DRAFT BASIC ASSESSMENT REPORT – PROPOSED MTHETHWA TRUST 10 HA SUGARCANE CULTIVATION ON BROUGHTON FARM, ALBERT FALLS, KWA-ZULU NATAL

DRAFT BASIC ASSESSMENT REPORT

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July 2018

Prepared for: The Mthethwa Trust

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JULY 2018

Prepared for:
The Mthethwa Trust

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REPORT DETAILS

Title:	**DRAFT BASIC ASSESSMENT REPORT – PROPOSED MTHETHWA TRUST 10 HA SUGARCANE CULTIVATION ON BROUGHTON FARM, ALBERT FALLS, KWA-ZULU NATAL**
Purpose of this report:	The purpose of this BA Report is to: • Present the proposed project and the need for the project; • Describe the affected environment at a sufficient level of detail to facilitate informed decision-making; • Provide an overview of the BA Process being followed, including public consultation; • Assess the predicted positive and negative impacts of the project on the environment; • Provide recommendations to avoid or mitigate negative impacts and to enhance the positive benefits of the project; and • Provide an Environmental Management Programme (EMPr) for the proposed project. This BA Report is the Draft Version submitted to I&Aps for 30 day public comment period.
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Authors:	Kelly Stroebel and Minnelise Levendal
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Appendix A	CVs of the EAPs (project team who prepared the report) and EAP Declaration
Appendix B	Locality Map and Site plan – (must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers)
Appendix C	Public Participation
Appendix D	Specialist Report: Terrestrial Ecology and Hydrology
Appendix E	Draft Environmental Management Programme

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REQUIREMENTS ACCORDING TO APPENDIX 1 OF GNR 326 OF 7 APRIL 2017 – SCOPE OF ASSESSMENT AND CONTENT OF BAR

Scope of Assessment and Content of BAR	SECTION IN BAR
1) A basic assessment report must contain all the information that is necessary for the competent authority to consider and come to a decision on the application, and must include - (a) details of – i. the EAP who prepared the report; and	Section 1
ii. the expertise of the EAP, including a curriculum vitae;	Section 1 Appendix A
(b) the location of the activity, 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, the coordinates of the boundary of the property or properties;	Section 1
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 1 Appendix B
(d) a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii)a description of the activities to be undertaken including associated structures and infrastructure ;	Section 1
(e) a description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 2
(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 location;	Section 3
(g) a motivation for the preferred site, activity and technology alternative;	Section 4
(h) a full description of the process followed to reach the proposed preferred alternative within the site, including: (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of	N/A Section 4 - 12 Appendix B Appendix C, Appendix D

Scope of Assessment and Content of BAR	SECTION IN BAR
the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (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 these impacts- (aa) can be reversed (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (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 geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) the outcome of the site selection matrix; (x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (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;	Section 7
(j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Section 7
(k) where applicable, a summary of the findings and impact management measures identified in 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 report;	Appendix D
(l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment; (i) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity	Section 8 Appendix E

Scope of Assessment and Content of BAR	SECTION IN BAR
and identified alternatives;	
(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;	Section 8
(n) 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;	Section 8
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Appendix D
(p) 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;	Appendix D Section 8
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Section 9
(r) an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (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; and	Section 10
(s) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t) any specific information that may be required by the competent authority; and	N/A
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A

ENVIRONMENTAL ASSESSMENT PRACTITIONER

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Project Team:

Name	**Qualification & Expertise**
Minnelise Levendal (***Reviewer***)	• MSc Biological Science (Botany) (Stellenbosch University) • 16 years of experience in Environmental Management • Inclusive of 10 years' experience in conducting Environmental Assessments • SACNASP registered: 117078 (Pr.Sci.Nat)
Kelly Stroebel (***Project Manager)***	• BSc (Hons) Environmental Science (Rhodes University) • 4+ years' experience in the environmental management field (Environmental Impact Assessment) • 4+ years' experience conducting Basic Assessments • SACNASP registered: 100151/14 (Cand.Sci.Nat)

Please see **Appendix A** for full CV's of the EAPs and the EAP Declaration.

The Council for Scientific and Industrial Research has been one of the leading organisations in South Africa contributing to the development and implementation of environmental assessment and management methodologies. The CSIR's Environmental Management Services (EMS) unit has over 20 years of experience in environmental management practices, involving conducting environmental assessment and management studies in over 15 countries in Africa. Key sectors of CSIR's work include renewable energy, infrastructure, natural resource management, mining, industrial development and oil and gas. CSIR's environmental assessments are conducted with national legal requirements as well as those of international agencies such as the World Bank, International Finance Corporation and World Health Organisation.

SECTION 1: INTRODUCTION

1.1 Project Overview

The Mthethwa Trust is an agricultural business located on Broughton Farm, 22km from Pietermaritzburg (See Figure 1-1) in the uMshwati Local Municipality, KwaZulu-Natal. Access to the site is via the existing R33 towards Greytown (from Pietermaritzburg). The Trust consists of 3 members, and is a 100% black-owned and operated family entity. The current land-use of Broughton Farm is zoned for agriculture and is currently consisting of indigenous vegetation and no infrastructure. The farm "borders" the uMngeni River to the South and is bordered and surrounded by agricultural practises.

Property Details	Farm Name	Surveyor General 21 Digit Code	Site Co-ordinates
	Broughton Farm	N0FT00000000092500022	29 26' 31.08"S 30 26' 58.22"E

The footprint of the proposed cultivation is ~10 hectares (see Figure 1-2) of the 14 ha Broughton Farm site. The proposed development will include the clearance of vegetation, ploughing, planting and harvesting of sugar cane. The sugar cane crops will be rain fed. In terms of harvesting, sugarcane field burning will be carried out prior to harvesting. Thereafter cane cutters will come in and the bell loader will load the sugarcane onto the truck which will then be transported to the mill. The harvested cane will be supplied to a local mill. The project is estimated to produce approximately 30 tonnes per hectare, depending on climate and other agricultural factors.

Road access to the cultivated land will be directly onto the site off the R33 (towards Greytown) from Pietermaritzburg. The project will not include the development of any new roads, and will not require electricity or any other municipal services. The proposed project will also not entail any infrastructure development or building on site.

1.2 Need for a Basic Assessment

A Basic Assessment (BA) Process is required for the proposed development as it triggers listed activities defined under the National Environmental Management Act, Act No. 107 of 1998 (NEMA, 1998), as amended, in terms of the, Government Notice (GNR) 326 of 7 April 2017 of the Environmental Impact Assessment (EIA) Regulations. The BA Process includes an environmental assessment with regards to the proposed development, and the aim is to identify potential impacts associated with the development and to recommend methods to avoid or reduce adverse impacts and promote positive impacts. A BA Process is undertaken to provide the Competent Authority, in this case the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (KZN-EDTEA), with information about environmental assessment outcome in order for the Department to make a decision on the Application for Environmental Authorisation for the proposed development. Relevant listed activities triggered by the proposed activities are described as follows:

Table 1-1: Listed activities triggered by the proposed development

Listed Activity Number	Listed Activity Description	Description of the project activity that potentially triggers the relevant listed activity
GN 327		
Activity 27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except 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.	The proposed project involves the clearing of an area of 10 hectares for cultivation of sugar cane.

NOTE: The Competent Authority confirmed in the pre-application meeting held on the 13 November 2017 (see minutes of this meeting attached as Appendix F) that GNR 324, Activity 12 **is not triggered** by the proposed development, as the critical biodiversity area as identified in systematic biodiversity plan has *not been adopted* by the competent authority. Thus, this activity is not included in this application.

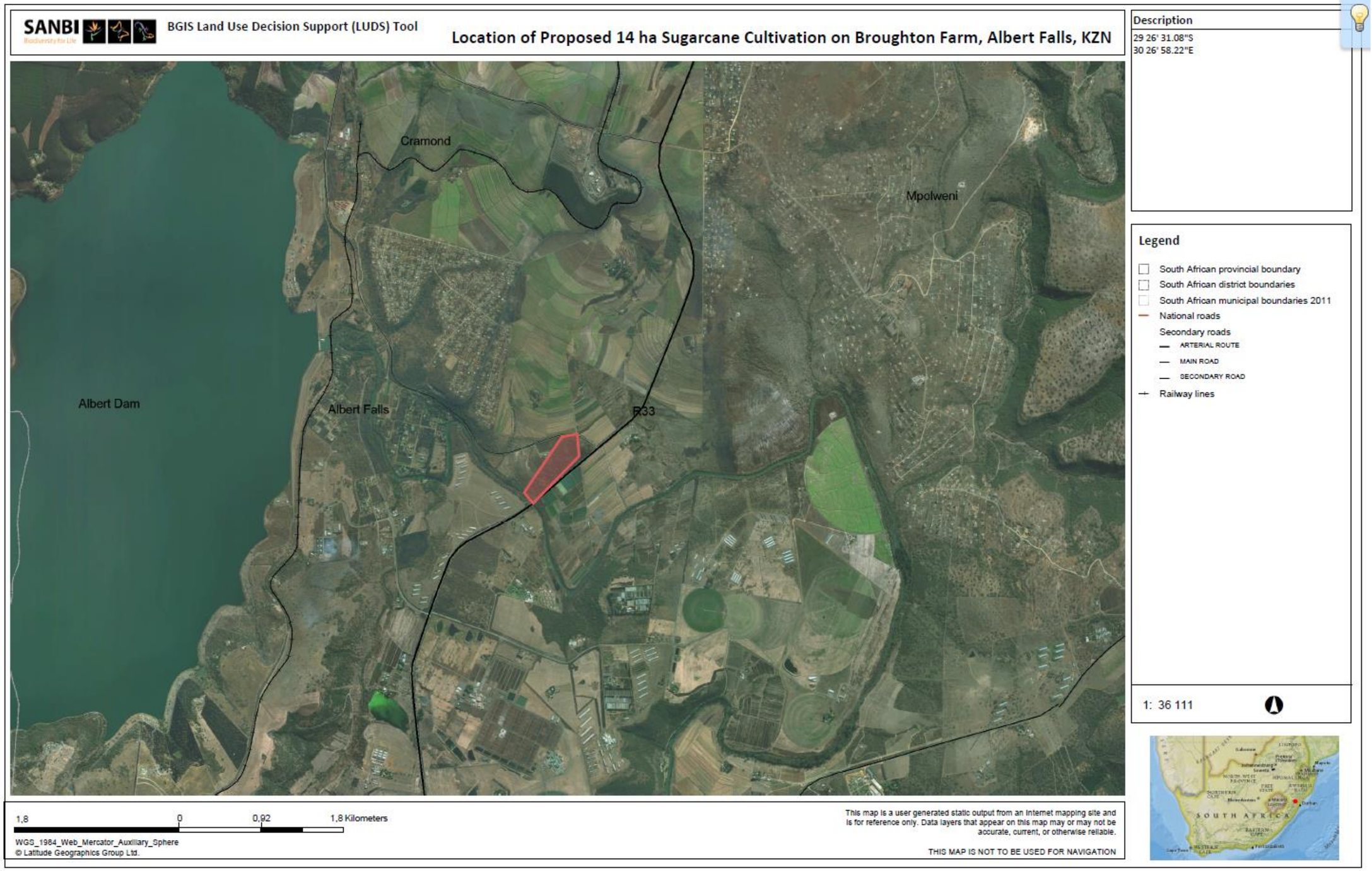

Figure 1-1: Project Locality Map

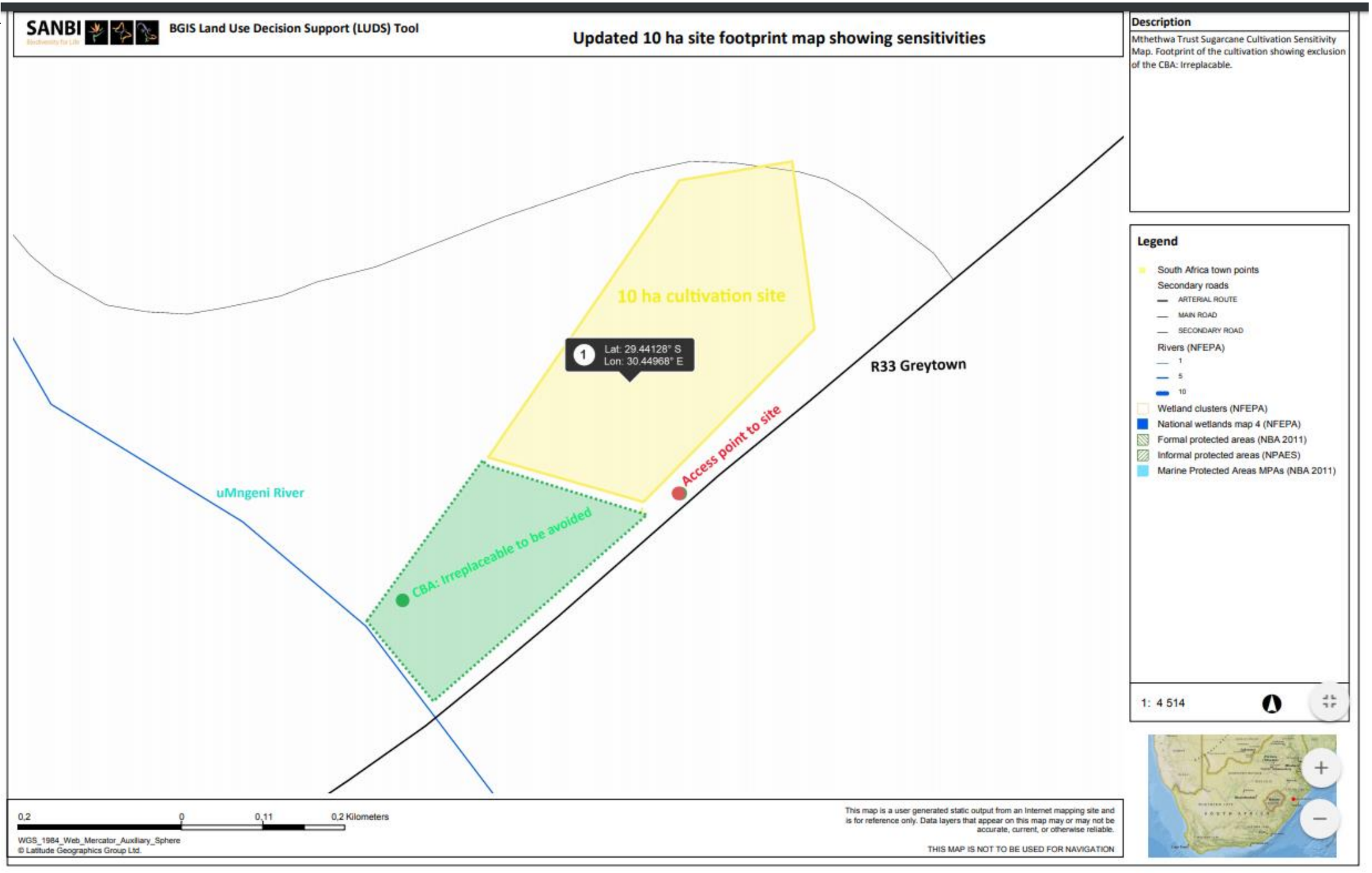

Figure 1-2: Project site layout plan

SECTION 2: APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

Table 2-1: Applicable legislation, policies and/or guidelines

Title of legislation, policy or guideline:	Administering authority:	Promulgation Date:
National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998 as amended).	National & Provincial	27 November 1998
NEMA Environmental Impact Assessment Regulations GNR 982 of 4 December 2014 (as amended)	National & Provincial	4 December 2017
NEMA Environmental Impact Assessment Regulations GNR 326 of 7 April 2017	National & Provincial	7 April 2017
National Water Act 36 of 1998	National & Provincial	26 August 1998
National Environmental Management Waste Act GNR 921	National & Provincial	29 November 2013
National Environmental Management Biodiversity Act 10 of 2004	National & Provincial	2004
National Heritage Resources Act 25 of 1999	National & Provincial	1999
KwaZulu-Natal Heritage Act 4 of 2008	Provincial	12 February 2009
National Environmental Management: Air Quality Act 39 of 2004	National & Provincial	11 September 2005
National Development Plan	National	2012
uMgungundlovu District Municipality IDP and SDF	Provincial/Local	2017 to 2021
uMshwathi Local Municipality Draft IDP	Local	2018/19
Sugar Act	National	1978
Sustainable Sugarcane Farm Management System Edition 3:2015	National	2015

