local Municipality

CONSULTANT AND CONTACT PERSON:
 Mrs. J.S. Mokoena (in Place of Mr. Edwin Mokoena)
 7 Louis Lapaard Street, Post Office Box 2521
 Tel: 051 862 8677
 Fax: 051 862 8677
 Email: mokoena@joe-mooking.co.za

Further writing to formally object to and/or comment on the proposed development are required to forward their objections and comments with evidence to the Northern Cape Province Department of Environment and Nature Conservation in the event of a dispute.
 Date of the Notice: 07 December 2020

10.2 DETERMINATION OF APPROPRIATE MEASURES

Details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN R.982.

Key stakeholders (other than organs of state) identified in terms of Regulation 40(2)(d) of GN R.982:

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
N/A	Neighbour	See photo evidence

PROOF OF COVID-19 APPROVED PUBLIC PARTICIPATION PROTOCOLS AS WELL AS PROOF OF LETTER DROP:







10.3 AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders. Key stakeholders identified in terms of Regulation 7(1) and (2) and Regulation 40(2) (a)-(c) of GN R.982:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
Department of Water and Sanitation Northern Cape	Abe Abrahams	(053) 836 7600	053 842 3258		28 Central Road Beaconsfield KIMBERLY 8300
Northern Cape Department of Agriculture and Land Reform and Rural Development	HOD, Mr. V. Mothibi	(053) 838 9118	(053) 831 3635	cfortune@agri.ncpg.gov	Private Bag X5018, Kimberley 8300
Northern Cape Department of Environment and Nature Conservation	Mr. Dewald Badenhorst Biodiversity Management services	(053) 807 7300	(053) 807 7367		Private Bag X6120 Kimberley 8301
Northern Cape Department of Agriculture, Forestry and Fisheries	Mrs. J Mans	(054) 338 5860	(054) 338 0030		P.O. Box 2782, Upington 8800
John Taolo Gaetsewe District Municipality	The District Municipal Manager:	053 712 8700	053 712 2502		PO Box 1480, Kuruman, 8460
Joe Morolong Local Municipality	The Municipal Manager:	053 773 9300	053 773 9350		Private Bag X117, Mothibistad, 8474
Joe Morolong Local Municipality	The councilor ward 7	053 773 9300	053 773 9350		Private Bag X117, Mothibistad, 8474
SAHRA	SAHRIS				

List of REGISTERED LETTERS
Lys van GEREGISTREERDE BRIEWE
 (with an insurance option/met 'n versekeringsopsie)



Full tracking and tracing/Volledige volg en spoor

Name and address of sender: F B Enviro Consult CC
 Naam en adres van afsender: F B Enviro Consult CC
7 Louis Leipoldt Street
Potchesström 2531

Enquiries/Navrae
 Sharecall
 number/nommer
0860 111 502
 www.postoffice.co.za

No	Name and address of addressee Naam en adres van geadresseerde	Insured amount Versekerde bedrag	Insurance fee Versekeringsgeld	Postage Posgeld	Service fee Diensgeld	Affix Track and Trace customer copy Plak Volg-en-Spoor-Kliëntafskrif INSURED PARCEL ShareCall 0860 111 502 www.postoffice.co.za
1	John Tsolo Gasewe District Man. The District Mun. Man. P.O. Box 1480, Kuruman					PA542693814ZA CUSTOMER COPY 301012
2	Joe Morolong Local Municipal. The Council of Ward 7 Mothibistad S47H					INSURED PARCEL ShareCall 0860 111 502 www.postoffice.co.za PA542693828ZA CUSTOMER COPY 301012
3	Joe Morolong Local Municipality The Mun. Manager. Mr. Tshapo Mac Private Bag X 117 Mothibistad S47H					INSURED PARCEL ShareCall 0860 111 502 www.postoffice.co.za PA542693831ZA CUSTOMER COPY 301012
4	Donald Pleasant Rural Development H.O.D. Mr. V. Mothibistad Private Bag X 2019, M.M. Berley S300					INSURED PARCEL ShareCall 0860 111 502 www.postoffice.co.za PA542693845ZA CUSTOMER COPY 301012
5	N.C. Dept. of Environment and Nature Conservation Biodiversity Management services. P.O. Devald Badenhorst Private Bag A 126 Kimberley S301					INSURED PARCEL ShareCall 0860 111 502 www.postoffice.co.za PA542693859ZA CUSTOMER COPY 301012
6	N.C. Dept. of Agriculture Forestry and Fisheries P.O. J. Mins P.O. Box 2152 Upington, 9800.					INSURED PARCEL ShareCall 0860 111 502 www.postoffice.co.za PA542693862ZA CUSTOMER COPY 301012
7						
8						
9						
10						

Number of letters posted 6/5/19 Total
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 Handtekening van klient.....

Signature of accepting officer
 Handtekening van aanneembeampte.....



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AB ENVIRO-CONSULT CC

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hannieduplooy@abenviro.co.za

09/12/2020

Department of Water and Sanitation
Regional Chief Director: Northern Cape
Mr Abe Abrahams
28 Central Rd,
Beaconsfield,
Kimberley,
8315
Tel: (053) 830 8800/6 7600

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

AB ENVIRO CONSULT was appointed by Joe Morolong Local Municipality to submit an application to the Northern Cape Province Department: Environment and Nature Conservation for the above mentioned proposed development.

Attached please find a notification of the proposed development as well as a copy of the draft Scoping report for your comments. We must receive your comments no later than the 29th January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

PROF A B DE VILLIERS (M Sc, Ph D, JCD, SACNASP)
MR.J.P. DE VILLIERS (M Sc, HED, EAP-EAPASA); MRS.J.E. DU PLOOY (M.E.M; EAP-EAPASA)



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09/12/2020

Northern Cape Department of Agriculture and Land Reform and Rural Development
HOD, Mr. V. Mothibi
Private Bag X5018
Kimberley
8300

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

AB ENVIRO CONSULT was appointed by Joe Morolong Local Municipality to submit an application to the Northern Cape Province Department: Environment and Nature Conservation for the above mentioned proposed development.

Attached please find a notification of the proposed development as well as an electronic copy of the draft Scoping report for your comments. We must receive your comments no later than the 29th January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

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MR.J.P. DE VILLIERS (M Sc, HED, EAP-EAPASA); MRS.J.E. DU PLOOY (M.E.M; EAP-EAPASA)



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Cell: + 27 (83) 5488 105
E-mail: jp@abenviro.co.za

22/06/2018

**Northern Cape Department of Environment and Nature conservation
Biodiversity Management services
Mr. Dewald Badenhorst
Private Bag X6120
Kimberley
8301**

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 380,8600 ha of indigenous vegetation in order to establish a township which will also include the establishment of a cemetery on Portion 1 and 2 of the farm Kalahari Gholf en Jag Landgoed No. 775 (to be known as Kathu Extension 6), Gamagara Local Municipality, Northern Cape Province

AB ENVIRO CONSULT was appointed by **Gamagara Local Municipality** to submit an application to the Northern Cape Province Department: Environment and Nature Conservation for the above mentioned proposed development.

Attached please find a notification of the proposed development as well as an electronic copy of the draft Scoping report for your comments. We must receive your comments within a period of 30 days from the date of this letter. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

PROF A B DE VILLIERS (M Sc, Ph D, JCD, Pr Sci Nat, EAP-EAPSA)
MR.J.P. DE VILLIERS (M Sc,HED, IAIA); MRS.J.E. DU PLOOY (M.E.M)



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hannieduplooy@abenviro.co.za

09/12/2020

Northern Cape Department of Agriculture, Forestry and Fisheries
FAO: J. Mans
P.O. Box 2782
Upington
8800

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

AB ENVIRO CONSULT was appointed by Joe Morolong Local Municipality to submit an application to the Northern Cape Province Department: Environment and Nature Conservation for the above mentioned proposed development.

Attached please find a notification of the proposed development as well as an electronic copy of the draft Scoping report for your comments. We must receive your comments no later than the 29th January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

PROF A B DE VILLIERS (M Sc, Ph D, JCD, SACNASP)
MR.J.P. DE VILLIERS (M Sc, HED, EAP-EAPASA); MRS.J.E. DU PLOOY (M.E.M: EAP-EAPASA)



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hanneduplooy@abenviro.co.za

09/12/2020

John Taolo Gaetsewe District Municipality
The District Municipal Manager
PO Box 1480
Kuruman
8460

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

AB ENVIRO CONSULT was appointed by Joe Morolong Local Municipality to submit an application to the Northern Cape Province Department: Environment and Nature Conservation for the above mentioned proposed development.