Table 2-2: Description of compliance with the relevant legislation, policy or guideline:

Legislation, policy or guideline	Description of compliance
National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998 as amended).	An application for Environmental Authorisation for the proposed development is submitted in terms of GNR 326 of NEMA EIA Regulations, 4 December 2014 (as amended on 7 April 2017), promulgated under NEMA.
GNR 326 of NEMA EIA Regulations, 7 April 2017	To promote integrated environmental management, contents of this BAR adhere to the requirements of the EIA Regulations (Appendix 1). Appendix E includes the Environmental Management Programme that the project will adhere to if authorisation is received. Appendix C refers to the Public participation followed thus far in undertaking this assessment.
National Environmental Management: Waste Act (NEM:WA) GNR 921, 29 November 2013	Adhere to best practice, including Norms and Standards, in terms of waste management.
National Development Plan	The South African Government through the Presidency has published a National Development Plan. The Plan aims to eliminate poverty and reduce inequality by 2030. The Plan has the target of developing people's capabilities to improve their lives through education and skills development, health care, better access to public transport, jobs, social protection, rising income, housing and basic services, and safety. It proposes to implement the following strategies to address the above goals: 1. Creating jobs and improving livelihoods; 2. Expanding infrastructure; 3. Transition to a low-carbon economy; 4. Transforming urban and rural spaces; 5. Improving education and training; 6. Providing quality health care; 7. Fighting corruption and enhancing accountability; 8. Transforming society and uniting the nation.
National Heritage Resources Act, 1999 (Act 25 of 1999)	An application for Heritage Resources review was submitted to SAHRA (at the time of release of this Draft BA Report) in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) as amended.
National Environmental Management: Biodiversity Act 10 of 2004	The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) as amended (NEMBA) including all the pertinent legislation published in terms of this act was considered in undertaking this Basic Assessment process. This included the determination and assessment of the fauna and flora prevailing in the proposed project and the handling thereof in terms of NEMBA.

Legislation, policy or guideline	Description of compliance
uMgungundlovu District Municipality IDP and SDF	The Spatial Development Framework (SDF) is the legislated component of the municipality's Integrated Development Plan (IDP) that prescribes development strategies and policy guidelines to restructure and reengineer the urban and rural form. The SDF is the municipality's long-term vision of what it wishes to achieve spatially, and within the IDP programmes and projects. The SDF should not be interpreted as a blueprint or master plan aimed at controlling physical development, but rather the framework giving structure to an area while allowing it to grow and adapt to changing circumstances. The proposed project has considered and is guided by the Regions' SDF and IDP priorities of the area.
uMshwathi Local Municipality Draft Integrated Development Plan (IDP) 2018/19	In developing this plan, the municipality took cognisance of the process plan that was adopted by council in terms of the Municipal Systems Act, 32 of 2000 to embark on extensive consultative process. The plan adopted clarified the roles and responsibilities, organisational arrangements and as well scheduled timeframes and alignment with other processes at different level (sector departments and public engagement). The plan also establishes a firm foundation for the alignment of the IDP, budget preparation and performance management processes.

SECTION 3: NEED AND DESIRABILITY

It is an important requirement in the BA Process to review the need and desirability of the proposed project. Guidelines on Need and Desirability were published in the Government Gazette 38108 of 20 October 2014. These guidelines list specific questions to determine need and desirability of proposed developments. This checklist is a useful tool in addressing specific questions relating to the need and desirability of a project and assists in explaining that need and desirability at the provincial and local context. Need and desirability answers the question of whether the activity is being proposed at the right time and in the right place. Table 3-1 below includes a list of questions based on the DEA's Guideline to determine the need and desirability of the proposed project. It should be noted this table was informed by the outcomes of the BA Process.

Table 3-1: The Guideline on the Need and Desirability's list of 14 questions to determine the "Need and Desirability" of a proposed project (2014)

NEED	
Question	**Response**
1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area)?	
1.1. How were the following ecological integrity considerations taken into account?: 1.1.1. Threatened Ecosystems, 1.1.2. 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, 1.1.3. Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"), 1.1.4. Conservation targets, 1.1.5. Ecological drivers of the ecosystem, 1.1.6. Environmental Management Framework, 1.1.7. Spatial Development Framework, and 1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	The environmental sensitivities present on site were determined and assessed within the ecological and aquatic impact assessment undertaken for this project. The specialist identified all ecological sensitive areas on site that have to be avoided by the proposed development as well as how to suitably develop within these areas so that the ecological and aquatic integrity of the areas is maintained. It is for this reason that the development was changed from the original 14ha to 10ha, to avoid the "Irreplaceable" CBA as identified in Appendix B. More information regarding the sensitivities on site can be found in the specialist study attached as Appendix D.
1.2. How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	The environmental sensitivities present on site were determined and assessed within the ecological and aquatic impact assessment undertaken for this project (Appendix D). The specialist identified all ecological sensitive areas on site that have to be avoided by the proposed development as well as how to suitably develop within these areas so that the ecological integrity of

NEED	
Question	**Response**
	the areas is maintained. Measures to avoid, remedy, mitigate and manage impacts are included within the compiled Environmental Management Programme (EMPr), included as Appendix E of the Report, which forms part of this BA Report.
1.3. How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Measures to avoid, remedy, mitigate and manage impacts are included within the compiled EMPr, which forms part of this Report (Appendix E).
1.4. What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether; what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	Potential impacts associated with the proposed project, including waste generation are included in Section 6 of this Report, as well as in the EMPr included as Appendix E of this Report. Measures to avoid, remedy, mitigate and manage impacts are included within the compiled EMPr), which forms part of this Report.
1.5. How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	The Draft Basic Assessment Report has been uploaded to SAHRIS for SAHRA comment. Pre-screening of the site highlights no cultural and/or heritage features. The outcomes of the SHARIS evaluation will form part of the Final BA Report. The applicable measures to avoid, remedy, mitigate and manage impacts are included in the EMPr included as Appendix E of this Report.
1.6. How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	An Ecological and Aquatic Assessment has been undertaken with regards to the proposed project; the assessment includes a detailed profile of the natural environment and anticipated impacts. Measures to avoid, remedy, mitigate and manage impacts are included in the EMPr (Appendix E of this Report).
1.7. How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure	The proposed project involves a sugarcane cultivation and requires no electricity or water resources. The cultivation will be rain-fed and harvested by workers. The ecological integrity of the site will be maintained in the form of CBA irreplaceable, which is being avoided by the development following the findings of the Ecological and Aquatic Specialist Study.

NEED	
Question	**Response**
responsible and equitable use of the resources? What measures were explored to enhance positive impacts? 1.7.1. Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life) 1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources of the proposed development alternative?) 1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?	The overall proposed project is a sustainable option for the area and the proposed footprint will be placed to ensure avoidance and/or mitigation of any potential impacts to the receiving environment.
1.8. How were a risk-averse and cautious approach applied in terms of ecological impacts?: 1.8.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? 1.8.2. What is the level of risk associated with the limits of current knowledge? 1.8.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	The precautionary approach has been adopted for this assessment, i.e. assuming the worst-case scenario will occur and then identifying ways to mitigate or manage these impacts. Current gaps in knowledge include the number of other projects in the area that may reduce the cumulative amount of indigenous vegetation. Ways in which this gap is addressed is to consider the cumulative impact of all agricultural projects being developed within the area.

NEED	
Question	**Response**
1.9. How will the ecological impacts resulting from this development impact on people's environmental right in terms following: 1.9.1. Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? 1.9.2. Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	This is considered and addressed as part of the impact assessment in Section 6 below. An EMPr (Appendix E) has been compiled for the proposed project to ensure that all potential negative impacts identified are suitably managed and mitigated, and potential positive impacts are enhanced. The impact on the sense of place is difficult to predict and would potentially be ambiguous. This is due to the subjective nature of perceptions regarding the relative attraction or disturbance of agriculture in the landscape. The visual impact has been assessed as part of the impact assessment in Section 6.
1.10. Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	Due to the small size of the development and its context in an agricultural landscape, the proposed project will not reduce the local population's access to ecosystem services, and is seen as positive in terms of the socio-economic spin-off for previously unemployed people in the area. The proposed activity does not compromise any of the objectives set within the uMshwathi Local Municipalities Draft Integrated Development Plan (IDP) 2018/19. The proposed overall project will also be supportive of the IDP's objective of creating more job opportunities and improving livelihoods.
1.11. Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	The proposed activity does not compromise any of the objectives set within the uMshwathi Local Municipalities Draft Integrated Development Plan (IDP) 2018/19. The integrity of the existing environmental management priorities for the area will not be compromised by this development.
1.12. Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	Please refer to Section 5 of this Report.
1.13. Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Please refer to Section 6 of this Report.

NEED	
Question	**Response**
2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?:	
2.1.1. The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,	The uMshwathi Local Municipalities Draft Integrated Development Plan (IDP) 2018/19 states that one of their key performance areas is promoting local economic development through promoting greater procurement from local cooperatives and SMME's, providing incentives to local businesses for the use of local labour and by develop a programme to roll out agrarian projects. In addition, one of their development principles is to avoid the loss of agricultural land to non-agricultural activities, and the council recognized the need to actively support agricultural projects and ensure their long-term viability. This is done through promoting the Business Cooperative Programme to maintain sustainable development within agricultural land. Therefore, the development would help to address the need for employment and sustainable agricultural projects. The proposed activity does not compromise any of the objectives set within IDP. The proposed project will also be supportive of the IDP's objective of creating more job opportunities.
2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integration of segregated communities, need to upgrade informal settlements, need for densification, etc.),	This is not applicable to the project as the proposed project is located within an agricultural area.
2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)	The impact on sensitive natural areas would be limited due to the re-design of the project footprint to avoid sensitive vegetation. Due to sensitive features present on site, the site layout has been amended to avoid these features. Please see Appendix B for an amended site layout map including the avoided sensitive features. The area and site are ideal for the use of sugarcane cultivation due to a large amount of sugarcane practices in the area and access to local markets. The industry makes an important contribution to employment, particularly in rural areas, with direct employment opportunities observed in the sugarcane fields as well as the sugar mills in the provinces where cane is grown. The sugar industry benefits more than a million people that are dependent on the industry in South Africa. As noted, an EMPr was compiled for the proposed project to ensure that all potential negative impacts

NEED	
Question	**Response**
	identified are suitably managed and mitigated, and potential positive impacts are enhanced.
2.1.4. Municipal Economic Development Strategy ("LED Strategy").	The uMshwathi Local Municipalities Draft Integrated Development Plan (IDP) 2018/19 states that the municipality under Local Economic Development aims at promoting SMMEs and Cooperatives, such as the Mthethwa Trust. In addition, their investment and business retention plans that have been included in the LED Strategy support sustainable job creation in uMshwathi and the proposition of Agricultural businesses to be done by cooperatives is being explored**.**
2.2. Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? 2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	The uMshwati Integrated Development Plan, aims at establishing and promoting SMME's and establishing co-operatives to maximise economic opportunities in the agricultural sector as one of its development strategies. The proposed development is in line with this objective and could therefore contribute to the local economic opportunities, ultimately impacting socio-economic development of the area; in support of the region's spatial development opportunities.
2.3. How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	The need for improved job opportunities, an improved local economy and livelihood enhancement will be impacted on through this project. According to the uMshwathi Local Municipalities Draft Integrated Development Plan (IDP) 2018/19, the participation of indigenous people is limited in the local economy and the municipality has plans to promote the participation of the indigenous people in the existing value chains viz. timber, **sugarcane** and crocodile farming. The will reduce the potential for conflict amongst the race groups in the future and promote social cohesion.
2.4. Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long term? Will the impact be socially and economically sustainable in the short- and long-term?	Please see Section 6 for further information.
2.5. In terms of location, describe how the placement of the proposed development will:	
2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,	N/A as the proposed project is located within a sparsely populated agricultural area.
2.5.2. reduce the need for transport of people and goods,	N/A as the proposed project is located within a sparsely populated agricultural area.
2.5.3. result in access to public transport or	N/A as the proposed project is located within a

NEED		
Question		**Response**
	enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	sparsely populated agricultural area. This project is an agricultural project and not a transportation project.
2.5.4.	compliment other uses in the area,	The preferred project site is currently being zoned agricultural and this is intended for agricultural purposes. The site is deemed to be of moderate agricultural potential and is in line with the agrarian planning of the area.
2.5.5.	be in line with the planning for the area,	
2.5.6.	for urban related development, make use of underutilised land available with the urban edge,	N/A as the proposed project is located within a sparsely populated agricultural area.
2.5.7.	optimise the use of existing resources and infrastructure,	The proposed project will make use of the existing access roads. There are no resource requirements (i.e. water or electricity) for this project and there will be no infrastructure constructed on site.
2.5.8.	opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	This project is an agricultural project and not related to bulk infrastructure expansion.
2.5.9.	discourage "urban sprawl" and contribute to compaction/densification,	Not applicable as the project is not proposed in an urban area where social impacts are expected to manifest.
2.5.10.	contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	N/A as the proposed project is located within a sparsely populated agricultural area.
2.5.11.	encourage environmentally sustainable land development practices and processes,	Based on the findings of this BA, the proposed project would not have a significant ("high") negative impact on the receiving environment, with the implementation of suitable mitigation measures and the avoidance of the sensitive CBA. No impacts of high significance (with the revised and smaller footprint) were identified in the BA. The project will make use of rain-fed irrigation and best practice for soil and land management will be implemented. It is also important to point out that the proposed project will be designed according to relevant national specifications and standards which are regarded as best practice in the sugarcane sector.
2.5.12.	take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	Please refer to Section 5 for a description of the process undertaken to identify the site is a preferred site for the proposed project.