Attached please find a notification of the proposed development as well as an electronic copy of the draft Scoping report for your comments. We must receive your comments no later than the 29th January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

PROF A B DE VILLIERS (M Sc, Ph D, JCD, SACNASP)
MR.J.P. DE VILLIERS (M Sc, HED, EAP-EAPASA); MRS.J.E. DU PLOOY (M.E.M: EAP-EAPASA)



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09/12/2020

Joe Morolong Local Municipality
The Municipal Manager: Mr Tshepo Mac Donald Bloom
Private Bag X117
Mothibistad
8474

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

AB ENVIRO CONSULT was appointed by **Joe Morolong Local Municipality** to submit an application to the Northern Cape Province Department: Environment and Nature Conservation for the above mentioned proposed development.

Attached please find a notification of the proposed development as well as an electronic copy of the draft Scoping report for your comments. We must receive your comments no later than the 29th January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

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PROF A B DE VILLIERS (M Sc, Ph D, JCD, SACNASP)
MR.J.P. DE VILLIERS (M Sc, HED, EAP-EAPASA); MRS.J.E. DU PLOOY (M.E.M; EAP-EAPASA)



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hannieduplooy@abenviro.co.za

09/12/2020

**Joe Morolong Local Municipality
The Councillor Ward 7
Private Bag X117
Mothibistad
8474**

Dear Sir/Madam

Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

AB ENVIRO CONSULT was appointed by Joe Morolong Local Municipality to submit an application to the Northern Cape Province Department: Environment and Nature Conservation for the above mentioned proposed development.

Attached please find a notification of the proposed development as well as an electronic copy of the draft Scoping report for your comments. We must receive your comments no later than the 29th January 2021. In the event of your organisation/department not wishing to comment on this matter, it would be appreciated if we could receive written confirmation thereof to enable us to continue with the finalisation of the application.

If no response is however received from your Department/organisation within the said time, it will be assumed that your department/organisation does not wish to comment on this matter and the application will be processed further.

Please do not hesitate to contact us should any further information or clarification be required.

Yours sincerely,

PROF. A.B. DE VILLIERS

PROF A B DE VILLIERS (M Sc, Ph D, JCD, SACNASP)
MR.J.P. DE VILLIERS (M Sc, HED, EAP-EAPASA); MRS.J.E. DU PLOOY (M.E.M; EAP-EAPASA)

10.4 ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summary of main issues raised by I&APs	Summary of response from EAP
SAHRA requested that a desktop Palaeontological Assessment be conducted.	A Specialist has been appointed to conduct the PIA and the report forms part of this DEIR.

Township establishment Churchill

Our Ref:



an agency of the
Department of Arts and Culture

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South African Heritage Resources Agency | 111 Harrington Street | Cape Town
P.O. Box 4637 | Cape Town | 8001
www.sahra.org.za

Enquiries: Natasha Higgitt
Tel: 021 462 4502
Email: nhiggitt@sahra.org.za
CaseID: 15905

Date: Friday January 29, 2021
Page No: 1

Interim Comment

In terms of Section 38(3), 38(8) of the National Heritage Resources Act (Act 25 of 1999)

Attention: joe morolong local municipality

D320 Cardington Road, Churchill Village, Mothibistad

the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

AB Enviro-Consult CC has been appointed by the Joe Morolong Local Municipality to conduct an Environmental Authorisation (EA) Application for the proposed township establishment on portion of the remaining extent of the farm Churchill 211-HM and a portion of the remaining extent of portion 2 of the Farm Nyra 213-HM, near Lotlhakane, Northern Cape Province.

A draft Scoping Report has been submitted in terms of the National Environmental Management Act, no 107 of 1998 (NEMA) and the NEMA Environmental Impact Assessment (EIA) Regulations. The proposed development will include one extension approximately 1216 residential erven with associated erven for business, churches, a crèche, a community facility and parks over 60.7444 ha and a second extension with 1229 residential erven and associated erven for business, churches, a crèche, primary school, sports field, a community facility and parks over 92.3198 ha, with the entire development covering 127.5 ha.

APelser Archaeological Consulting has been appointed to provide heritage specialist input as part of the EIA process as required by section 24(4)b(iii) of NEMA and section 38(3) and 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA).

Pelser, A. 2020. Report on a Phase 1 HIA for the Proposed Churchill Township Development On A Portion Of The Remaining Extent Of Churchill 211HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213HM, in the Joe Morolong Local Municipality near Kuruman in the Northern Cape Province.

One surface scatter of Stone Age lithics of no heritage significance was identified within the proposed development area.

Township establishment Churchill

Our Ref:



an agency of the
Department of Arts and Culture

T: +27 21 462 4502 | F: +27 21 462 4500 | E: info@sahra.org.za
South African Heritage Resources Agency | 1111 Burlington Street | Cape Town
PO Box 4632 | Cape Town | 8001
www.sahra.org.za

Enquiries: Natasha Higgitt
Tel: 021 462 4502
Email: nhiggitt@sahra.org.za
CaseID: 15905

Date: Friday January 29, 2021
Page No: 2

Recommendations provided in the report include the following:

- Once the final layout of the proposed township development has been determined and the installation of services (sewerage, water, roads) commences an archaeologist should be contracted to undertake a watching brief so that if any sites or material are exposed by the development activities that the finds can be investigated and recommendations on the way forward be provided;
- Finally, it should be noted that although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed as a result of grass cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.

Interim Comment

The SAHRA Archaeological, Palaeontological and Meteorites (APM) Unit requests that a desktop Palaeontological Assessment be conducted as part of the EIA phase as the proposed development is located in an area of moderate and high palaeontological sensitivity as per the SAHRIS PalaeoSensitivity Map.

Further comments will be issued upon receipt of the above requested report and the draft EIA with associated appendices.

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully

Natasha Higgitt
Heritage Officer

10.5 COMMENTS AND RESPONSE REPORT

I&AP registered:	Comment received:	Response by the EAP:
SAHRA	SAHRA requested that a desktop Palaeontological Assessment be conducted.	A Specialist has been appointed to conduct the PIA and the report is included in this DEIR.

11. SUMMARY OF THE FINDINGS AND RECOMMENDATIONS OF SPECIALISTS

11.1 DOLOMITE STABILITY INVESTIGATION REPORT (See Appendix A for a copy of this report)

11.1.1 Terms of Reference

An engineering geological investigation was conducted for the proposed development on the property. The dolomite stability investigation was carried out in accordance with the latest standard practice (SANS 1936-2:2012); and broadly included desk study, site-walk over, gravity survey, percussion drilling, analysis of results and report writing.

The aim of this investigation was to identify and evaluate any possible engineering geological problems before commencement of proper township proclamation.

According to the 1:250 000 scale, geological map, 2722 KURUMAN, the site is predominantly underlain by aeolian sands, calcrete and calcified pan dunes of Gordonia Formation. The area also hosts surface limestone of tertiary age.

The Ghaap Group outcrops are found within 10 kilometres from the study area. According to the Ghaap Group is subdivided into four subgroups of different depositional composition, namely; Schmidtdrift (siliclastic carbonates), Campbell Rand (dolomite and siliclastic mudstone), Asbestos Hill (banded and granular Banded Iron Formation) and Koegas (submarine fans) Subgroups (Kendal *et al*, 2012). The beds tend to dip 5° in a south westerly direction.

Dolomitic rock is composed mainly of the mineral dolomite, which is a carbonate of calcium and magnesium. Groundwater that is weakly acidic through enrichment with carbon dioxide, dissolves and removes the calcium and magnesium in the form of bicarbonates as it percolates through the network of joints, fractures and faults in the rock mass. This dissolution gives rise to karst features in the form of cave systems and voids. In many parts of South Africa, the karst landscape is buried beneath younger deposits and/or weathering products of the dolomitic formation, and these materials can either collapse or be transported into voids or cave systems, resulting in catastrophic ground movement at surface. Because of risks of sinkhole and subsidence development associated with the presence of these soluble dolomitic rocks, it is required that a dolomite stability assessment be conducted, in accordance with SANS 1936-2:2012. It is further stated that developments on such dolomitic land shall be in accordance with the Inherent Hazard Classes and the Dolomite Area Designations as determined by the geotechnical site investigations.

Summary of Dolomite Hazard

The hazard zonation is based on geophysical surveys and drilling results from 62 boreholes. An assessment of all these based on the method of scenario supposition, Buttrick *et. al.* (2001) favours the site being zoned into one (1) Inherent Hazard Zone as dictated by geological conditions revealed by the drilling results. Based on the percussion drilling results, geohydrological data and geological information, the dolomite stability of the site is described in terms of the following zones as:

Zone A

Inherent Hazard Class: 3/4 (1) // 3(1)

This zone is largely characterised by a medium inherent hazard of a medium (2-5 m diameter) sinkhole and subsidence (with sub areas of medium inherent hazard of large [5-15 m diameter] sinkhole and subsidence) in a non-dewatering scenario. The inherent hazard for any size sinkhole and subsidence is medium with respect to a dewatering scenario.

The non-dolomitic overburden consists of aeolian deposits and pedogenic calcrete which is in a form of hardpan and calcified nodules in places. This zone occupies all gravity zones (i.e. highs, lows and gradients). Neither was nor low density material was recorded in the boreholes drilled. The groundwater level rests within the blanketing layer.

Dolomitic Area Designation

This zone is assessed as D3 and implies that extra precautionary measures in addition to those pertaining to the prevention of concentrated ingress of water into the ground, in accordance with the relevant requirements of SANS 1936-3, are required and must be adhered to.

Location

The zone covers the entire site boundary area.

Recommendations

- It is recommended that the municipality sets up at least two groundwater monitoring boreholes distributed across the current study area to establish trends. Any future developments must be investigated in accordance with SANS 1936-2 (2012).
- A high density development, i.e. 150 m² stands or developed as group housing such as a block of flats, has a greater probability of inducing a sinkhole than a commercial development on the same property because of the higher density of wet services and greater chance of an undetected leak. Therefore, new development should take into cognizance the allowable land use densities shown in Appendix 3 as per SANS 1936-1 (2012) permissible land use Tables.
- Based on this feasibility study, the entire site is suitable for most planned low cost housing development.
- Any signs of ground instabilities or subsidence should be reported immediately to the municipality, and remediated in accordance with SANS 1936-4 (2012).

11.2 CIVIL ENGINEER'S REPORT (SEE APPENDIX B)

Bulk services will be connected to Municipal infrastructure. A Civil Engineer has been appointed to assess the availability and design of services in the area and his report will be included in the EIAr.

WATER

The Civil Engineer found that the services will be designed to accommodate all requirements for developments of this nature. The internal services will be according to accepted engineering specifications and principles as well as acceptable environmental requirements and specifications. Drawings indicating the proposed preliminary water, sewer, access roads and parking layouts are included in this report. The layout of the water, sewer, roads and storm water infrastructure will be finalised during the preliminary engineering and detail design phases of the project.

Due to the dolomitic classification (D3) of the area it is essential that all requirements of SABS 1936-3:2012 is adhered to. An extract of selected items that needs to be considered as stipulated in SABS 1936-3:2012 is listed below:

De-watering and groundwater recharging

Before abstracting groundwater on dolomite land, the person or entity undertaking such abstraction shall obtain a water use licence from the relevant national authority in accordance with the relevant national legislation. The application for such licence shall clearly state that the ground from which the water is to be abstracted is dolomite land.

Where abstraction or recharging of ground water could result in changes of more than 6 m in the original groundwater level, the person or entity undertaking such abstraction or recharging shall notify the relevant national authorities.

Existing Water Infrastructure:

Churchill is supplied with ground water abstracted from 4 boreholes situated in the vicinity of the proposed development. See **Borehole details below:**



Bulk Supply: Potable Water:

The only bulk water supply to the area is by means of 4 boreholes. These boreholes are currently being used to provide water to the existing inhabitants of Churchill. Borehole Results DWS the permissible abstraction rate (**269kℓ/day**) is less than the required summer peak demand for the proposed development. Bearing in mind that the existing boreholes are used to provide domestic water to the current residents, the supply of the 4 boreholes will not suffice to accommodate the required supply of the proposed development. It is proposed that in depth specialised study is done to explore the option of using more boreholes in the area to supply the development with the required amount of domestic water. The water quality is therefore unknown which makes the possibility of the construction of some form of water treatment infrastructure a reality. Further studies regarding this is also proposed. However, in accordance with the dolomitic study, the dewatering of dolomitic area poses a risk for the formation of sink holes and as stated the water rest level has subsided from 3m in 2012 to more than 10m in 2017. Taking into consideration that the yield of the existing boreholes are minimal and acquiring additional water sources could pose a challenge, the alternative would be to

provide a bulk water pipeline from Kuruman which could serve as a water source to other villages in the vicinity.

The proposed trunk main to serve the proposed Churchill development shall be installed from Kuruman to a Reservoir approximately 25kms away.

It is important to note that alternative water sources need to be investigated as the existing boreholes in the vicinity are insufficient.

SEWER

According to the Department of Water and Sanitation (DWS) dry sanitation is commonly used in Joe Morolong Local Municipality due to the vast expanses of the municipality. Therefore, there is no formal bulk sewer infrastructure in the proximity of the proposed development. Following discussions with Joe Morolong Local Municipality and the idea of developing Churchill as a nodal point, waterborne sanitation will be provided.

Proposed Design Criteria

A waterborne gravitational sewerage system is recommended to convey sewer effluent from all the areas of the proposed development to common low points. In order to keep excavations as shallow as possible a Pumpstation will have to be built. The Pumpstation will lift the sewage a second gravity network which will further convey the sewage to the proposed oxidation ponds. Due to the dolomitic classification (D3) of the area it is essential that all requirements of SABS 1936-3:2012 is adhered to.

Proposed Bulk Sewr Infrastructure

The proposed bulk infrastructure will consist of the following components namely:

- Bulk Sewer Lines
- Bulk Electrical connection
- Bulk sewer pump station
- Construction of new oxidation pond system (aerobic and non aerobic ponds)

(This does not form part of the application and requires an application for a Waste licence)

STORM WATER DESIGN

All storm water on the roads will gravitate and flow via drifts towards the lined channel and daylight into open veldt.

Due to the dolomitic classification (D3) of the area it is essential that all requirements of SABS 1936-3:2012 is adhered to. An extract of selected items that needs to be considered as stipulated in SABS 1936-3:2012 is listed below.

- Stormwater drainage
- Stormwater drainage systems shall discharge into a natural watercourse unless the land upon which it is discharged is
 - a) not dolomite land; or
 - b) dolomite land categorized as dolomite area designation D1 in accordance with SANS 1936-1.
- Storm water drainage
- Channels and canals which are constructed to reroute water from natural drainage paths shall be lined. Any joints in such channels shall be suitably sealed to be watertight.
- Unlined storm water cut-off or diversion trenches shall be avoided as far as possible.

- All concentrated storm water entering any parcel of land shall be diverted away from any building and structures by means of concrete-lined channels. Where necessary, earth berms and contouring shall be used to enhance site drainage.
- Storm water drainage systems shall incorporate measures to ensure watertightness (zero leakage) of conveyance systems, culverts and other compartments, including the sealing of all joints, and shall be designed to minimize the effects of settlement. All manholes, junction boxes and conveyance systems shall be tested for watertightness during construction. Reinforced concrete manholes shall be designed as liquid-retaining structures.
- Storm water drainage conveyance systems shall be designed to gradients which are self-cleansing. Such systems shall have an internal diameter equal to or greater than 300 mm.
- For drainage purposes, surfaced roadways and parking areas should be constructed at a level below the surrounding buildings, developed or landscaped areas and gardens.
- All storm water from downpipes and gutters from buildings and structures shall discharge onto concrete-lined channels which, in turn, shall discharge the water at least 1,5 m away from structures onto areas permitting surface drainage away from buildings and structures. Joints between any open channel drains and buildings shall be suitably sealed.
- Small diameter storm water drainage pipes shall not be placed parallel to buildings unless they are at least 5 m (if stand size allows) from the structure. If this is not practical, a rational design shall be performed by a competent person (engineer).
- Buildings and structures without gutters shall be provided with impervious paving not less than 1,5 m wide with a minimum slope of 1:20 all around. Joints between such paving and the building or structure, as well as any joints to control shrinkage/expansion, shall be suitably sealed. The ground surface shall be shaped to fall away from the building at a minimum slope of 1:20 for a further 1 m from the edge of the slab and shall thereafter fall continuously towards the closest drainage point.
- Water shall not be permitted to accumulate against boundary walls. Suitable drainage ports shall be incorporated in boundary walls, particularly at the lowest point of the site, to permit the passage of surface runoff water. Such ports shall be provided (on both the inlet and outlet sides of the wall or fence) with a concrete slab 1,0 m wide, 100 mm thick, and extending 400 mm beyond the edges of the drainage port along the fence. The concrete slab shall have a minimum fall of 1:15 to ensure self-cleaning drainage characteristics. Any security outlet grids that are provided shall not impede the flow of water through the port.
- The type, size and pressure rating of the pipe to be used shall be specified by the competent person (engineer).

ROADS

Existing infrastructure

Currently there is a surfaced road running in a North-Easterly direction. All roads within the proposed development will connect to the main road through well designed intersections. It is proposed that a thorough traffic impact assessment is done by a specialist in order to design these intersections. Since there is an existing road there is no need for any new bulk road infrastructure.

11.3 ECOLOGICAL HABITAT REPORT (SEE APPENDIX C)

The study area is at the proposed Churchill, 19 km north of Kuruman, South Africa (elsewhere referred to as the site). Site is part of the Savanna Biome which is represented by the Kuruman Thornveld vegetation type at the central and eastern parts of the site as well as the Kuruman Vaalbosveld at the eastern parts of the site (Mucina & Rutherford 2006).

To serve as local context for the landscape and vegetation at the site an outline of the Kuruman Vaalbosveld and Kuruman Thornveld from Mucina and Rutherford (2006) follows.