NEED	
Question	**Response**
2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	N/A as the proposed project is located within a sparsely populated agricultural area.
2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	The impact of the proposed project on cultural/heritage areas (archaeology and palaeontology) was assessed in Section 6 and all comments from the heritage authority will be included in the FBAR.
2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	The main economic driver in the rural component of the municipality is agriculture (forestry and sugarcane). The primary objective of the SDF in this area is therefore to provide opportunities for both this sector while minimizing mutually negative impacts. Commercial agriculture and tourism (where the potential exists) are the main economic drivers, and the needs of both sectors need to be accommodated.
2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	
2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Please refer to Section 6 for the impact assessment methodology.
2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	
2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
2.7. How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Please refer to Section 6 for the detailed impact assessment. It must be noted that this is a small project with limited activities (i.e. cultivation), and will not impact significantly on the socio-economic landscape of the area.
2.7.2. Positive impacts. What measures were taken to enhance positive impacts?	
2.8. Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies	

NEED	
Question	**Response**
applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	
2.9. What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	
2.10. What measures were taken to pursue environmental justice 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 (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	
2.11. What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	
2.12. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	
2.13. What measures were taken to:	
2.13.1. ensure the participation of all interested and affected parties,	The PPP undertaken to date as part of the BA process is included in Section 4 and Appendix C of this Report. Various methods have been employed to notify potential (I&APs) of the proposed project, namely, through a Background Information Document (BID), adverts, site notices on site and notification letters.
2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	
2.13.3. ensure participation by vulnerable and disadvantaged persons,	
2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	The BA process has taken cognisance of all interests, needs and values espoused by all interested and affected parties. Opportunity for public participation has been provided to all I&APs throughout the BA process in terms of the 2014 EIA Regulations, as amended.
2.13.5. ensure openness and transparency, and access to information in terms of the process,	The PPP undertaken to date as part of the BA process is included in Section 4 and Appendix C of this Report. This has been updated with the PPP undertaken during the distribution of the Draft BA Report. Various methods have been employed to notify potential (I&APs) of the proposed project,

NEED	
Question	**Response**
	namely, through a BID, adverts, site notices on site and notification letters.
2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge,	The BA process has taken cognisance of all interests, needs and values adopted by all interested and affected parties.
2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein was promoted.	Public participation of all I&APs has been promoted and opportunities for engagement have been provided throughout the BA process.
2.14. Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	The proposed project presents viable long term benefits for the community and society in the area. Recommendations made within the EMPr (Appendix E) have the potential to facilitate more options to local community members in terms of socio-economic benefits.
2.15. What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	An EMPr has been developed to address health and safety concerns. An Environmental Control Officer will be appointed to monitor compliance.
2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1. the number of temporary versus permanent jobs that will be created,	It must be noted that this is a small project with limited activities (i.e. cultivation only), and will not impact significantly on job creation and employment as it will only provide limited number of jobs for the members of the Trust. However, as the members of the Trust are currently unemployed, the project will have a significant positive impact on their livelihoods through income generation. The South African sugar industry is one of the driving forces behind South Africa's economy and continues to make a valuable contribution to the country's economy. This is due to its agricultural and industrial investments, foreign exchange earnings, its high employment and linkages with major suppliers, support industries and customers. This economy is built on a diverse industry including agricultural activities of sugarcane cultivation and the industrial factory production. South Africa's sugar industry is recognised as constantly ranking in the top 15 out of
2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),	
2.16.3. the distance from where labourers will have to travel,	
2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits),	
2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	

NEED	
Question	**Response**
	approximately 120 sugar producing countries in the world. According to the South African Sugar Association (SASA), the industry generates an annual average income of approximately R8 billion. The industry makes an important contribution to employment, particularly in rural areas, with direct employment opportunities observed in the sugarcane fields as well as the sugar mills in the provinces where cane is grown. The sugar industry benefits more than a million people that are dependent on the industry in South Africa.
2.17. What measures were taken to ensure:	
2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment,	Legislation, policies and guidelines, which could apply to impacts of the proposed project on the environment, have been considered. The scope and content of this BA Report has been informed by applicable integrated environmental management legislation and policies. Section 3 of this Report and the specialist studies included in this Report also provide a description of the relevant applicable legislation that the proposed development complies with.
2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	Public Participation has been undertaken as part of the BA process, and to this date the CSIR has not received information on potential conflicts of interest.
2.18. What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	Public participation forms an integral part of the Environmental Assessment Process and assists in identifying issues and possible alternatives to be considered during the BA Process.
2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	The proposed mitigation measures included in the EMPr (Appendix E) of this Report have been informed by the Specialist studies undertaken and this includes a detailed assessment of the environment as well as the impacts associated with the proposed development. Based on material and socio-economic terms, and measured to the value of the best alternative that is not chosen, the proposed project will result in positive opportunity costs.
2.20. What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	The EMPr (Appendix E) of this proposed project must form part of the contractual agreement and be adhered to by both the contractors/workers and the applicant.

NEED	
Question	**Response**
2.21. Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	Please see Section 5 for a detailed motivation for the exclusion of alternatives.
2.22. Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	In assessing the cumulative impacts of the proposed development, particular attention must be given to the loss of CBA: Irreplaceable, which is why the development footprint was reduced and avoided this CBA. The cumulative socio-economic benefit offered by the development in the area are positive. The cumulative impact of the proposed development is therefore considered to be of moderate significance.

Project Estimated Socio-economic Value

Anticipated CAPEX value of the project on completion	**R 200 000**
What is the expected annual turnover to be generated by or as a result of the project?	R 400 000
New skilled employment opportunities created in the construction phase of the project	3
New skilled employment opportunities created in the operational phase of the project	3
New un-skilled employment opportunities created in the construction phase of the project	10
New un-skilled employment opportunities created in the operational phase of the project	4
What is the expected value of the employment opportunities during the operational and construction phase?	R 250 000

SECTION 4: MOTIVATION FOR THE PREFERRED ALTERNATIVES

Agriculture is the backbone of the uMshwati Municipality's economy, with a large portion of the municipal population employed in this sector. The Mthethwa Trust is proposing to cultivate 10 hectares of fallow land for sugarcane production on Broughton Farm, Albert Falls, Kwa-Zulu Natal. The proposed area of development has been informed by the specialist study conducted as part of this assessment and the initial proposed footprint of 14 ha was reduced and the layout was revised to 10 hectares as a measure to avoid areas of high sensitivity (CBA: Irreplaceable). The proposed development is located on land currently leased by The Trust. The current land-use of Broughton Farm is open-space (no activities occurring). The proposed development would enable the business to engage in sugarcane cultivation and ultimately sustain the business. The proposed activity will contribute towards socio-economic upliftment as there is a guaranteed market for cane production in the province. Activities on site for the proposed development will include the clearance of vegetation, ploughing, planting and harvesting of sugarcane. Cane will be removed; cut and stacked for removal by a loader. Manual cutting and stacking allows for employment opportunities for unskilled and semi-skilled people from the local community.

Motivation for the exclusion of alternatives:

1. Site location and layout alternatives

The Department of Environmental Affairs (DEA) commissioned the Council for Scientific and Industrial Research (CSIR) to run the "Special Needs and Skills Development (SNSD) Programme" which is aimed at providing pro bono Environmental Impact Assessments (EIAs) for people who are classified as special needs clients/applicants, specifically Small, Medium and Micro Enterprises (SMMEs), Community Trusts, Individuals or Government Programmes. The CSIR received an application from the Mthethwa Trust under the SNSD Programme. The CSIR identified the Trust as a client or a special needs applicant and has agreed to assist them with acquiring Environmental Authorization for the project on a *pro bono* basis, including the cost of the basic assessment, specialist studies, site visits and human resources. Please refer to **Appendix F** for a referral letter from the Department of Economic Development and Environmental Affairs KZN for this application.

The Mthethwa Trust is a small family enterprise which is aiming to expand to further its economic viability in the future. The site which is being investigated in this report is the only site available to this entity and there are no available alternative sites to be considered. The layout of the proposed project has been carefully informed by the findings of the Ecological and Aquatic Impact Assessment (Appendix D).

2. Design, technology & operational alternatives

The operating plan for the proposed project has been informed by extensive market research and an assessment of the need of the products that will be produced. A robust economic assessment has been submitted to the SNSDP for the approval of this project. In addition to the economic viability, the project does not make use of major technologies, which in turn results in the proposed development requiring very little energy. There will be no solid waste being produced by the project and no infrastructure is being planned for the site. The cane is being sold 100% locally and the jobs being created by the proposed development will be sourced to local communities. The pre-development research which has been conducted on this project has been extensive, including feasibility studies and market research as well as production research. Applying the top principles in cane cultivation will be adopted by the Trust. In terms

of technology, rain-water will be used for irrigation which is deemed the most sustainable and environmentally friendly option. There will be hand-harvesting taking place, and thus no other technology alternatives will be further discussed. In addition, the environmentally friendly design of the project ensures that there are zero energy requirements. In terms of the positives which have given rise to this development option being pursued, some of the major factors are:

- There is a guaranteed market for the cane from the proposed project at in the province and the price is set by the SA Sugar Association after marketing the final sugar product and its bi-products locally and internationally.
- In terms of capacity building, over the term of the business, the members of the Trust will be exposed to the field of business, operations, finances, human resources and farm management.
- No resources are required for the project (i.e. water, energy) and no waste will be produced.

Thus, due to the nature of the industry, the support structures and the knowledge and experience of the Trust, the proposed project alternatives are the only viable alternatives to take forward to the Impact Assessment phase.

SECTION 5: PUBLIC PARTICIPATION PROCESS

This section provides an overview of the tasks undertaken during the BA Phase, with a particular emphasis on providing a clear record of the PPP followed. All comments submitted during the project announcement and 30-day review of the Draft BA Report will be incorporated into the finalised BA Report, as applicable and where necessary. The finalised BA Report will be submitted to the DEDTEA, in accordance with Regulation 19 (1) of the 2014 NEMA EIA Regulations (as amended), for decision-making in terms of Regulation 20 of the 2014 NEMA EIA Regulations (as amended April 2017).

5.1 Determination of Appropriate Measures

The section below which provides a detailed outline of the measures taken to include all potential I&APs during the BA Process (as required by Regulation 41(2)(e), 41(6) and 41(2)(b) of GN R326, in terms of the 2014 NEMA EIA Regulations (as amended)).

Proof of emails sent during the Project Initiation Phase (i.e. for the release of the Background Information Document (BID) and Letter to I&APs, Stakeholders and Organs of State) has been included in **Appendix C**. In terms of Regulation 41(2)(e) of GN R326, at this stage of the assessment process no persons have been identified as desiring but unable to participate in the process. Therefore, no alternative methods have been agreed to by the competent authority during the pre-application meeting.

In line with Regulation 41(2)(b) of GN R326 and prior to the commencement of the BA Process an initial database of I&APs (including key stakeholders and Organs of State) was developed for the BA Process. Appendix C of this BA Report contains a detailed copy of the I&AP database which indicates interaction with I&APs, key stakeholders and all I&APs registered on the project database during the BA Process. The current I&AP database has been updated to include requests to register interest in the project, and comments received following the project announcement.

In terms of the electronic database, I&AP details are captured and automatically updated as and when information is distributed to or received from I&APs. This ongoing record of communication is an important component of the PPP. It must be noted that while not required by the Regulations, those I&APs proactively identified at the outset of the BA Process will remain on the project database throughout the process and will be kept informed of all opportunities to comment and will only be removed from the database by request (it should be noted that to date, no requests to de-register were received by the EAP).

At the time of compiling this Draft BA Report for release to I&APs, Organs of State and stakeholders in June 2018, the database included 74 registered I&APs.

While I&APs have been encouraged to register their interest in the project from the start of the process, following the public announcements, the identification and registration of I&APs is ongoing for the duration of the study. Stakeholders from a variety of sectors, geographical locations and/or interest groups are expected to show an interest in the proposed project, for example:

- Provincial and Local Government Departments;
- Local interest groups, for example, Councillors and Rate Payers associations;
- Surrounding landowners;
- Farmer Organisations;
- Environmental Groups and NGOs; and
- Grassroots communities and structures.

As noted in the sections above, the Mthethwa Trust 10ha sugarcane cultivation will include one farm portion (Broughton Farm) in the Kwa-Zulu Natal. The landowner of the affected farm property has given consent (Appendix F) and included on the database of I&APs (as included in Appendix C). Therefore, written notice has been provided to the occupiers of the site (in accordance with Regulation 41 (2) (b) (i) of the 2014 NEMA EIA Regulations (as amended)).

5.2 Approach to the PPP

In terms of Regulation 41(6) of GN R326 the section below outlines the PPP for this assessment in order to provide potential I&APs, Stakeholders and Organs of State access to information on the project and the opportunity to comment at the various stages of the assessment process. It should be noted that no deviations from the PPP have been requested or undertaken.

5.3 Project Initiation Phase - Identification and Notification to I&APs and Organs of State

The following summarises the PPP undertaken up to the release of the Draft BA Report for I&AP Review:

- **Database Development and Maintenance**: In line with Regulation 41(2)(b) of GN R326, prior to the commencement of the BA Process, an initial database of potential I&APs was developed for the BA Process. As noted above, while not required by the Regulations, all I&APs (and authorities and Organs of State) proactively identified prior to advertising the BA Process will remain on the database for the duration of the assessment process. As comments are received or requests to register interest are received from I&APs during the project, the database is amended to include these I&APs as registered I&APs. A copy of the updated I&AP database is included in Appendix C of this BA Report.
- **Letter 1 to I&APs**: As noted above, I&APs were notified via a Letter (dated 5 September 2017) of the Project Initiation Phase. Letter 1 to I&APs was emailed to I&APs and organs of state on the database (where email addresses were available), as well as posted to those whose email addresses were not available.
- **Background Information Document:** A BID was released to all pre-identified I&APs on **5 September 2017** highlighting the project details and requesting I&APs to register on the database. This BID was also released to key organs of state and Government Departments. A copy of the BID is included in Appendix C of this BA Report.
- **Comments Received:** All comments received on this project (prior to the release of this Draft BA Report) have been captured in a comments and responses trail in Appendix C.
- **Access to Information**: All project information has been made available on an easily accessible website: https://www.csir.co.za/environmental-impact-assessment

5.4 BA Report Phase - Review of the Draft BA Report (Current Stage)

As noted above, the Draft BA Report (this report) is currently being released to I&APs for review. The section below summarises the PPP for the review of the BA Reports.