SVk 8 Kuruman Vaalbosveld

Distribution: North-West and Northern Cape Provinces. East of Kuruman to Lykso, south of Bendell towards Good Hope. Altitude: 1300-1500 m.

Vegetation and landscape features: Open tree layer characterised by *Acacia erioloba*, *Acacia karroo*, *Searsia lancea* and *Ziziphus mucronata*. Shrub layer poorly developed, with *Grewia flava* and *Tarchonanthus camphoratus* and grass layer open, with much bare soil in places.

Geology and soils: Carbonates and chert of the Vaalian Griqualand West Supergroup and Kalahari sediments from flat, rocky sandy plains with shallow (0.1-0.6 m) red aeolian sands, stony and underlain by rock. Dominant land types Ae and Fc, with Hutton, Clovelly and Mispah soil forms common.

Important taxa: Tall Tree: *Acacia erioloba*. Small Trees: *Acacia karroo*, *Ziziphus mucronata*, *Searsia lancea*. Tall Shrubs: *Tarchonanthus camphoratus*, *Cadaba aphylla*, *Diospyros austro-africana*, *Diospyros lycioides* subsp. *lycioides*, *Grewia flava*, *Gymnosporia buxifolia*. Low Shrubs: *Amphiglossa triflora*, *Anthospermum rigidum* subsp. *pumilum*, *Anthospermum rigidum* subsp. *rigidum*, *Helichrysum zeyheri*. Geoxylic Suffrutex: *Elephantorrhiza elephantina*. Succulent Shrub: *Ebracteola wilmaniae*. Herbaceous Climber: *Rhynchosia holosericea*. Graminoids: *Antheophora pubescens*, *Aristida meridionalis*, *Eragrostis lehmanniana*, *Stipagrostis uniplumis*, *Aristida stipitata* subsp. *spicata*, *Cymbopogon caesius*, *Digitaria eriantha* subsp. *eriantha*, *Fingerhuthia africana*, *Pogonarthria squarrosa*, *Schmidtia pappophoroides*, *Themeda triandra*, *Tragus koelerioides*. Herbs: *Acrotome inflata*, *Dicoma schinzi*, *Geigeria ornativa*, *Heliotropium strigosum*, *Stachys spathulata*, *Tripteria aghillana*.

SVk 9 Kuruman Thornveld

Distribution: In South Africa the Kuruman Thornveld is found at the North West and Northern Cape Provinces. Kuruman Thornveld occurs on the flats from the vicinity of Postmasburg and Danielskuil (here west of the Kuruman Hills) in the south extending via Kuruman to Tsineng and Dewar in the north. Altitude is 1100 – 1500 m (Mucina & Rutherford, 2006).

Vegetation and landscape features: Flat rocky plains and some sloping hills with very well-developed, closed shrub layer and well-developed open tree stratum consisting of *Acacia erioloba* (Mucina & Rutherford, 2006).

Geology and soils: Some Campbell Group dolomite and chert and mostly younger, superficial Kalahari Group sediments, with red wind-blown (0.3 – 1.2 m deep) sand. Locally, rocky pavements are formed in places. Most important land types Ae, Ai, Ag and Ah, with Hutton soil form (Mucina & Rutherford, 2006).

Important taxa: Tall tree: *Acacia erioloba*. Small trees: *Acacia mellifera* subsp. *detinens*, *Boscia albitrunca*. Tall Shrubs: *Grewia flava*, *Lycium hirsutum*, *Tarchonanthus camphoratus*, *Gymnosporia buxifolia*. Low Shrubs: *Acacia hebeclada* subsp. *hebeclada*, *Monechma divaricatum*, *Gnidia polycephala*, *Helichrysum zeyheri*, *Hermannia comosa*, *Pentzia calcarea*, *Plinthus sericeus*. Geoxylic Suffrutex: *Elephantorrhiza*

elephantina. Graminoids: *Aristida meridionalis*, *Aristida stipitata* subsp. *stipitata*, *Eragrostis lehmanniana*, *Eragrostis echinochloidea*, *Melinis repens*. Herbs: *Dicoma schinzii*, *Gisekia africana*, *Harpagophytum procumbens* subsp. *procumbens*, *Indigofera daleoides*, *Limeum fenestratum*, *Nolletia ciliaris*, *Seddera capensis*, *Tripteris aghillana*, *Vahlia capensis* subsp. *vulgaris*.

Note: Though some plant species of the above listed vegetation type are present at the site, not necessarily all of the plant species listed above are present at the site.

Most of the site has been cultivated in the past. Areas with noticeable densities of alien invasive *Eucalyptus* trees are found at the central-western and southwestern parts of the site. Few trees and some diversity of grasses and forbs remain at the site.

Terrestrial vegetation at the site is an open savanna with few trees that are taller than shrub-height. Patches of shrub-height *Diospyros lycioides* subsp. *lycioides* are present in some areas. Other indigenous tree species at the site include *Vachellia hebeclada* subsp. *hebeclada*, *Senegalia mellifera* subsp. *detinens* (Black Thorn), *Ziziphus mucronata* (Buffalo-thorn), *Tarchonanthus camphoratus* (Camphor Bush), *Grewia flava* (Velvet Raisin Bush) and *Searsia lancea* (Karee). *Vachellia erioloba* (Camel Thorn) is sparsely distributed across the site. Shrublets such as *Gnidia polycephala*, *Elephantorrhiza elephantina* and *Lycium horridum* are found at the site.

Herbaceous plant species include *Hermannia tomentosa*, *Heliotropium ciliatum*, *Barleria macrostegia*, *Hermbsstaedtia odorata*, *Gazania krebsiana* and *Acrotome inflata*. Indigenous grass species at the site include *Eragrostis lehmanniana*, *Eragrostis rigidior*, *Eragrostis superba*, *Schmidtia pappophoroides*, *Enneapogon cenchroides* and *Aristida congesta* subsp. *barbicollis*.

Some of the alien invasive weed species at hitherto bare ground or ecologically disturbed areas are *Nicotiana glauca* (Tree Tobacco), *Argemone ochroleuca* (Mexican Poppy), *Schkuhria pinnata* (Dwarf Marigold), *Xanthium spinosum* (Spiny Cocklebur), *Chenopodium album* (White Goosefoot), *Alternanthera pungens* (Paper Thorn) and *Verbesina encelioides* (Wild Sunflower). Conspicuous alien invasive tree species at the site are *Prosopis glandulosa* (Mesquite), *Agave americana* and *Opuntia ficus-indica* (Prickly Pear).

Typical wetland plant species are sparse at a small pan (wetland depression) at the site. The grass species *Cynodon dactylon* (Couch Grass) and the sedge *Scirpoides dioecus* are found at the pan at the site. Encroachment by terrestrial plant species such as the exotic *Opuntia ficus-indica* and *Vachellia hebeclada* subsp. *hebeclada* occurs at the pan (wetland depression).

Terrestrial vegetation at the site is an open savanna with few trees that are taller than shrub-height. Some indigenous shrublets, herbaceous plant species and grass species remain at the visibly degraded savanna. Alien invasive weed species are conspicuous at hitherto bare ground or ecologically disturbed areas. Noticeable alien invasive tree species at the site are *Prosopis glandulosa* (Mesquite), *Agave americana* and *Opuntia ficus-indica* (Prickly Pear). Typical wetland plant species appear to be sparse at a small pan (wetland depression), Pan 1, at the site.

Site appears trampled and overgrazed in many areas. Numerous tracks and some diggings are found at the site. Some old dirt roads at the site are deeply eroded. Numbers of free roaming goats, cattle and donkeys are likely cause of overgrazing. Site is, for large parts, surrounded by settlements, roads, scraped areas and fences. Informal dumping occurs at some parts.

No Threatened or Near Threatened plant or animal species appear to be present at site.

One plant species that is not threatened but listed as Protected tree species (and also Declining species) occurs at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.

The Ecological Specialist Concluded the following:

- Terrestrial vegetation at the site is an open savanna with few trees that are taller than shrub-height. Patches of shrub-height *Diospyros lycioides* subsp. *lycioides* are present in some areas. Other indigenous tree species at the site include *Vachellia hebeclada* subsp. *hebeclada*, *Senegalia mellifera* subsp. *detinens*, *Ziziphus mucronata*, *Tarchonanthus camphoratus*, *Grewia flava* and *Searsia lancea*. *Vachellia erioloba* (Camel Thorn) is sparsely distributed across the site. Some indigenous shrublets, herbaceous plant species and grass species remain at the visibly degraded savanna.
- Alien invasive weed species are conspicuous are hitherto bare ground or ecologically disturbed areas. Noticeable alien invasive tree species at the site are *Prosopis glandulosa* (Mesquite), *Agave americana* and *Opuntia ficus-indica* (Prickly Pear).
- Site appears trampled and overgrazed in many areas. Numerous tracks and some diggings are found at the site. Some old dirt roads at the site are deeply eroded. Numbers of free roaming goats, cattle and donkeys are likely cause of overgrazing. Site is, for large parts, surrounded by settlements, roads, scraped areas and fences. Informal dumping occurs at some parts.
- No Threatened or Near Threatened plant species appear to be present at site.
- None of the protected plant species according to Northern Cape Nature Conservation Act No. 9 of 2009 (Updated in Provincial Gazette No. 1566, Desember 2011 with date of commencement 1 January 2012) have been found at the site.
- One plant species that is not threatened but listed as Protected tree species (and also Declining species), *Vachellia erioloba* (Camel Thorn) occurs at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.
- If avoidance of any *Vachellia erioloba* (Camel Thorn tree) at the site is not practical, application for a permit to remove the tree would be imperative because in terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.
- The vegetation types representing the Savanna Biome at the site are Kuruman Vaalbosveld (SVk 8) Kuruman Thornveld (SVk 9). Kuruman Vaalbosveld and Kuruman Thornveld are not listed as threatened according to the National List of Threatened Ecosystems (2011).
- Ecological sensitivity at the terrestrial zone of the site is medium. Ecological sensitivity at the two poorly defined narrow non-perennial streambeds and their buffer zones are medium based on their importance to connectivity of watercourses in the larger area.

- Ecological sensitivity is medium-high at the pan (wetland depression) and its buffer zone (30 m). Kindly also see Wetland Assessment report which accompanies this Ecological Habitat Survey Report.
- Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate or low.
- Establishment of exotic weeds should be monitored and exotic weeds at the site should be eradicated. A declared invader such as the mesquite tree (*Prosopis* species), should not be planted or allowed to spread from adjacent areas to the proposed footprint.

11.4 WETLAND IMPACT ASSESSMENT REPORT (SEE APPENDIX D)

Two poorly defined narrow non-perennial streambeds with indistinctive riparian zones are found at the northeastern part and the central-eastern part of the site respectively.

The narrow poorly defined non-perennial streambeds should be viewed as important conservation corridors in the larger area. If the development is approved careful planning should take place to conserve the functioning of non-perennial streambeds. The riparian areas are likely to be degraded by overgrazing and are overall largely indistinctive. The scope for large buffer zones at the site is small and probably not practical. A 10 m buffer zone from the outer edge of the active channels are recommended. Proper planning of stormwater as well as the cultivation of indigenous tree species are key to sustainable functioning of the active channels and riparian zones.



Figure 4 Indications of important aspects relevant to watercourses at the site.

— Light blue outline and Wetlands at the site shading

— Blue outline and shading Artificial waterbodies (with groundwalls; dams)

Two streams were identified where flood lines will develop that may have an effect on developments on each site.

The main stream in this study area is **Stream 1** with a catchment of **51,9 km²** at the study area. **Stream 2** will form along the tarred road (no number) and will drain partially underneath the tarred road at an existing installed culvert.

Figure 6 illustrates the calculated 1:100 year flood lines.



Figure 5: Streams in the area.



Figure 6: 1:100 year flood lines

The poorly defined drainage lines at the site are anticipated to comprise a low\ moderate risk. If the development is approved the surface flow and erosion of the wetland are likely to be limited. There is no distinct indication that interflow play of the wetlands would be impacted significantly by the proposed developments. The geomorphological setting and flow regime likely to be similar post development, if the development is approved according to the mitigation measures stated. Loss of any wetland animal or plant species of particular conservation importance are not expected.

In summary the Wetland Specialist Concluded the following:

- Two poorly defined narrow non-perennial streambeds with indistinctive riparian zones are found at the northeastern part and the central-eastern part of the site respectively.
- Site is situated at the Lower Vaal Water Management Area (WMA 10). Site falls outside any FEPA (Freshwater Ecosystem Priority Area) (Nel et al., 2011a, 2011b). The site is part of an Upstream Management Area which are sub-quadernary catchments in which human activities need to be managed to prevent degradation of downstream river FEPAs and Fish Support Areas.
- The narrow poorly defined non-perennial streambeds should be viewed as important conservation corridors in the larger area. If the development is approved careful planning should take place to conserve the functioning of non-perennial streambeds. The riparian areas are likely to be degraded by overgrazing and are overall largely indistinctive. The scope for large buffer zones at the site is small and probably not practical. A 10 m buffer zone from the outer edge of the active channels are recommended. Proper planning of stormwater as well as the cultivation of indigenous tree species are key to sustainable functioning of the active channels and riparian zones.
- Impacts on the poorly defined drainage lines at the site are anticipated to comprise a low\ moderate risk. If the development is approved the surface flow and erosion of the wetland are likely to be limited. There is no distinct indication that interflow play of the wetlands would be impacted significantly by the proposed developments. The geomorphological setting and flow regime likely to be similar post development, if the

development is approved according to the mitigation measures stated. Loss of any wetland animal or plant species of particular conservation importance are not expected.

- A key issue at the site that emerged from the risk and impact assessment is the implementation of efficient control of alien invasive plant species. Following the mitigations which will be upheld and planned footprint for development all the impact risks listed above are moderate or low.

11.5 HERITAGE IMPACT ASSESSMENT (HIA) (See Appendix E for a copy of this report)

11.5.1 Terms of Reference for Heritage Impact Assessment

The Terms of Reference for the study was to:

1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the portion of land that will be impacted upon by the proposed development;
2. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
3. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
4. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;
5. Review applicable legislative requirements;

Legislative requirements of National Heritage Resources Act (NHRA), Act 25 of 1999

Aspects concerning the conservation of cultural resources are dealt with mainly in two acts. These are the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998).

The National Heritage Resources Act

According to the above-mentioned act the following is protected as cultural heritage resources:

- a. Archaeological artifacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. *Grave yards and graves older than 60 years*
- h. Meteorites and fossils

- i. Objects, structures and sites of scientific or technological value.

The National Estate includes the following:

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Sites of Archaeological and palaeontological importance
- g. *Graves and burial grounds*
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g. archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.)

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources. An HIA must be done under the following circumstances:

- a. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length
- b. The construction of a bridge or similar structure exceeding 50m in length
- c. *Any development or other activity that will change the character of a site and exceed 5 000m² or involve three or more existing erven or subdivisions thereof*
- d. Re-zoning of a site exceeding 10 000 m²
- e. Any other category provided for in the regulations of SAHRA or a provincial heritage authority

11.5.2 Methodology

Survey of literature

A survey of available literature was undertaken in order to place the development area in an archaeological and historical context. The sources utilized in this regard are indicated in the bibliography.

Field survey

The field assessment section of the study was conducted according to generally accepted HIA practices and aimed at locating all possible objects, sites and features of heritage significance in the area of the proposed development. The location/position of all sites, features and objects is determined by means of a Global Positioning System (GPS) where possible, while detail photographs are also taken where needed.

Oral histories

People from local communities are sometimes interviewed in order to obtain information relating to the surveyed area. It needs to be stated that this is not applicable under all circumstances. When applicable, the information is included in the text and referred to in the bibliography.

Documentation

All sites, objects, features and structures identified are documented according to a general set of minimum standards. Co-ordinates of individual localities are determined by means of the Global Positioning System (GPS). The information is added to the description in order to facilitate the identification of each locality

11.5.3 Recommendations and Conclusions

A number of known cultural heritage sites (archaeological and/or historical) exist in the larger geographical area within which the study area falls. There are no known sites on the specific land parcel. Besides a few Stone Age objects identified in one area, no other sites, features or material of cultural heritage (archaeological and/or historical) origin or significance were identified in the study area during the assessment. This includes graves and the ruins of earlier homesteads and related structures.

The Stone Age-related site identified and recorded consisted of a few pieces of flakes and possible core material from which stone tool were manufactured. The objects were found in an area exposed by trenching for a possible pipeline and occur on top of calcrete levels underlying the sands covering the study area. It is therefore possible that similar finds could be situated in undisturbed sections of the development area and that it will get exposed during development activities (such as trenching, the digging of foundations).

In isolation the site and material recorded is not of high significance as the scatter of Stone Age material is not dense and not in situ. However the possibility of in situ deposits and sites do exist and the following is therefore recommended:

“Once the final layout of the proposed township development has been determined and the installation of services (sewerage, water, roads) commences an archaeologist should be contracted to undertake a watching brief so that if any sites or material are exposed by the development activities that the finds can be investigated and recommendations on the way forward be provided.”

It should be noted that although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed as a result of grass cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.

From a cultural heritage point of view the proposed Churchill Township Development can therefore continue, taking cognizance of the above recommendations.

11.6 DESKTOP PALEAONTOLOGICAL IMPACT ASSESSMENT (PIA) (See Appendix F for a copy of this report)

Palaeontological Heritage

The dolomites and carbonite rocks of the Gaap Group, which are covered by sediments of the Kalahari Group, and thus not exposed in the study area, could potentially host fossil of stromatolites. The wind-blown sands of the Kalahari Group, which are also sedimentary of origin, could also potentially host much younger fossils but this is extremely unlikely.