- **Database Maintenance**: As noted above, at the time of release of this BA Report for comment, 74 I&APs were registered on the project database. The current database is included in Appendix C of this Draft BA Report.
- **Letter 2 to I&APs**: Written notification of the availability of the Draft BA Report will be sent to all I&APs and Organs of State registered on the project database via Letter 2 via email (where email

addresses were available) and post (where addresses were available). The letter includes notification of the 30-day comment period for the Draft BA Report. Proof of delivery and a copy of the emails sent will be included in Appendix C of the finalised BA Report (which will be submitted to the DEDTEA for decision-making).

- **Newspaper Advertisement:** In order to notify and inform the public of the proposed project and invite I&APs to register on the project database, the BA Process is to be advertised in a local newspaper. The newspaper advertisement is being placed at the same time as the release of this Draft BA Report to allow for I&APs to also comment on the Draft BA Report for 30 days. Proof of the placement f this advertisement will thus be included in the Final BA Report as Appendix C. The newspaper advertisement will provide the details of the project website (i.e. https://www.csir.co.za/environmental-impact-assessment) where information available on the project could be downloaded from.
- **Site Notice Boards:** Regulation 41 (2) (a) of the 2014 NEMA EIA Regulations (as amended) requires that a notice board providing information on the project and BA Process is fixed at a place that is conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of the site where the application will be undertaken or any alternative site. To this end, notice boards will be placed at the same time as the release of this Draft BA Report and the locations and proof thereof will be shown in Appendix C of the Final BA Report.
- **30-day Comment Period**: As noted above, registered I&APs, including authorities and Organs of State, were notified via Letter 2, of the 30-day comment period for the BA Report which extends from **5 July 2018 to 6 August 2018.**
- **Availability of Information:** The Draft BA Report was made available and distributed to ensure access to information on the project and to communicate the outcome of specialist studies. A copy of the report was placed at the Msunduzi Municipal Library (771 Bombay Road, Northdale, Pietermaritzburg) for I&APs and Stakeholders to access for viewing. Key authorities were provided with either a hard copy and/or CD of the Draft BA Report via courier. The Draft BA Report was also uploaded to the project website (i.e. https://www.csir.co.za/environmental-impact-assessment) and telephonic consultations will take place, as necessary.
- **Comments Received**: A key component of the BA Process is documenting and responding to the comments received from I&APs and the authorities. Copies of all comments received during the review of the Draft BA Reports will be included in Appendix C of the Final BA Report and in the Comments and Response Report (Appendix C of the Final BA Report), which will be submitted for decision-making. The Comments and Responses Report indicates the nature of the comment, as well as when and who raised the comment.

5.5 Compilation of Finalized BA Report for Submission to the DEDTEA

- Following the 30-day commenting period of this Draft BA Report and incorporation of the comments received into the reports, the finalised BA Report (i.e. hard copies and electronic copies) will be submitted to the DEDTEA in line with Regulation 19 (1) (a) of the 2014 NEMA EIA Regulations (as amended). In line with best practice, I&APs on the project database will be notified via email (where email addresses are available) of the submission of the finalised BA Report for decision-making.
- The BA Report that is submitted for decision-making includes proof of the PPP that was undertaken to inform Organs of State, Stakeholders and I&APs of the availability of the Draft Report for the 30 day review (as explained above).
- The DEDTEA will have 107 days (from receipt of the finalised BA Report) to either grant or refuse EA (in line with Regulation 20 (1) of the 2014 NEMA EIA Regulations, as amended on 7 April 2017).

5.6 Environmental decision-making

- **Environmental Decision-Making and Appeal Period** - Subsequent to the decision-making phase, if an EA is granted by the DEDTEA for the proposed project, all registered I&APs, Organs of State and stakeholders on the project database will receive notification of the issuing of the EA and the appeal period. The 2014 NEMA EIA Regulations (as amended) (i.e. Regulation 4 (1)) states that after the Competent Authority has a reached a decision, it must inform the Applicant of the decision, in writing, within 5 days of such decision. Regulation 4 (2) of the 2014 NEMA EIA Regulations (as amended) stipulates that I&APs need to be informed of the EA and associated appeal period within 14 days of the date of the decision. All registered I&APs will be informed of the outcome of the EA and the appeal procedure and its respective timelines. A letter (i.e. Letter 3) will also be sent via registered mail and email to all registered I&APs, Stakeholders and Organs of State (where postal, physical and email addresses are available) on the database. The letter will include information on the appeal period, as well as details regarding where to obtain a copy of the EA. In addition, all I&APs on the project database will be notified of the outcome of the appeal period in writing.

SECTION 6: DESCRIPTION OF THE BASELINE ENVIRONMENT

6.1 Site description

The proposed project is located on 10 ha of the 14 ha Broughton Farm, 22km north on the R33 from Pietermaritzburg, uMshwati Municipality. The Municipality is predominantly rural in nature, with the dominant land use being commercial agriculture due to the medium to high agricultural potential of a large portion of the municipal area. The land use is characterised by open space or fallow grassland, neighbouring agricultural activities and the uMngeni River. The proposed development site comprises of natural grassland, located on generally flat topography.

6.2 Climate

The area surrounding Albert Falls (within 5km of the project site) normally receives about 790mm of rain per year, with most rainfall occurring mainly during mid-summer. It receives the lowest rainfall (6mm) in June and the highest (129mm) in January. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Albert Falls range from 20.9°C in June to 27.6°C in February. The region is the coldest during July when the mercury drops to 5.3°C on average during the night.

6.3 Biodiversity

The vegetation occurring within and adjacent to the site is characterised by a mosaic of grassland and open savanna/woodland (Figure 6-1). The open savanna/woodland component comprises a well-defined tree layer that is dominated by *Acacia sieberiana* trees interspersed by a number of exotic Syringa trees (*Melia azederach*). The understorey layer contains mostly weedy/ruderal species, including invasive alien plants such as *Bidens pilosa*, *Lantana camara* and *Tagetes minuta*. The grassland areas adjacent to the open savanna/woodland support a more moderate diversity of herbs, with the following species found to be dominant across the site at the time of the site visit: *Ajuga ophrydis*, *Becium obovatum*, *Eriosema cordatum*, *Gerbera ambigua*, *Helichrysum nudifolium*, *Hypoxis hemerocallidea*, *Kohautia amatymbica*, *Ledebouria floribunda*, *Ruellia cordata*, *Thunbergia atriplicifolia* and *Zornia capensis* (see also Figure 3-3). A reasonable proportion of the species recorded are characteristic of Ngongoni Veld and KwaZulu-Natal Hinterland Thornveld, as defined by Rutherford *et al.* (2006). These include the distinctive tree: *Acacia sieberiana*; the herbs/geophytic herbs: *Chaetacanthus setiger*, *Gerbera ambigua*, *Hermania grandistipula* and *Hypoxis argentea*. Several grasses were also observed, but could not be accurately identified due to a lack of inflorescences. These include species from the following genera: *Aristida*, *Eragrostis*, *Hyparrhenia*, *Panicum* and *Sporobolus* – it is likely that several grass species are also indicative of the natural vegetation types for the area (i.e. Ngongoni Veld and KwaZulu-Natal Hinterland Thornveld). Localised disturbances in the form of sites cleared of vegetation, and to a lesser extent felled *Acacia sieberiana* trees and solid waste dumping have given rise to pioneer and weedy species with a small to moderate infestation by invasive alien plants (IAPs).

The southern third (~ 4.8 ha) of the Broughton site contains land that is classified as CBA: Irreplaceable according to the latest SCA **(see detailed maps in Appendix B).** Thus, from a conservation perspective, the area is considered irreplaceable in terms of maintaining biodiversity targets. This may appear to contradict the status of vegetation, which suggests that the northern section is more sensitive (i.e. Dry Coast Hinterland Thornveld as Vulnerable vegetation type). Reason for this is due to more localised and more vital biodiversity features that are of greater importance in terms of meeting biodiversity targets within KZN. Appendix B illustrates that distribution and extent of formally protected areas and CBAs in relation to the site

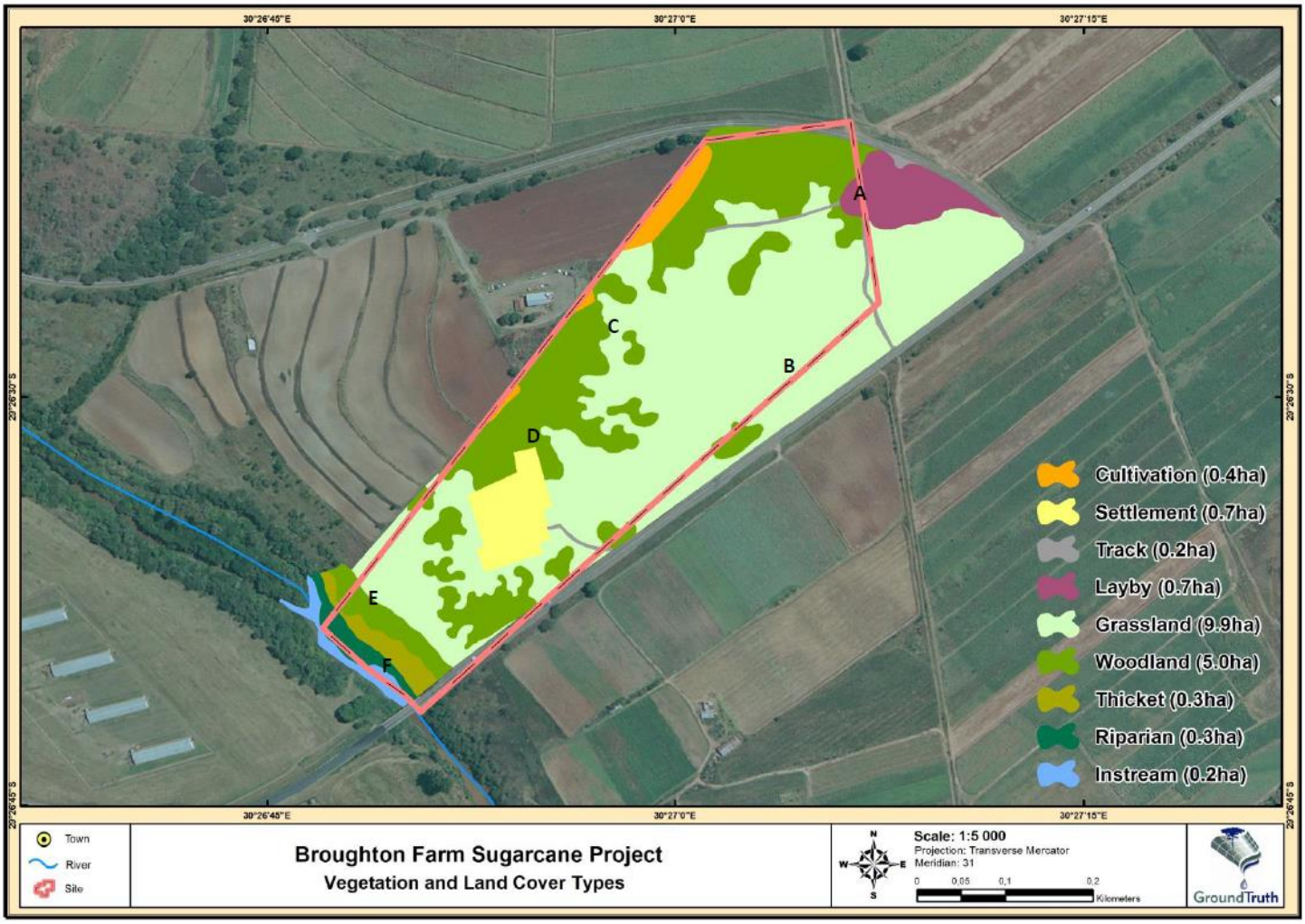

Figure 6-1: Distribution and extent of various land cover types on site (Specialist Report – Appendix D) (A – F refer to cross references to site photographs shown on Page 17 of the Specialist Report)

The following points present a summary of conservation important fauna, listed according to respective indicator groups/taxa that potentially occur within the broader landscape under natural/untransformed conditions:

Butterflies – Up to 150 species of butterfly have been recorded from the broader study area based on the 2930AD quarter degree cell within which the Broughton Farm is located (ADU, 2017). This represents about 30% of the butterfly diversity in KZN. Only a single Red Listed species is known to occur within the broader study area, i.e. Karkloof Blue *Orachrysops ariadne* (Endangered).

Amphibians – Approximately 35 species of amphibian potentially occur within the area under natural conditions. This represents about 50% of the frog diversity in KZN. A small fraction of the potential amphibian diversity includes species of conservation concern, namely: Natal Leaf-folding Frog *Afrixalus spinifrons* subsp. *spinifrons* (Near Threatened) and Spotted Shovel-nosed Frog *Hemisus guttatus* (Vulnerable) (Minter *et al.*, 2004).

Reptiles – Up to 60 species of reptile potentially occur within the area under natural conditions, and represents about 30% of the diversity in KZN. The list of potential reptiles includes 34 snakes, 23 lizards, one tortoise and one terrapin. According to Bates *et al.* (2014), four of these species are Red Listed,

namely: Stripped Harlequin Snake *Homoroselaps dorsalis* (Near Threatened), Natal Black Snake *Macrelaps microlepidotus* (Near Threatened), KwaZulu Dwarf Chameleon *Bradypodion melanocephalum* (Vulnerable) and Large-scaled Grass Lizard *Chamaesaura macrolepis* (Near Threatened).

Birds – According to the South African Bird Atlas Project 2 (SABAP2), up to 280 bird species have been recorded from Pentad 2925_3025 within which the Broughton Farm is located (SABAP2, 2017). This includes 13 Red Listed species – four are Endangered, six are Vulnerable and three are Near Threatened (Taylor *et al.*, 2015). Most of these birds are only occasionally recorded in the area (recorded <5% of the time). Grey Crowned Crane *Balearica regulorum* (Endangered), Lanner Falcon *Falco biarmicus* (Vulnerable) and Southern Bald Ibis *Geronticus calvus* (Vulnerable) are generally encountered more frequently (SABAP2, 2017).

Mammals – Approximately 60 species of mammal potentially occur within the area under natural conditions. This represents about 30% of the mammal diversity in KZN. About 60% of this diversity is made up of small and/or crepuscular/nocturnal species that are generally difficult to detect (e.g. rodents, shrews and bats). Of the potential diversity, 24 are Red Listed of which 19 are rodents, shrews and bats that are listed as Data Deficient and Near Threatened (Friedmann and Daly, 2004; Monadjem *et al.*, 2010). Two Threatened species potentially occurring in the broader area include Oribi *Ourebia ourebi* (Endangered) and Rough-haired Golden Mole *Chrysospalax villosus* (Critically Endangered).