Collections of stromatolites from the Transvaal Supergroup are present in the collections of the Evolutionary Studies Institute (ESI), formerly BPI Palaeontology, at the University of the Witwatersrand, and the Council for Geoscience in Pretoria.

Methodology

The study area is underlain by Precambrian rocks of the Transvaal Supergroup which is considered of high palaeontological sensitivity because of the possibility of finding fossil stromatolites. However, because these Precambrian rocks are overlain by thick unconsolidated sands of the Kalahari Formation in the study area and are not exposed (Figure 4), a desktop Palaeontological Impact Assessment was undertaken to identify possible sensitive fossil occurrences, assess the significance of possible fossil occurrences, comment on the impact of the proposed development, and to make mitigating recommendations. The thick covering of Kalahari sand over the entire study area covering the rocks of the Transvaal Supergroup means that a field study will not yield anything of palaeontological significance.

Recommendations

From the documentation supplied regarding the development it is extremely unlikely that the proposed development will have any affect on palaeontological heritage. The underlying Precambrian rocks of the Gaap Group are not exposed in the study area and it is unlikely that fossils will be preserved in the overlying Quaternary alluvial deposits.

It is thus recommended that, in the unlikely event that fossils are exposed as a result of construction activities, a qualified palaeontologist must be contacted to assess the exposure for fossils before further development takes place so that the necessary rescue operations are implemented. Depending on the nature of the fossils discovered this could entail excavation and removal to a registered palaeontological museum collection. A list of professional palaeontologists is available from South African Heritage Resources Agency (SAHRA).

Conclusion

The proposed Churchill township development northeast of Kuruman is underlain by Precambrian aged rocks of the Gaap Group which in turn is overlain by unconsolidated Tertiary-Quaternary aged alluvial deposits. It is extremely unlikely that fossils will be exposed as a result of the development. From a palaeontological perspective, the proposed township development should proceed but, if fossils are uncovered in the course of construction activities, the developer must immediately call in a qualified palaeontologist to assess the situation and, if necessary, undertake excavation of the fossils.

12. CONCLUSIONS AND RECOMMENDATIONS

The Applicant, the **Joe Morolong Local Municipality** has appointed **AB Enviro Consult CC**, an independent environmental consultancy, to undertake an Environmental Impact Assessment for the proposed clearance of 127.5 ha of indigenous vegetation, partially located within an Ecological Support Area for the proposed township establishment to be located on a Portion of the remaining extent of the Farm

Churchill 211-HM and a Portion of the Remaining Extent of Portion 2 of the Farm Nyra 213-HM, Joe Morolong Local Municipality, Northern Cape Province.

This Chapter of the EIR provides a summary of the findings of the EIA process, including the EAP's opinion as to whether the activity should or should not be authorised.

12.1 ENVIRONMENTAL IMPACT STATEMENT

The detailed environmental assessment for the proposed development, has not found any environmental impacts that *cannot* be mitigated to acceptable and manageable levels.

In the National Framework for Sustainable Development (NFSD) it is stated that *"the achievement of sustainable development is not a once-off occurrence and its objectives cannot be achieved by a single action or decision. It is an ongoing process that requires a particular set of values and attitudes in which economic, social and environmental assets that society has at its disposal, are managed in a manner that sustains human well-being without compromising the ability of future generations to meet their own need.* The NFSD further continues to emphasize that South Africa's current development path in certain instances reflects signs of being unsustainable in the long-term. It highlights that a large percentage of growth in economic activity (measured in terms of its contribution to the GDP) is achieved by *"consuming' natural resources and degrading our habitat at accelerating rates with the inevitable consequence that future economic growth and development objectives will be prejudiced. "*

Consistent with national priorities, environmental authorities must support *"increased economic growth and promote social inclusion"*, whilst ensuring that such growth is *"ecologically sustainable"*. In the National Spatial Development Perspective (NSDP) it is highlighted that, to achieve the goal of stimulating sustainable economic activities and to create long-term employment opportunities, it is required that spending on economic infrastructure is focused in priority areas with potential for economic development, with development to serve the broader societies' needs equitably.

As in the rest of South Africa, there is a housing shortage in the area. This is totally unacceptable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty. Linking basic services such as water to health is viewed as a false separation as these services are 'intimately related to housing'. It becomes a housing issue if children playing outside the house contract diarrhoea via ingesting pathogens from fecal matter which contaminates the land on which they play. Otherwise, it is the house which provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

The new "Human Settlements Plan" promotes the achievement of a non-racial, integrated society through the development of sustainable human settlements and quality housing. Housing is to be utilized for the development of sustainable human settlements in support of spatial restructuring.

The aim is to move beyond the provision of basic shelter towards achieving the broader vision of sustainable human settlements and more efficient towns, cities and regions. The following factors will be taken into consideration in order to achieve this vision:

- Progressive Informal Settlement Eradication: These settlements must be integrated into the broader urban setup so as to overcome spatial, social and economic exclusion. The plan encourages the eradication of informal settlements through in-situ upgrading in desired locations coupled with the relocation of households where development is not possible or desirable.
- Promoting Densification and Integration: The aim is to integrate previously excluded groups into the city so as to enable them to enjoy the benefits it offers and to create more integrated, functional and environmentally sustainable human settlements, towns and cities.
- Enhancing Spatial Planning: Greater co-ordination and alignment of various planning instruments and economic policies lies at the heart of sustainable human settlements. This requires more than mere co-ordination between departments but there needs to be a single overarching planning authority and/or instrument to provide macro-level guidance to support the development of sustainable human settlements.
- Enhancing the location of New Housing Projects: The location of past housing projects was said to reinforce apartheid spatial settlement patterns. Spatial restructuring aims to achieve a more decisive intervention in land markets. The following interventions are envisaged viz. accessing well located state-owned and parastatal land: acquisition of well-located private land for housing development, funding for land acquisition and fiscal incentives.
- Supporting Urban Renewal and Inner-City Regeneration: Urban renewal and inner-city regeneration often result in the current inhabitants being excluded as a result of the construction of dwelling units they cannot afford. Some municipalities are trying to avoid this by promoting affordable inner-city housing. The "Human Settlements Plan" will support this by encouraging social housing.
- Developing Social and Economic Infrastructure: The need to move away from a housing-only approach towards a more holistic development of human settlements which includes the provision of social and economic infrastructure is emphasized.
- Enhancing the Housing Product: The aim is to develop more appropriate settlement layouts and housing products and to ensure appropriate housing quality.

In accordance with the policy guidelines contained in the Breaking New Ground (BNG) Principles it is indicated that new residential township areas should focus on the establishment of integrated human settlements focussing on the provision of erven not only for subsidized/low income households but also addressing the need for other housing typologies such as rental housing, bonded housing and FLISP projects.

A housing subsidy is a grant by government to qualifying beneficiaries for housing purposes. This is one of the Department of Human Settlement's areas of responsibility in the delivery of human settlements to the bottom-most end of the market, where it provides housing subsidies to the poor. This is where the bulk of the housing backlog exists, affecting mainly those who earn below R3500 a month. The following subsidy programmes are available from the Department of Human Settlements:

Integrated Residential Development Programme

The Integrated Residential Development Programme replaced the Project Linked Subsidy Programme. The programme provides for planning and development of integrated housing projects. Projects can be planned and developed in phases and provides for holistic development orientation:

Phase 1: Land, Services and Township Proclamation

Phase 2: Housing Construction (this also includes the sale of stands to non-qualifying beneficiaries and to commercial interests)

Individual Subsidy

This programme provides access to state assistance where qualifying households wish to acquire an existing house or a vacant serviced residential stand, linked to a house construction contract through an approved mortgage loan. These properties are available in the normal secondary housing market or have been developed as part of a project not financed through one of the National Housing Programmes.

Enhanced People's Housing Process

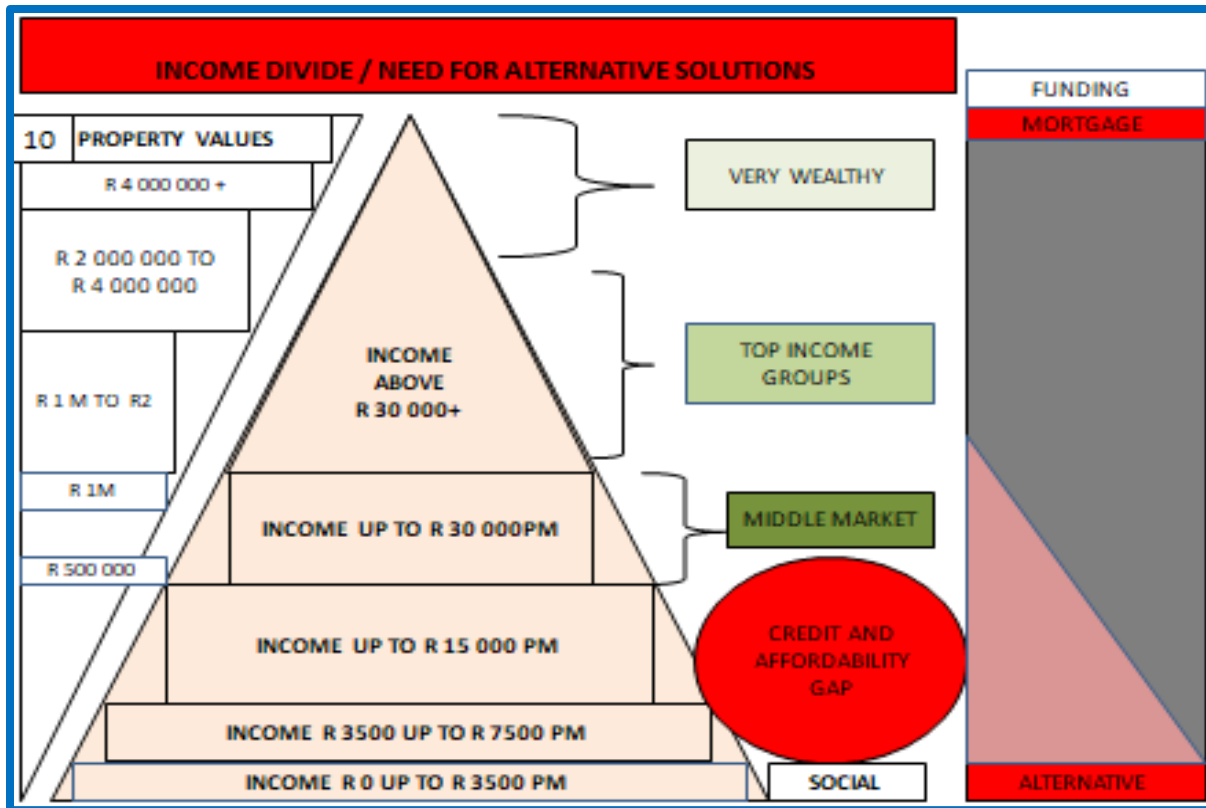
The Enhanced People's Housing Process aims to support households who wish to enhance their housing subsidies by funding their own homes. The Enhanced People's Housing process can be accessed through the Integrated Residential Development Programme, Project Linked Consolidation or Institutional Subsidies.

People's Housing Process

This subsidy is given to people who want to build or manage the building of their own homes. Unlike the Project Linked Subsidy where a contractor builds houses for a number of people, the People's Housing Process allows people or beneficiaries to build or organize the building of their homes.

Housing the poor was an ingredient of the Department of Human Settlement's three-part response to the State's Vision 2030 Strategy. "Gap housing" is a term that describes the shortfall or gap in the market between units supplied by the State and houses delivered by the private sector. The gap housing market comprises people who typically earn between R3500 and R15000 per month, which is too little to enable them to participate in the private property market, yet too much for state assistance. Gap housing is a policy that addresses the housing aspirations of people such as nurses, fire-fighters, teachers, SAPS members and member of the armed forces who earn between R3500 and R15000 per month and therefore do not qualify for RDP houses and do not earn enough to obtain home loans.

The following figure illustrates the income divide / Need for alternative solutions.



Income Divide / Need for alternative solutions

One of the subsidy programmes further available from the Department of Human Settlements includes the Finance Linked Individual Subsidy Programme (FLISP).

FLISP was developed to enable first time home-ownership to households in the “affordable or gap” market, that is, people earning between R3501 and R15000 per month. Individuals in these salary bands generally find it hard to qualify for housing finance; their income is regarded as low for mortgage finance, but too high to qualify for the government subsidy scheme available to households earning less than R3500 per month. Depending on the applicant’s gross monthly income, their once-off FLISP subsidy qualifying amount may vary between R20 000 and R87 000, as defined in the FLISP Subsidy Quantum. Any residential property acquired with the FLISP subsidy may not exceed the R300 000 price margin. FLISP assists qualifying beneficiaries who wish to obtain mortgage finance from a lender to:

- Acquire ownership of an existing residential property
- Obtain vacant serviced residential stands which are linked to house building contracts with the home builders registered with the National Home Builders Registration Council (NHBRC); or
- Build a new house with the assistance of a home builder registered with the National Home Builders Registration Council (NHBRC) on serviced residential stand that is already owned by the beneficiary.

The objective of the programme is to reduce the initial mortgage loan amount to render the monthly loan repayment instalments affordable over the loan payment term.

The Churchill integrated human settlement project from the onset aims at providing a proper integrated human settlement that ascribes to the BNG Principles set out above. This will be achieved as follows:

- This project makes provision for a variety of erven that can be utilized for various housing typologies. The largest proportion of the township areas will however be aimed at both the subsidized housing sector through the implementation of one of Government's subsidized housing programmes as well as the need that exists for people that does not qualify for a Government subsidy, due to either already owning other property or earning in excess of the threshold household income prescribed in respect of the various housing subsidy programmes, but who still wishes to acquire an affordable stand where they can construct their own home. This project will also aim at alleviating the plight of people that live in informal settlement areas and in squalid conditions.
- The location of the proposed township area directly adjacent to the existing urban area of Churchill further enhances integration and will offer inhabitants the opportunity to access the existing social and commercial facilities on offer within the existing village area whilst also providing social and business opportunities within the proposed development area itself that can in turn be utilized by and to the benefit of the inhabitants of the existing village area.

The development of the Churchill integrated human settlement represents a definitive move away from providing housing-only township areas and towards the provision of a proper integrated human settlement that offers a magnitude of social, educational and commercial support facilities and infrastructure in close proximity to the inhabitants

Skills development

The members of the Project Steering Committee will during the entire life-cycle of the project be involved with all processes and it anticipated that the capacity of the officials of the Joe Morolong Local Municipality as well as the relevant community structures will be broadened through the transfer of knowledge and skills specifically relating to the integrated human settlement planning process as well as the statutory processes associated with the township establishment process.

During the construction phase of the proposed development, jobs will be created and thus the unemployment rate of the area will be reduced.

The identification, description, evaluation and comparison of alternatives are important for ensuring a sound environmental scoping process.

The alternatives considered for the proposed development includes "Mixed land use township" (Alternative 1), "Single land use: Housing only" (Alternative 2) and the "No-go option.

Although the emphasis is on housing, complimentary land uses have been included in the township. People want easy access to job opportunities shops, banking facilities, clinics, etc. and want their living environment, such as residential townships to be placed at strategic positions with good access routes in close proximity to these amenities.

A mixed land use development is *socially responsible* based on the following:

- It covers the mixed and lower income bracket by providing a higher density housing option;

- The development will inevitably support the use of public transport;
- The development will include supporting social infrastructure (schools), as well as some retail or commercial activities;
- The layout of the development must respond to the future road planning for the area, to facilitate and maximise pedestrianisation and public transport.
- Commercial erven can accommodate a shopping centre, to service the existing formalised and informal settlements in the area. The commercial node will:
 - Promote entrepreneurial services and products;
 - Be within walking distance to places of refreshment and trade for residents;
 - Provide Job opportunities; and
 - Improve neighbourhood quality.

By providing only one land use type (i.e., housing), mixed income development and social integration across race and income levels, *cannot be achieved*. By restricting a township to one land use only, the above benefits to the local community, and subsequent council area, cannot be realised, and hence, is not a preferred land use option.

The only other alternative that exists for the proposed development is the “no-go” option which will imply that the status quo will prevail. This is unacceptable as Informal settlements consist of non-conventional housing built without complying with legal building procedures. Broadly, these crude dwellings mostly lack proper indoor infrastructure, such as water supply, sanitation, drainage, waste disposal and proper road access. There is also a bond between poor housing and environmental conditions in informal settlements which also reflects poverty. Linking basic services such as water to health is viewed as a false separation as these services are ‘intimately related to housing’. It becomes a housing issue if children playing outside the house contract diarrhoea via ingesting pathogens from faecal matter which contaminates the land on which they play. Otherwise, it is the house which provides for shelter against injury, weather and disease. Improving the surroundings of the house is to limit severe health risks existing within poor quality housing.

Specialist studies were conducted and a full Public Participation Process was followed. This information was used to generate a sensitivity map that was used to assess the sustainability of the design and layout plan for the proposed development.

The **Dolomite stability investigation** has found that Based on the percussion drilling results, geo-hydrological data and geological information, the dolomite stability of the site is described and the Development Potential found that restrictions are placed on the types of residential development that may be considered on Class 3 land. Full title residential development (RN2-3) on stands of 300 m² or greater is recommended or 10 – 25 dwelling houses per hectare and a population if ≤ 60 people per hectare is recommended. Any form of commercial, retail and/or light industrial development is permissible (C1 to C10) as in SANS 1936-1(2012) Table 1 with appropriate stringent precautionary measures. Footprint investigations are required for each commercial development.