6.4 Water Resources

According to the available NFEPA coverage, there are no NFEPA wetland or river systems within the site study, as well as within the immediate vicinity of the site (i.e. within a 500 m radius of the site as recommended by the Department of Water and Sanitation, DWS) (Nel *et al.*, 2011). Only a few small, "low priority" wetlands are located a short distance outside of the 500 m DWS radius, and Albert Falls Dam is classified as a FEPA on the basis that it is an important water resource from an socio-economic perspective. Figure 6-2 below illustrates the distribution and extent of wetland and river systems in relation to the site, including NFEPA wetland systems based on national scale mapping and classification, as well as desktop mapping of aquatic features (riparian and instream habitats, wetlands, and dams) that occur within the 500 m DWS radius. The desktop mapping shows that the actual site contains riparian and riverine habitats along the southern boundary of the site, and it is highly unlikely that other aquatic ecosystems (e.g. wetland habitat) occur elsewhere on-site.

The only aquatic ecosystem occurs along the site's southern boundary and comprises of the uMngeni River and associated riparian habitat on the left bank of the watercourse. Located about four kilometres downstream of Albert Falls Dam, the ecological functions and processes of the system have been influenced by the operational regime of the dam since construction in 1976. Paramount to this has been the significant alteration of the natural flow regime exhibiting a reversed hydrograph with high flow releases in winter and lower volumes in the summer wet season (Dickens *et al.*, 2008). Structure of the riparian vegetation community has undergone significant change with a notable decrease in grass/reed cover and an increase in shrubs and trees. 0ther components of the system have also been affected, such as reduced diversity of fish and changes in the aquatic invertebrate communities. The riparian and instream habitats that are associated with the site are a D and C Ecological Category. This indicates that the riparian zone is 'largely modified' denoting that there has been a reasonably large loss of natural habitats, biota and basic ecosystem functions within the system. The findings are also somewhat congruent with the 2014 DWS PES EI ES assessment, which rated the 9.5 km reach of the uMngeni River within which the site is located as a C Ecological Category (DWA, 2014).

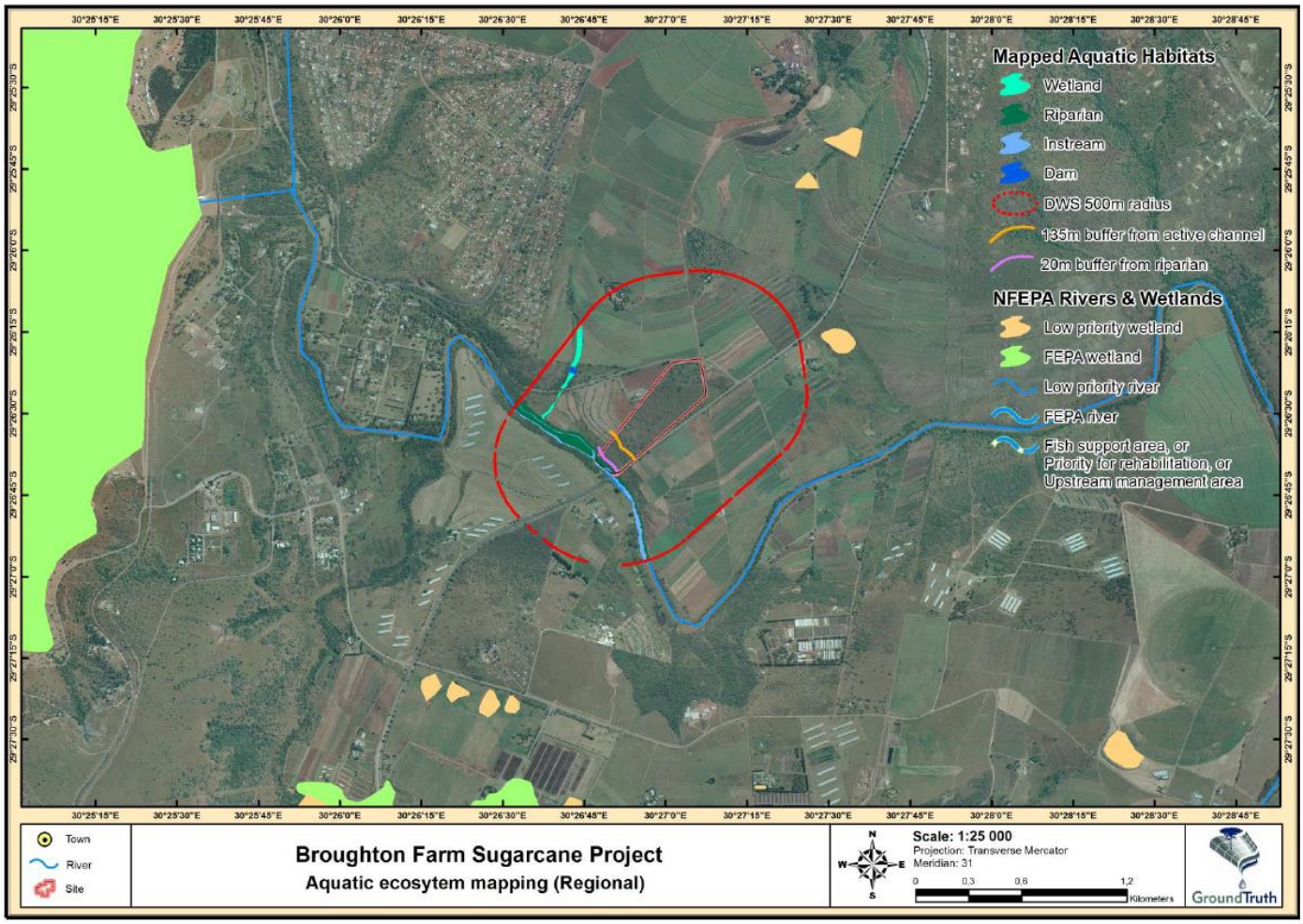

Figure 6-2: Overview of NFEPA systems within the broader study area (regional view) (Appendix D)

6.5 Socio-economic

The proposed development site is located near Albert Falls which falls in the uMshwathi Municipality (KZN221). uMshwati is situated within the uMgungundlovu District Municipal area, to the north of Msunduzi Municipality (Pietermaritzburg). The political leadership of uMshwathi Municipality comprises 26 Councillors representing 13 wards. Covering a land area of approximately 1924 square kilometres, the uMshwathi Municipality has a total of 106 374 people living in approximately 23 732 households according to Census 2011. With regard to the population statistics for uMshwathi Municipality, there has been an outward migration of its people to major cities and centres in other municipalities. Some of the reasons identified for this migration include peoples' search for a wider scope of employment and other opportunities which are currently limited in uMshwathi Municipality. Despite the uMshwathi Municipality experiencing a negative growth rate of -1,2 since 2007 according to the Census 2011, the Municipality still has the second largest population in the uMgungundlovu District after Msunduzi Municipality. uMshwathi Municipality is home to approximately 11% of the total 1 017 763 people living within the uMgungundlovu District Municipal area.

The land within the Municipality is dominated by agricultural landscapes (timber and sugar-cane) and rural-residential settlements. The four main urban centres within the Municipality are New Hanover, Wartburg, Dalton and Cool Air. While each of these centres vary in terms of the services they offer, the Primary Centre/ Node is New Hanover which serves as the —Administrative Hub of the Municipality.

Table 6-1: Census data of the uMshwati Municipality

uMSHWATHI MUNICIPALITY CENSUS DATA 1996, 2001 and 2011			
Demographic Indicators	**1996**	**2001**	**2011**
Population Size			
Total Population	113229	108422	106374
Growth Rates		-1.2	-0.2
Change (%)			
Population Composition			
Young (0-14)	40936	39258	34881
Working Age (15-64)	66592	63728	65970
Elderly (65+)	5702	5435	5523
Sex ratio(Women/men)	86	88	90
Dependancy Ratio	70	70.1	61.2
Disabled (%)			
Population Groups			
Black African	108136	104080	101172
Coloured	164	198	263
White	3273	2146	2862
Indian/Asian	2162	1998	1823
Socio Economic Indicators	**1996**	**2001**	**2011**
Female and Child Headed Households			
Female headed households	10027	12293	13787
Child headed households	311	289	248
Population Size			
Total Population	113229	108422	106374
Growth Rates		-1.2	-0.2
Change (%)			

Outside of these main urban areas, are various other nodes which boast thriving economic activities, high concentrations of people, mixtures of land use and the availability of goods and services essential for the communities living around these nodes e.g. Bhamshela, Swayimane, Appelsbosch, Crammond, etc. Throughout the Municipality, there is a broad spectrum of services, facilities, amenities and other opportunities which aim to improve the Municipality's economic, social, political and environmental status. The Municipality is also characterized by large tracts of land under traditional authority/Ingonyama Trust Board. The Municipality ensures that Traditional leaders participate fully and contribute to the developments initiatives and decision making processes.

As mentioned above, uMshwathi municipality is vastly dominated by agricultural land which according to the SDF 2016/17 framework illustrates three categories which mostly are dominating. Areas located in the western and eastern side of the municipality is predominately high agricultural land and where non-agricultural development which would detract from the production potential of these areas should be discouraged. The main economic driver in the rural component of the municipality is agriculture (forestry and sugarcane). The primary objective of the SDF in this area is therefore to provide opportunities for

both this sector while minimizing mutually negative impacts. The following general planning principles should apply in the rural component of the municipality: Commercial agriculture and tourism (where the potential exists) are the main economic drivers, and the needs of both sectors need to be accommodated. Figure 6-3 bellow illustrates the dominant agricultural setting of uMshwathi municipality.

The agricultural and manufacturing sectors contribute 41.5% and 19.9% to the local GDP respectively. (Statistics SA 2011). Sugarcane and timber plantations contribute the most to this GDP. Chicken houses are playing an ever-increasing role as well. Manufacturing activities are mainly related to agricultural processing activities, notably sugar and timber processing activities, and to a lesser extent processing and manufacturing of food. In the interim, a superficial glance at the Municipality indicates the major industries as Illovo sugar milling in Noodsberg and the sugar and maize mill and tannin producing plant of UCL Company Limited in Dalton. Other businesses of significance include the feedlots of Triple A, Crafcor and Mountain Valley. There is evidence of numerous downstream industries developing as a consequence of these industries.

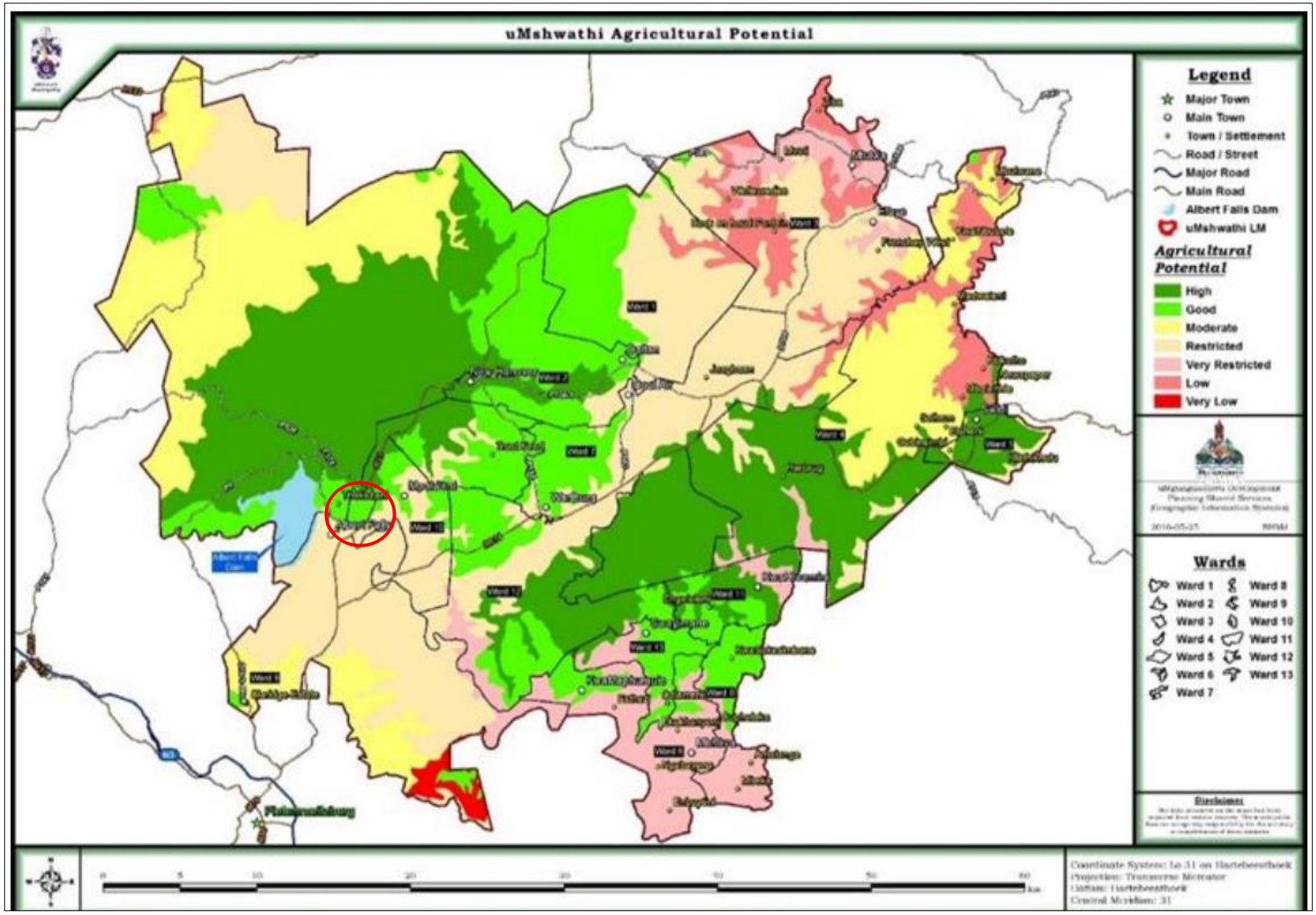

Figure 6-3: Dominant Agricultural setting of uMshwathi municipality (red circle indicates project area) (uMshwati IDP 2018/19)

SECTION 7: IMPACT ASSESSMENT

Methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks

APPROACH TO THE BASIC ASSESSMENT

1) METHODOLOGY OF IMPACT ASSESSMENT

According to the DEA IEM Series guideline on "Impact Significance" (2002), there are a number of quantitative and qualitative methods that can be used to identify the significance of impacts resulting from a development. The process of determining impact significance should ideally involve a process of determining the acceptability of a predicted impact to society. Making this process explicit and open to public comment and input would be an improvement of the EIA/BA process. The CSIR's approach to determining significance is generally as follows:

- Use of expert opinion by the specialists ("professional judgement"), based on their experience, a site visit and analysis, and use of existing guidelines and strategic planning documents and conservation mapping (e.g. SANBI biodiversity databases);
- Review of specialist assessment by all stakeholders including authorities such as nature conservation officials, as part of the report review process (i.e. if a nature conservation official disagreed with the significance rating, then we could negotiate the rating); and
- Our approach is more a qualitative approach - we do not have a formal matrix calculation of significance as is sometimes done.

2) SPECIALIST CRITERIA FOR IMPACT ASSESSMENT

The following methodology has been provided by the CSIR to the specialist who conducted the Ecological assessment, NSS, for incorporation into their specialist assessment:

Assessment of Potential Impacts

The assessment of impact significance is based on the following conventions:

Nature of Impact - this reviews the type of effect that a proposed activity will have on the environment and should include "what will be affected and how?"

Spatial Extent - this should indicate whether the impact will be:

- Site specific;
- Local (<2 km from site);
- Regional (within 30 km of site); or
- National.

Duration - The timeframe during which (lifetime of) the impact will be experienced:

- Temporary (less than 1 year);
- Short term (1 to 6 years);
- Medium term (6 to 15 years);
- Long term (the impact will cease after the operational life of the activity); or
- Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient).

Intensity - it should be established whether the impact is destructive or innocuous and should be described as either:

- High (severe alteration of natural systems, patterns or processes such that they temporarily or permanently cease);

- Medium (notable alteration of natural systems, patterns or processes; where the environment continues to function but in a modified manner); or
- Low (negligible or no alteration of natural systems, patterns or processes); can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making.

Probability - this considers the likelihood of the impact occurring and should be described as:
- Improbable (little or no chance of occurring);
- Probable (<50% chance of occurring);
- Highly probable (50 – 90% chance of occurring); or
- Definite (>90% chance of occurring).

Reversibility - this considers the degree to which the adverse environmental impacts are reversible or irreversible. For example, an impact will be described as low should the impact have little chance of being rectified to correct environmental impacts. On the other hand, an impact such as the nuisance factor caused by noise impacts from wind turbines can be considered to be highly reversible at the end of the project lifespan. The assessment of the reversibility of potential impacts is based on the following terms:
- High - impacts on the environment at the end of the operational life cycle are highly reversible;
- Moderate - impacts on the environment at the end of the operational life cycle are reasonably reversible;
- Low - impacts on the environment at the end of the operational life cycle are slightly reversible; or
- Non-reversible - impacts on the environment at the end of the operational life cycle are not reversible and are consequently permanent.

Irreplaceability - this reviews the extent to which an environmental resource is replaceable or irreplaceable. For example, if the proposed project will be undertaken on land that is already transformed and degraded, this will yield a low irreplaceability score; however, should a proposed development destroy unique wetland systems for example, these may be considered irreplaceable and thus be described as high. The assessment of the degree to which the impact causes irreplaceable loss of resources is based on the following terms:
- High irreplaceability of resources (this is the least favourable assessment for the environment);
- Moderate irreplaceability of resources;
- Low irreplaceability of resources; or
- Resources are replaceable (this is the most favourable assessment for the environment).

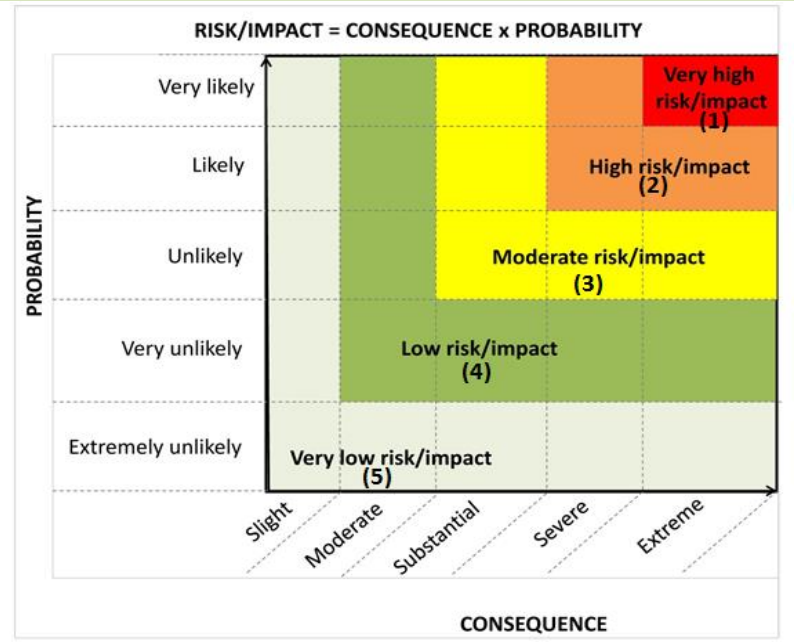

Figure 7-1: Guide to assessing risk/impact significance as a result of consequence and probability.

The status of the impacts and degree of confidence with respect to the assessment of the significance is stated as follows:

Status of the impact: A description as to whether the impact will be:
- Positive (environment overall benefits from impact);
- Negative (environment overall adversely affected); or
- Neutral (environment overall not affected).

Degree of confidence in predictions: The degree of confidence in the predictions, based on the availability of information and specialist knowledge. This should be assessed as:
- High;
- Medium; or
- Low.

Based on the above considerations, the specialist provides an overall evaluation of the significance of the potential impact, which should be described as follows:
- **Low to very low:** the impact may result in minor alterations of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated;
- **Medium:** the impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated; or
- **High:** Where it could have a "no-go" implication for the project unless mitigation or re-design is practically achievable.

Furthermore, the following must be considered:
- Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the construction, operation and decommissioning phases of the project, where relevant.
- The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region, if relevant.

Management Actions:
- Where negative impacts are identified, mitigatory measures will be identified to avoid or reduce negative impacts. Where no mitigatory measures are possible this will be stated.
- Where positive impacts are identified, augmentation measures will be identified to potentially enhance these.
- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements will be set. This will include a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.

Monitoring:
Specialists should recommend monitoring requirements to assess the effectiveness of mitigation actions, indicating what actions are required, by whom, and the timing and frequency thereof.

Cumulative Impact:
Consideration is given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts are evaluated with an assessment of similar developments already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

Mitigation:
The objective of mitigation is to firstly avoid and minimise impacts where possible and where these cannot be completely avoided, to compensate for the negative impacts of the development on the receiving environment and to maximise re-vegetation and rehabilitation of disturbed areas. For each impact identified, appropriate mitigation measures to reduce or otherwise avoid the potentially negative impacts are suggested. All impacts are assessed without mitigation and with the mitigation measures as suggested.

Table 7-1: Potential impacts associated with The Mthethwa Trust's proposed sugar cane cultivation

	CONSTRUCTION PHASE												
	Potential Impact Description	**Status[1]**	**Extent[2]**	**Duration[3]**	**Consequence**	**Probability**	**Significance of impact/risk = consequence x probability**	**Reversibility of impact**	**Irreplaceability of receiving environment**	**Can impact be avoided?**	**Can be mitigated?**	**Potential mitigation measures**	**Significance of residual risk/impact (after mitigation)**
Biophysical	**Loss of natural vegetation and habitats within the CBA**	–	Regional	permanent	Substantial	Very likely	High	No	Highly irreplaceable	x	✓	• Avoid the CBA (see Appendix B for a map of this)	Low
	Loss of Vulnerable Ngongoni Veld that is also a listed Threatened ecosystem	–	Regional	permanent	Substantial	Very likely	Moderate	No	Highly irreplaceable	☒	✓	• Avoid the grassland and savanna/ woodland vegetation, alternatively offset for the losses	Low
	Removal of flora (including species of conservation importance)	–	Site	Permanent	Substantial	Very Likely	Low	Partially	Moderate irreplaceability	☒	✓	• Obtain permit from EKZNW for removal/ relocation of listed NCO species • Conduct a search and rescue operation to recover and relocate suitable wild flowers/ herbs • Avoid the lower portion of the site based on the 135m aquatic buffer to retain a portion of the available habitat on-site • Avoid disturbance /activities outside of the direct footprint	Low
	Faunal mortality and disturbance (including possible conservation important species)	–	Local	Long-term	Moderate	Likely	Moderate	Partially	Moderate irreplaceability	x	✓	• Conduct focused surveys of terrestrial invertebrates (millipedes and snails) and herpetofauna (amphibians and reptiles) to determine presence and absence of sensitive species • Restrict and control the movement of people/vehicles outside of designated areas • As far as possible, the ECO should relocate fauna to suitable nearby habitat as and when encountered during earthworks	Low

[1] Status: Positive (+) ; Negative (-)
[2] Site; Local (<10 km); Regional (<100); National; International
[3] Very short-term (instantaneous); Short-term (<1yr); Medium-term (1-10 yrs); Long-term (project duration); Permanent (beyond project decommissioning)

CONSTRUCTION PHASE													
	Potential Impact	a t	e n	a t i	e q u	a b	**Significance**	i t y	f r e	t b	n i	**Potential mitigation**	**Significance**
	Loss of riparian habitat and buffer zone for the uMngeni River	–	Regional	Permanent	Moderate	Likely	Moderate	Yes	Moderate irreplaceability	x	✓	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity)	Low
	Disturbance to fauna from noise, light and other disturbances	–	Local	Short Term	Low	Very Likely	Low	Yes	Moderate irreplaceability	x	✓	• Minimise lighting on-site, use pressure sodium vapour lights/or LED lights, and angle/face into working areas. Infrared and/or sensor lights and security systems should be used as far as possible to limit need for permanent lighting. • Ensure minimal or no disturbance outside of footprint areas	Low
	Loss of habitat integrity due to spread of IAPs	–	Local	Long Term	Moderate	Very Likely	Moderate	Partially	Low irreplaceability	x	✓	• Develop and implement and invasive alien plant control programme, with routine follow-ups, monitoring, and should be implemented by a competent contractor (special care is essential when working within the riparian/aquatic environments)	Low
	Loss of ecological connectivity and dispersal/movement	–	Regional	Permanent	Moderate	Very Likely	Moderate	Partially	Moderate irreplaceability	x	✓	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity)	Low

CONSTRUCTION PHASE													
	Potential Impact	**Nature**	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**	**Status**	**Irreplaceability**	**Reversibility**	**Mitigation**	**Potential mitigation**	**Significance**
	Water quality impacts (including sedimentation) to the uMngeni River system	–	Regional	Short Term	Moderate	Likely	Moderate	Partially	Moderate irreplaceability	x	✓	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity) • Limit earthworks to the winter season	Low
Social	**Influx of people (jobseekers)**	–	Regional	Short-term	Moderate	Unlikely	Low	Yes	Low irreplaceability	x	✓	• 'Locals first' employment policy	Very low
	Labour required for project development and operation	+	Regional	Short-term	Moderate	Likely	High (positive)	Yes	Low irreplaceability	x	✓	• 'Locals first' employment policy	High (positive)
Heritage	**Development of the proposed facility in the presence of sensitive heritage resources**	–	Local	Permanent	Severe	Unlikely	Low	Yes	Low irreplaceability	x	✓	• Adaptive project design to avoid heritage resources (if any)	Low
Visual	**Visual intrusion of the project (cultivated land)**	–	Regional	Short-term	Low	Unlikely	Low	Yes	Low irreplaceability	x	✓	• Ensure site is kept neat and clear of waste	Very low
Economic	**Investment and growth in local economy**	+	Regional	Long Term	Moderate	Likely	Moderate (positive)	Yes	Low irreplaceability	x	✓	N/A	Moderate (positive)
	Increased land-use income	+	Regional	Long term	Moderate	Likely	Moderate (Positive)	Yes	Low irreplaceability	x	✓	N/A	Moderate (Positive)
Traffic	**Increased pressure on the road network**	-	Regional	Short-term	Low	Likely	Low	Yes	Low irreplaceability	x	✓	• Construction to be kept to normal working hours (8am to 5pm) • Minimise trucking activities per day during construction	Low

CONSTRUCTION PHASE												
	Potential Impact	Status	Extent	Duration	Consequence	Probability	Significance	Reversibility of impact	Irreplaceability of receiving environment	Can impact be avoided?	Can be mitigated?	Potential mitigation	Significance
Air Quality	**Emissions from construction vehicles and generation of dust as a result of land clearing**	-	Local	Short term	Moderate	Likely	Moderate	No	Low irreplaceability	x	✓	• Limit vehicles, people and materials to the construction site • Construction vehicles to travel at low speeds on dirt tracks/roads	Low

OPERATIONAL PHASE													
	Potential Impact Description	**Status[4]**	**Extent[5]**	**Duration[6]**	**Consequence**	**Probability**	**Significance of impact/risk = consequence x probability**	**Reversibility of impact**	**Irreplaceability of receiving environment**	**Can impact be avoided?**	**Can be mitigated?**	**Potential mitigation measures**	**Significance of residual risk/impact (after mitigation)**
Biophysical	**Faunal mortality and disturbance (including possible conservation important species)**	–	Local	Long-term	Low	likely	Low	Yes	Moderate	x	✓	• Restrict and control the movement of people/vehicles outside of operational/working areas	Low
	Disturbance to fauna from noise, light and other disturbances	–	Site	Long-term	Severe	Extremely unlikely	Low	Partially	Low	☒	✓	• Minimise lighting on-site, use pressure sodium vapour lights/or LED lights, and angle/face into working areas. Infrared and/or sensor lights and security systems should be used as far as possible to limit need for permanent lighting. • Ensure minimal or no disturbance outside of footprint areas	Low
	Loss of habitat integrity due to spread of IAPs	–	Local	Long term	Substantial	Likely	Moderate	Partially	Moderate	☒	✓	• Develop and implement and invasive alien plant control programme, with routine follow-ups, monitoring, and should be implemented by a competent contractor (special care is essential when working within the riparian/aquatic environments)	Low

[4] Status: Positive (+) ; Negative (-)
[5] Site; Local (<10 km); Regional (<100); National; International
[6] Very short-term (instantaneous); Short-term (<1yr); Medium-term (1-10 yrs); Long-term (project duration); Permanent (beyond project decommissioning)

OPERATIONAL PHASE													
	Potential Impact	**Nature**	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**	**Status**	**Reversibility**	**Loss of resources?**	**Can impacts be mitigated?**	**Potential mitigation**	**Significance**
	Water quality impacts (including sedimentation) to the uMngeni River system	–	Regional	Long-term	Moderate	Very likely	Moderate	Partially	Moderate	x	✓	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity) • Limit earthworks to the winter season	Low
Social	**Labour required for project development and operation**	+	Regional	Short-term	Moderate	Likely	High (positive)	Yes	Low	x	✓	• 'Locals first' employment policy	High (positive)
Traffic	**Increased pressure on the road network**	-	Regional	Short-term	Low	Likely	Low	Yes	Low	x	✓	• Harvest deliveries to be kept to normal working hours (8am to 5pm) • Minimise trucking activities per day	Low
Economic	**Increased supply to local cane mills and income generation**	+	Regional	Long Term	Moderate	Likely	Moderate (positive)	Yes	Low	x	✓	N/A	Moderate (positive)
EHS	**Minor accidents to the public and moderate accidents to operational staff (e.g. fires).**	-	Site	Short Term	Severe	unlikely	Low	Partially	Low	☒	✓	• An Emergency Plan should be compiled in order to deal with potential fires. Records of practices should be kept on site. • Scheduled inspections should be implemented by operating personnel • Portable fire extinguishers and fire water hydrants (i.e. appropriate fire-fighting equipment) should be provided as required.	