The **Fauna and Flora Habitat** study conducted revealed one plant species that is not threatened but listed as Protected tree species (and also Declining species), *Vachellia erioloba* (Camel Thorn) occurs at the site. In terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the

Minister. If avoidance of any *Vachellia erioloba* (Camel Thorn tree) at the site is not practical, application for a permit to remove the tree would be imperative because in terms of a part of section 15(1) of the National Forests Act No. 84 of 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister. The vegetation types representing the Savanna Biome at the site are Kuruman Vaalbosveld (SVk 8) Kuruman Thornveld (SVk 9). Kuruman Vaalbosveld and Kuruman Thornveld are not listed as threatened according to the National List of Threatened Ecosystems (2011). Ecological sensitivity at the terrestrial zone of the site is medium. Ecological sensitivity at the two poorly defined narrow non-perennial streambeds and their buffer zones are medium based on their importance to connectivity of watercourses in the larger area.

A **Wetland impact assessment** was also done and the specialist came to the following conclusion: Impacts on the poorly defined drainage lines at the site are anticipated to comprise a low\ moderate risk. If the development is approved the surface flow and erosion of the wetland are likely to be limited. There is no distinct indication that interflow play of the wetlands would be impacted significantly by the proposed developments. The geomorphological setting and flow regime likely to be similar post development, if the development is approved according to the mitigation measures stated. Loss of any wetland animal or plant species of particular conservation importance are not expected.

The **Heritage Impact Assessment** revealed no known sites on the specific land parcel. Besides a few Stone Age objects identified in one area, no other sites, features or material of cultural heritage (archaeological and/or historical) origin or significance were identified in the study area during the assessment. This includes graves and the ruins of earlier homesteads and related structures. The Stone Age-related site identified and recorded consisted of a few pieces of flakes and possible core material from which stone tool were manufactured. The objects were found in an area exposed by trenching for a possible pipeline and occur on top of calcrete levels underlying the sands covering the study area. It is therefore possible that similar finds could be situated in undisturbed sections of the development area and that it will get exposed during development activities (such as trenching, the digging of foundations). In isolation the site and material recorded is not of high significance as the scatter of Stone Age material is not dense and not in situ. However the possibility of in situ deposits and sites do exist and the following is therefore recommended:

“Once the final layout of the proposed township development has been determined and the installation of services (sewerage, water, roads) commences an archaeologist should be contracted to undertake a watching brief so that if any sites or material are exposed by the development activities that the finds can be investigated and recommendations on the way forward be provided.”

The **Paleontological desktop study** revealed that the proposed Churchill township development northeast of Kuruman is underlain by Precambrian aged rocks of the Gaap Group which in turn is overlain by unconsolidated Tertiary-Quaternary aged alluvial deposits. It is extremely unlikely that fossils will be exposed as a result of the development. From a palaeontological perspective, the proposed township development should proceed but, if fossils are uncovered in the course of construction activities, the developer must immediately call in a qualified palaeontologist to assess the situation and, if necessary, undertake excavation of the fossils.

Skills development

The members of the Project Steering Committee will during the entire life-cycle of the project be involved with all processes and it anticipated that the capacity of the officials of the Joe Morolong Local Municipality as

well as the relevant community structures will be broadened through the transfer of knowledge and skills specifically relating to the integrated human settlement planning process as well as the statutory processes associated with the township establishment process.

During the construction phase of the proposed development, jobs will be created and thus the unemployment rate of the area will be reduced.

Although this is only the Scoping phase of the proposed development, no “fatal flaws” has been encountered as of yet. All the issues envisaged at this stage can be mitigated.

12.2 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

EMPR’s aim to identify and minimise the potential impacts that the proposed construction and operational phases of the project may have on the receiving environment. An EMPR has been developed which is contained in Appendix F and includes detailed mitigatory measures for the construction phase.

As a general guideline, the EMPR should be based on a comprehensive set of environmental aspects (elements of the facility that can interact with the environment), and hence, the EMPR compiled for this application includes the following key components:

- Mechanisms for the on-going identification and assessment of environmental aspects and impacts;
- Environmental management programmes; objectives and targets;
- Environmental monitoring and reporting framework;
- Environmental management procedures; and,
- Mechanisms for the recording of environmental incidents and implementing corrective and preventative actions.

12.3 EAP OPINION

The information contained in this DEIAR and Specialist Studies, provides a detailed and comprehensive description of the proposed project, baseline environment and potential environmental impacts associated with the proposed development. As no significant impacts that cannot be mitigated were identified, AB Enviro Consult is of the opinion that the project should proceed, provided that the necessary mitigation and management measures are implemented.

Under South African environmental legislation, the Applicant is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. The Applicant therefore has overall and total environmental responsibility to ensure that the implementation of the construction phase of the EMPR complies with the relevant legislation and the conditions of the environmental authorisation. The applicant will thus be responsible for the implementation of the EMPR.

The environmental management programme (EMPR) should form part of the contract between the construction company and the applicant. This will help ensure that the EMPR is adhered to. It is suggested that a suitably qualified Environmental Control Officer (ECO) be appointed for the construction phase.

12.4 CONDITIONS RECOMMENDED TO BE INCLUDED IN ANY AUTHORISATION THAT MAY BE GRANTED BY THE COMPETENT AUTHORITY IN RESPECT OF THE APPLICATION

1. A full copy of the signed EA from DENC in terms of NEMA, granting approval for the development must be available on site
2. A copy of the EMPr as well as any amendments thereof must be available on site
3. A suitably qualified ECO must be appointed.
4. Impacts on the environment must be minimised during site establishment and the development footprint must be kept to the approved development area.
5. Vegetation clearing may not commence until such time as the development footprint has been clearly defined.
6. No clearance of vegetation outside of the development footprint may occur.
7. At the end of the construction phase the site and its surrounding area must be free from any pollution that originated as a result of the construction activities.
8. No disturbance of topsoil & subsoil may commence until such time as the development footprint has been clearly defined.
9. No disturbance of topsoil & subsoil outside of the development footprint may occur.
10. At the end of the construction phase the site and its surrounding area must be free from any chemical, fuel, oil and cement spills that originated as a result of the construction activities.
11. At the end of the construction phase the site and its surrounding area must be free from any sewage that originated as a result of the construction activities.
12. At the end of the construction phase the site and its surrounding area must be free from any hazardous or general waste pollution that originated as a result of the construction activities.
13. Dust prevention measures must be applied to minimise the generation of dust.
14. Noise prevention measures must be applied to minimise the generation of unnecessary noise pollution as a result of construction activities on site.
15. Absolutely no burning of waste is permitted.
16. Fires will only be allowed in facilities especially constructed for this purpose.
17. No hunting of animals will be allowed.
18. No intentional destruction of any sites, features or material of cultural heritage (archaeological and/or historical) origin or significance may occur.
19. All Contractors and sub-contractors must abide to the rules and regulations of the Occupational Health and Safety Act, 85 of 1993.

13. AFFIRMATION BY EAP

- I Ms JE du Plooy declare under oath that I:
- a. act as the independent environmental practitioner in this application ;
 - b. do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed;
 - c. do not have and will not have a vested interest in the proposed activity proceeding;
 - d. have no, and will not engage in, conflicting interests in the undertaking of the activity;
 - e. undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required;
 - f. will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
 - g. will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
 - h. will keep a register of all interested and affected parties that participated in a public participation process; and
 - i. will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.

Signature of the Environmental Assessment Practitioner:

Name of company:

Date:

Signature of the Commissioner of Oaths:

Date

Designation

Official stamp:

14. LIST OF REFERENCES

Department of Environmental Affairs and Tourism. 1992. Integrated Environmental Management. Pretoria, DEAT.

Department of Environmental Affairs and Tourism. 1998. *Guideline Document - EIA Regulations.* Pretoria, DEAT.

Department of Environmental Affairs. 1988. *Climate of South Africa, climate statistics up to 1984.* Weather Bureau (WB40). Pretoria, Government Printer.

Department of Transport, 19--. *Climate of South Africa Part 1 Climate statistics.* Weather Bureau (WB20). Pretoria Government Printer.

S. Cliff. 2015. Environmental Scoping report for the proposed high density residential township "Tanganani extension 7", to be located on a part of Portion 119 of the farm Diepsloot 388 JR, City of Johannesburg Municipality, Gauteng

**APPENDIX A:
GEOTECHNICAL REPORT**

**APPENDIX B:
CIVIL ENGINEERING REPORT**

**APPENDIX C:
FAUNA AND FLORA HABITAT SPECIALIST REPORT**

**APPENDIX D:
WETLAND IMPACT ASSESSMENT REPORT**

**APPENDIX E:
HERITAGE IMPACT ASSESSMENT REPORT**

**APPENDIX F:
ENVIRONMENTAL MANAGEMENT PLAN**