DECOMISSIONING PHASE													
	Potential Impact Description	**Status[7]**	**Extent[8]**	**Duration[9]**	**Consequence**	**Probability**	**Significance of impact/risk = consequence x probability**	**Reversibility of impact**	**Irreplaceability of receiving environment**	**Can impact be avoided?**	**Can impact be managed or mitigated?**	**Potential mitigation measures**	**Significance of residual risk/impact (after mitigation)**
Biophysical	**Impact of decommissioning and removal of facilities on fauna and flora on site**	–	Site	Long-term	Substantial	Very likely	Moderate	Yes	Moderate	x	✓	• Promote the re-establishment of indigenous vegetation in disturbed areas and minimize introduction and spread of invasive alien vegetation. • Plant only locally indigenous flora if landscaping is required.	Low
	Potential re-establishment of alien plants on site.	–	Site	Long-term	Severe	Likely	Moderate	Partially	Low	✓	✓	• Ensure that any alien invasive plants that become re-established on site are removed promptly. • The removed alien invasive vegetation should be immediately disposed of correctly and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species.	Low
EHS	**Potential health injuries to demolition staff during the decommissioning phase.**	–	Regional	Short-term	Moderate	Unlikely	Low	Yes	Low	x	✓	• The Contractor must ensure that all decommissioning personnel are provided with adequate PPE for use where appropriate.	Very low
Traffic	**Increased pressure on the road network**	-	Regional	Short-term	Low	Likely	Low	Yes	Low irreplaceability	x	✓	• Decommissioning activities to be kept to normal working hours (8am to 5pm) • Minimise trucking activities per day	Low
Air Quality	**Emissions from construction vehicles and generation of dust as a result of land clearing**	-	Local	Short term	Moderate	Likely	Moderate	No	Low irreplaceability	x	✓	• Limit vehicles, people and materials to the site • vehicles to travel at low speeds on dirt tracks/roads	Low

[7] Status: Positive (+) ; Negative (-)
[8] Site; Local (<10 km); Regional (<100); National; International
[9] Very short-term (instantaneous); Short-term (<1yr); Medium-term (1-10 yrs); Long-term (project duration); Permanent (beyond project decommissioning)

Cumulative Impacts													
	Potential Impact Description	**Status[10]**	**Extent[11]**	**Duration[12]**	**Consequence**	**Probability**	**Significance of impact/risk = consequence x probability**	**Reversibility of impact**	**Irreplaceability of receiving environment**	**Can impact be avoided?**	**Can impact be managed or mitigated?**	**Potential mitigation measures**	**Significance of residual risk/impact (after mitigation)**
Biophysical	**Additional loss of natural vegetation and habitat compromising abilities for the conservation of biodiversity in the Province**	–	Regional	Permanent	Substantial	Very likely	High	No	High	x	✓	• Avoid the grassland and savanna/woodland vegetation, particularly within the CBA. Alternatively, offset for the losses to ensure no-net-loss.	Low
	Loss of ecological connectivity and dispersal/movement	–	Regional	Permanent	Severe	Very Likely	Moderate	Partially	Moderate	☒	✓	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity)	Low
	Disturbance of soils	–	Site	Long-term	Severe	Very likely	Low	Yes	Moderate (endangered vegetation)	x	✓	• Erosion Management Plan (EMPr)	Moderate
Traffic	**Increased pressure on the road network**	-	Regional	Short-term	Low	Likely	Low	Yes	Low	x	✓	• Harvest deliveries to be kept to normal working hours (8am to 5pm) • Minimise trucking activities per day	Low
Economic	**Increased supply to local cane mills and income generation**	+	Regional	Long Term	Moderate	Likely	Moderate (positive)	Yes	Low	x	✓	N/A	Moderate (positive)

[10] Status: Positive (+) ; Negative (-)
[11] Site; Local (<10 km); Regional (<100); National; International
[12] Very short-term (instantaneous); Short-term (<1yr); Medium-term (1-10 yrs); Long-term (project duration); Permanent (beyond project decommissioning)

SECTION 8: ENVIRONMENTAL IMPACT STATEMENT & RECCOMONDATIONS OF THE EAP

This BA Report has investigated and assessed the significance of potential positive and negative and cumulative impacts associated with the proposed Mthethwa Trust sugarcane project. Following the specialist study and recommended mitigation, the project footprint was re-designed to **avoid** the CBA (Irreplaceable) (see **Appendix B**) and, thereafter, no negative impacts have been identified within this BA that, in the opinion of the EAPs who have conducted this BA Process, should be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial termination of the project. Based on the findings of the BA process, the proposed project is considered to have an overall **low to moderate** negative environmental impact and an overall moderate positive socio-economic impact (with the implementation of respective mitigation and enhancement measures, as mentioned above).

In terms of the preferred site, as noted above, the location of the proposed sugarcane project is dependent on the landowner willingness and feasibility in terms of cost effectiveness. The site currently assessed as part of this BA Process are considered to be suitable based on the aforementioned factors and the reduction of the project footprint to 10ha to avoid sensitivities. An environmental sensitivity map has been produced (and included in the EMPr included in Appendix B of this BA Report).

This BA considered the nature, scale and location of the proposed development as well as the wise use of land (i.e. is this the right time and place for the development of this proposed project). The proposed sugar cane cultivation will contribute to the local economy during both the "construction" and operational phases as local labourers will be employed and the cane produce will also be supplied to a local mill. Increased productivity as a result of the project will lead to the creation of employment opportunities and skills development in the area, as well as sustaining the business. The impact will be of temporal nature during the "construction" phase and permanent for the operational phase.

It is understood that the information contained in this BA Report and appendices is sufficient to make a decision in respect of the activity applied for. Section 24 of the Constitutional Act states that "everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development." Based on this, this BA was undertaken to ensure that these principles are met through the inclusion of appropriate management and mitigation measures, and monitoring requirements. These measures will be undertaken to promote conservation by avoiding the sensitive environmental features present on site and through appropriate monitoring and management plans. In order to ensure the effective implementation of the mitigation and management actions, an EMPr has been compiled and is included in Appendix E of this BA Report. The mitigation measures necessary to ensure that the project is planned and carried out in an environmentally responsible manner are listed in this EMPr. The EMPr includes the mitigation measures noted in this report and the specialist studies. The EMPr is a dynamic document that should be updated as required and provides clear and implementable measures for the proposed project. Listed below are the main recommendations that should be considered (in addition to those in the EMPr and BA Report) for inclusion in the EA (should such authorisation be granted by the DEDTEA):

- Avoid the CBA (See Appendix D for details) through the re-design and reduction of the project footprint to 10 ha (from the original proposed 14ha) ***(Note: this recommendation has already been applied in this BA report and this version of the BA report contains the updated project footprint which avoids the CBA).***
- Obtain permit from EKZNW for removal/ relocation of listed NCO species.
- Conduct a search and rescue operation to recover and relocate suitable wild flowers/ herbs.
- Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary.
- Extend the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni ***(Note: this has automatically been incorporated with the reduction of the project footprint and the exclusion of the lower ~4ha of the site).***
- Ensure minimal or no disturbance outside of footprint areas.
- The EMPr of this proposed development must form part of the contractual agreement and be adhered to by both the contractors and the applicant.
- The applicant to ascertain that there is representation of the applicant on site, at all times of the project phases, and ensuring compliance with the conditions of the EMPr and Environmental Authorisation thereof.

Taking into consideration the findings of the BA Process, it is the opinion of the EAP, that the project benefits outweigh the costs and that the project will make a positive contribution to sustainable Sugarcane production in the uMgungondlovu region. Provided that the specified mitigation measures are applied effectively (including the 10ha footprint to avoid the CBA), it is recommended that the proposed project receive EA in terms of the EIA Regulations promulgated under the NEMA.

SECTION 9: PERIOD FOR WHICH ENVIRONMENTAL AUTHORISATION IS REQUIRED

The Environmental Authorisation is required for a minimum of 20 years.

SECTION 10: EAP UNDERTAKING

The EAP herewith confirms:

(a) the correctness of the information provided in the reports;
(b) the inclusion of comments and inputs from stakeholders and I&APs;
(c) c)the inclusion of inputs and recommendations from the specialist reports where relevant; and
(d) that the 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 are correctly reflected herein.

Signature of the Environmental Assessment Practitioner

Council for Scientific and Industrial Research
Name of Company

Date

SECTION 11: APPENDICES

Appendix A	CVs of the EAPs (project team who prepared the report) and EAP Declaration
Appendix B	Locality Map and Site plan – (includes a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers)
Appendix C	Public Participation
Appendix D	Specialist Report: Terrestrial Ecology and Hydrology
Appendix E	Draft Environmental Management Programme

DRAFT BASIC ASSESSMENT REPORT – PROPOSED MTHETHWA TRUST 10 HA SUGARCANE CULTIVATION ON BROUGHTON FARM, ALBERT FALLS, KWA-ZULU NATAL

APPENDICES

DRAFT
BASIC ASSESSMENT
REPORT

BASIC ASSESSMENT REPORT

APPENDIX A:
CVS OF THE EAPS AND EAP DECLARATION

CONTENTS

A-1: CV's of the project team: Minnelise Levendal (Project Leader)

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Jan Cilliers Street
PO Box 320
Stellenbosch 7600
South Africa

Phone: +27 21 888 2400
Fax: +27 21 888 2693
Email: mlevendal@csir.co.za

CURRICULUM VITAE OF MINNELISE LEVENDAL – PROJECT LEADER

Name of firm	CSIR
Name of staff	Minnelise Levendal
Profession	Environmental Assessment and Management
Position in firm	Project Manager
Years' experience	8 years
Nationality	South African
Languages	Afrikaans and English

CONTACT DETAILS:

Postal Address:	P O Box 320, Stellenbosch, 7599
Telephone Number:	021-888 2495/2661
Cell:	0833098159
Fax:	0865051341
e-mail:	mlevendal@csir.co.za

BIOSKETCH:

Minnelise joined the CSIR Environmental Management Services group (EMS) in 2008. She is focussing primarily on managing Environmental Impact Assessments (EIAs), Basic Assessments (BAs) and Environmental Screening studies for renewable energy projects including wind and solar projects. These include an EIA for a wind energy facility near Swellendam, Western Cape South Africa for BioTherm (Authorisation granted in September 2011) and a similar EIA for BioTherm in Laingsburg, Western Cape (in progress). She is also managing two wind farm EIAs and a solar Photovoltaic BA for WKN-Windcurrent SA in the Eastern Cape. Minnelise was the project manager for the Basic Assessment for the erection of ten wind monitoring masts at different sites in South Africa as part of the national wind atlas project of the Department of Energy in 2009 and 2010..She was also a member of the Project Implementation Team who managed the drafting of South Africa's Second National Communication under the United Nations Framework Convention on Climate Change. The national Department of Environmental Affairs appointed the South African Botanical Institute (SANBI) to undertake this project. SANBI subsequently appointed the CSIR to manage this project.

EDUCATION

- M.Sc. (Botany) Stellenbosch University 1998
- B.Sc. (Hons.) (Botany) University of the Western Cape 1994
- B.Sc. (Education) University of the Western Cape 1993

MEMBERSHIPS:

- International Association for Impact Assessment (IAIA), Western Cape (member of their steering committee from 2001-2003)
- IUCN Commission on Education and Communication (CEC); World Conservation Learning Network (WCLN)
- American Association for the Advancement of Science (AAAS)
- Society of Conservation Biology (SCB)

EMPLOYMENT RECORD:

- **1995:** Peninsula Technicon. Lecturer in the Horticulture Department.
- **1996:** University of the Western Cape. Lecturer in the Botany Department.
- **1999:** University of Stellenbosch. Research assistant in the Botany Department (3 months)
- **1999:** Bengurion University (Israel). Research assistant (Working in the Arava valley, Negev – Israel; 2 months). Research undertaken was published (see first publication in publication list)
- **1999-2004:** Assistant Director at the Department of Environmental Affairs and Development Planning (DEA&DP). Work involved assessing Environmental Impact Assessments and Environmental Management Plans; promoting environmental management and sustainable development.
- **2004 to present:** Employed by the CSIR in Stellenbosch:
- September 2004 – May 2008: Biodiversity and Ecosystems Services Group (NRE)
- May 2008 to present: Environmental Management Services Group (EMS)

PROJECT EXPERIENCE RECORD:

The following table presents a list of projects undertaken at the CSIR as well as the role played in each project:

Completion Date	Project description	Role	Client
2011 *(in progress)*	EIA for the proposed Electrawinds Swartberg wind energy project near Moorreesburg in the Western Cape	Project Manager	Electrawinds
2010-2011 *(in progress)*	EIA for the proposed Ubuntu wind energy project, Eastern Cape	Project Manager	WKN Windkraft SA
2010-2011 *(in progress)*	EIA for the proposed Banna ba pifhu wind energy project, Eastern Cape	Project Manager	WKN Windkraft SA
2010-2011	BA for a powerline near Swellendam in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010-2011 *(Environmental Authorisation granted in September 2011)*	EIA for a proposed wind farm near Swellendam in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010 (complete)	Basic Assessment for the erection of two wind monitoring masts near Swellendam and Bredasdorp in the Western Cape	Project Manager	BioTherm Energy (Pty Ltd
2010 (complete)	Basic Assessment for the erection of two wind monitoring masts near Jeffrey's Bay in the Eastern Cape	Project Manager	Windcurrent (Pty Ltd

Completion Date	Project description	Role	Client
2009-2010 (*(Environmental Authorisations granted during 2010)*	Basic Assessment Process for the proposed erection of 10 wind monitoring masts in SA as part of the national wind atlas project	Project Manager	Department of Energy through SANERI; GEF
2010	South Africa's Second National Communication under the United Nations Framework Convention on Climate Change	Project Manager	SANBI
2009 *(Environmental Authorisation granted in 2009)*	Basic Assessment Report for a proposed boundary wall at the Port of Port Elizabeth, Eastern Cape	Project Manager	Transnet Ltd
2008	Developing an Invasive Alien Plant Strategy for the Wild Coast, Eastern Cape	Co-author	Eastern Cape Parks Board
2006-2008	Monitoring and Evaluation of aspects of Biodiversity	Project Leader	Internal project awarded through the Young Researchers Fund
2006	Integrated veldfire management in South Africa. An assessment of current conditions and future approaches.	Co- author	Working on Fire
2004-2005	Biodiversity Strategy and Action Plan Wild Coast, Eastern Cape, SA	Co-author	Wilderness Foundation
2005	Western Cape State of the Environment Report: Biodiversity section. (Year One).	Co- author and Project Manager	Department of Environmental Affairs and Development Planning

PUBLICATIONS:

Bowie, M. (née Levendal) and Ward, D. (2004). Water status of the mistletoe *Plicosepalus acaciae* parasitic on isolated Negev Desert populations of *Acacia raddiana* differing in level of mortality. Journal of Arid Environments 56: 487-508.

Wand, S.J.E., Esler, K.J. and **Bowie, M.R** (2001). Seasonal photosynthetic temperature responses and changes in ^{13}C under varying temperature regimes in leaf-succulent and drought-deciduous shrubs from the Succulent Karoo, South Africa. South African Journal of Botany 67:235-243.

Bowie, M.R., Wand, S.J.E. and Esler, K.J. (2000). Seasonal gas exchange responses under three different temperature treatments in a leaf-succulent and a drought-deciduous shrub from the Succulent Karoo. South African Journal of Botany 66:118-123.

LANGUAGES

Language	***Speaking***	***Reading***	***Writing***
English	*Excellent*	*Excellent*	*Excellent*
Afrikaans	*Excellent*	*Excellent*	*Excellent*

Minnelise Levendal

July 2018

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Stellenbosch 7600
South Africa

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Fax: +27 21 888 2693
Email: *kstroebel@csir.co.za*

Curriculum Vitae of Kelly Stroebel – Project Manager/ EAP (Cand. Sci. Nat.)

Name of firm	CSIR
Name of staff	Kelly Stroebel
Profession	Environmental Assessment Practitioner
Position in firm	Environmental Assessment Practitioner
Years' experience	4 years
Nationality	South African

Biographical Sketch

Kelly holds a Bachelor of Science with Honours in Environmental Science from Rhodes University in Grahamstown and is currently pursuing a Masters at the University of Stellenbosch. Her undergraduate degree was a Bachelor of Science with majors in Environmental Science and Zoology. She is currently working as an environmental assessment practitioner at the Council for Scientific and Industrial Research (CSIR). Kelly has been the Project Manager of several EIA's in South Africa and several Basic Assessments for the Special Needs and Skills Development Programme. She has assisted in the SIP projects including the National Wind & Solar Strategic Environmental Assessment (SEA) and Electricity Grid Infrastructure SEA as SEA which were commissioned by the national Department of Environmental Affairs. On a personal level, Kelly enjoys the outdoors, traveling and SCUBA diving and is passionate about the field of environmental science and management.

EMPLOYMENT TRACK RECORD

The following table presents a sample of the projects that Kelly Stroebel has been involved in to this date:

Completion Date	Project description	Role	Client
In progress	**EIA's in the South African energy sector**	Project Manager/EAP	Private energy companies and organs of state
In progress	**Special Needs and Skills Development Programme (DEA-CSIR)**	Project Manager conducting Environmental services such as basic Assessments and Environmental Screening Studies.	Various SMME's and Community Trusts

Completion Date	Project description	Role	Client
2015	**Strategic Environmental Assessment (SEA)** for Electricity Grid Infrastructure	Project member-stakeholder engagement and project support.	National Department of Environmental Affairs
2015	**EIA for two proposed Desalination plants on the KZN coast.**	Project member- Public Participation Process, stakeholder engagement and project support.	Umgeni Water
August 2014	**National Strategy for Sustainable Development Review (NSSD1)**	Project member- research and report development.	National Department of Environmental Affairs
2013-2014	**Strategic Environmental Assessment (SEA)** for roll out of photovoltaic solar and wind energy in South Africa.	Project member- Stakeholder engagement and project support	National Department of Environmental Affairs

EMPLOYMENT RECORD

- **2015 to present** Environmental Scientist and Assessment Practitioner. Council for Scientific and Industrial Research – Consulting and Analytical Services (CAS) - Stellenbosch
- **2014** Environmental Scientist and Assessment Practitioner (Intern). Council for Scientific and Industrial Research – Consulting and Analytical Services (CAS) - Stellenbosch
- **2013** Environmental Education Counselor - Fernwood Cove Summer Camp, USA.
- **2012** Graduate Assistant: Rhodes University Department of Environmental Science.
- **2011** Vacation Internship: Environmental Management Department of Mittal Steel, Newcastle.
- **2011** Vacation Internship: Northern Kwa-Zulu Natal branch of WWF.

QUALIFICATIONS/EDUCATION

- BSc Hons. Environmental Science (Rhodes University, Grahamstown, South Africa)
    - Honours modules including Environmental Impact Assessment, Statistics, Climate Change Adaptation, Urban Ecology and Environmental Water Quality.
    - Honours thesis: "Water use and conservation by households of different economic status in King Willliam's Town"
- Bachelor of Science with Distinction (Rhodes University, Grahamstown, South Africa)
    - Undergraduate courses including Environmental Science, Zoology, Ichthyology, Chemistry, Earth Science, Botany and Computer Science.
- IEB Matric Certificate, 5 Distinctions (St Dominic's Academy, Newcastle)

TRAINING, CONFERENCES AND PROFFESIONAL REGISTRATIONS

- Member of the Conference Organizing Committee (COC) for the IAIAsa Annual Conference 2017
- Project Management Practices and Principles with MS projects with the University of Pretoria: Distinction obtained (2016)
- Introduction to Earth Observation using ENVI with the University of Stellenbosch (2016)
- Public Participation Course with IAP2 (2016)
- Conflict Management Accredited through Conflict Dynamics (2015)
- Media and Science Training Accreditation through Jive Media Africa (2015)
- IAIA WC Workshop for Integrating Climate Change into EIA practice (2015)

- Presented on the DEA-CSIR "Special Needs and Skills Development Programme" at the 2014 & 2015 Annual IAIA (International Association for Impact Assessment) South Africa Conference.
- Environmental Impact Assessment Training Course accreditation through Coastal and Environmental Services, Grahamstown (2012)
- DEA&DP Training on the EIA Regulations (2014)
- Registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP) (Reg #: 100151/14)
- Member of the South African Affiliate of the International Association for Impact Assessment (Membership no: 3588)

LANGUAGE CAPABILITY

LANGUAGES	***Speaking***	***Reading***	***Writing***
English	Excellent	Excellent	Excellent
Afrikaans	Moderate	Moderate	Moderate

A-2: EAP Declaration

THE INDEPENDENT ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

I, **Kelly Stroebel,** as the appointed independent environmental practitioner ("EAP") hereby declare that I:

- act/ed as the independent EAP in this application;
- regard the information contained in this report to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 49B of the Act) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the application was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments;
- have ensured that the comments of all interested and affected parties were considered, recorded and submitted to the competent authority in respect of the application;
- have kept a register of all interested and affected parties that participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 49B of the Act.

Signature of the environmental assessment practitioner:

Council for Scientific and Industrial Research (CSIR)

Name of company:

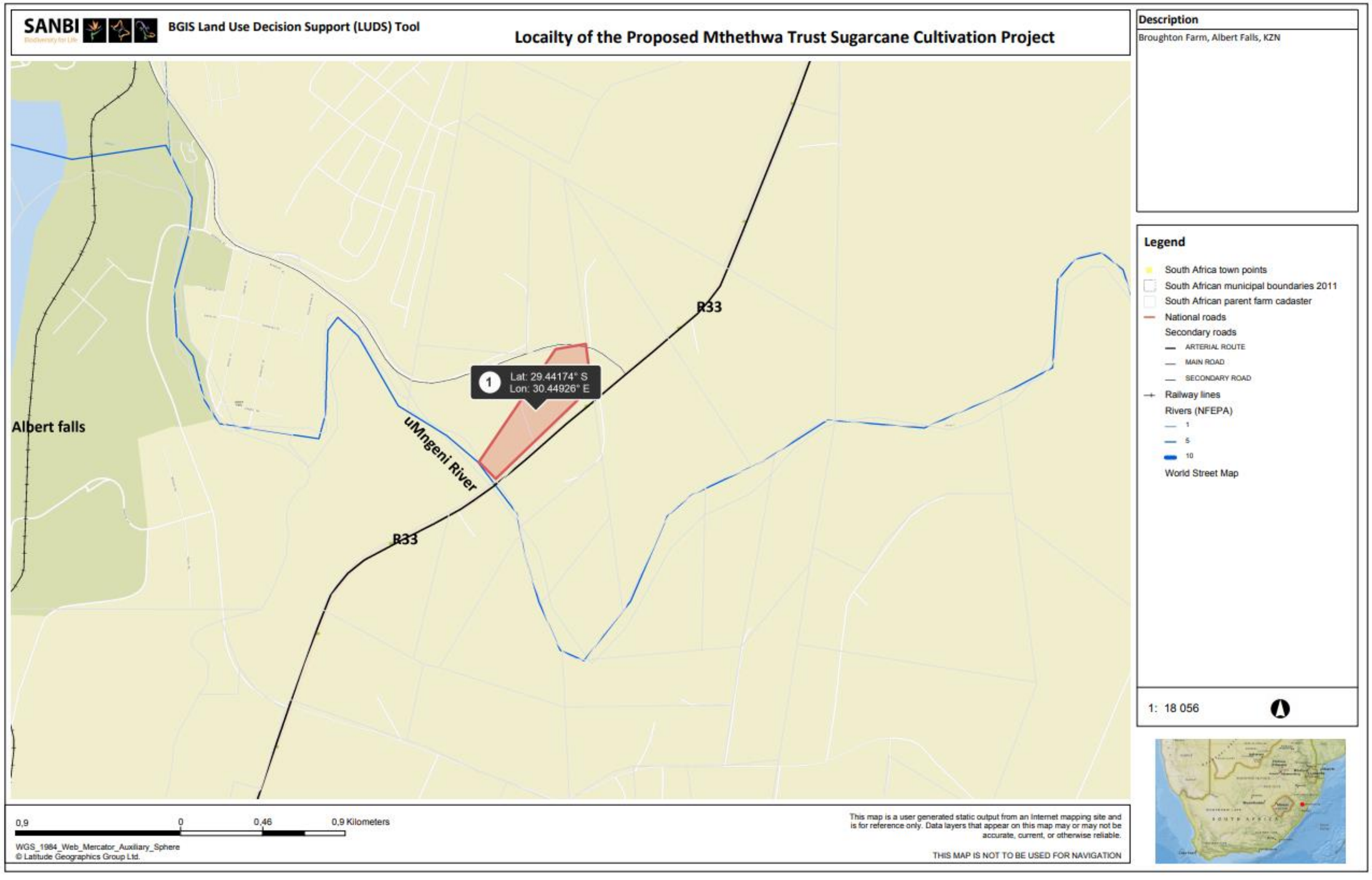
Date:

BASIC ASSESSMENT REPORT

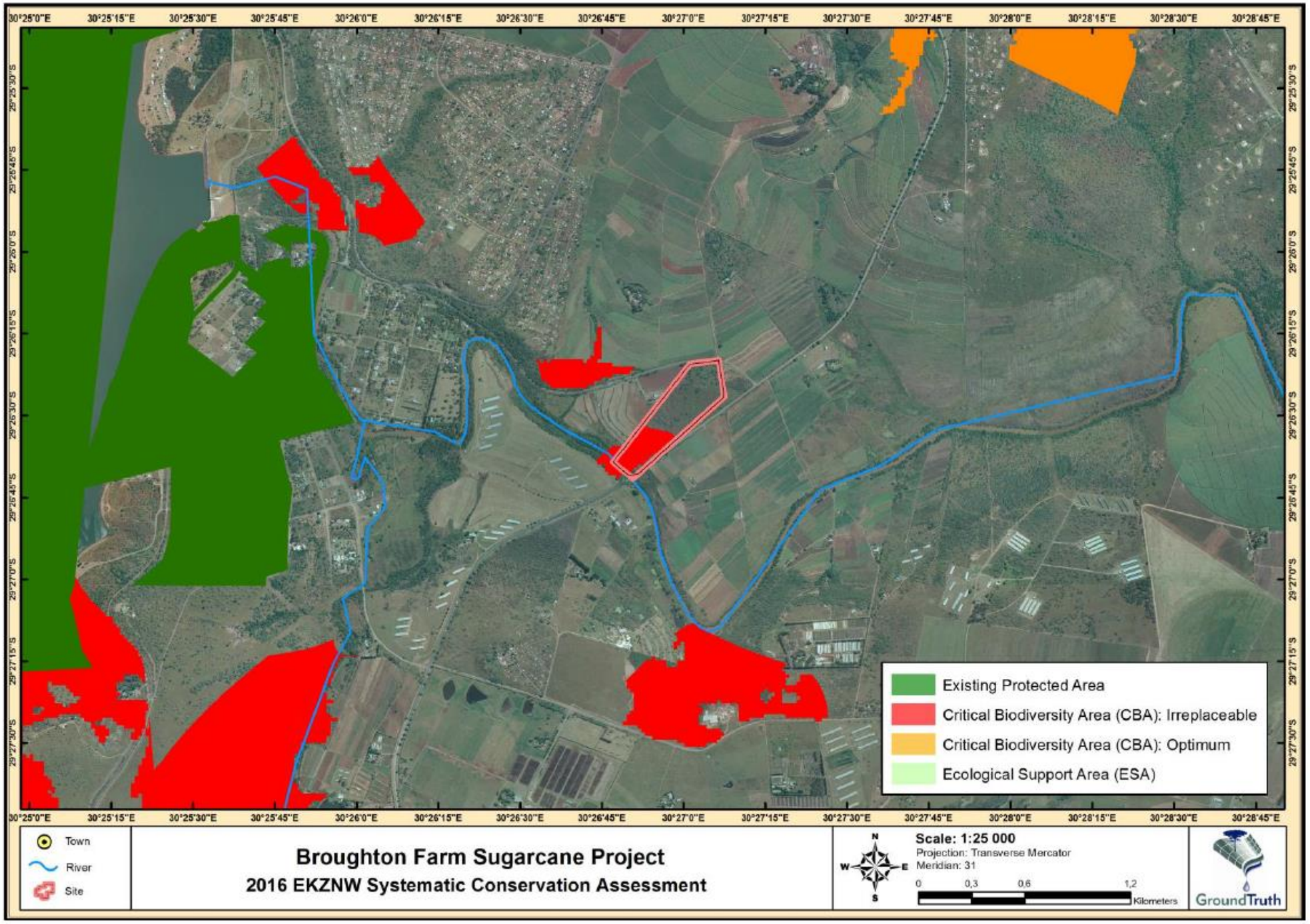
APPENDIX B:
LOCALITY MAP AND SITE PLAN

CONTENTS

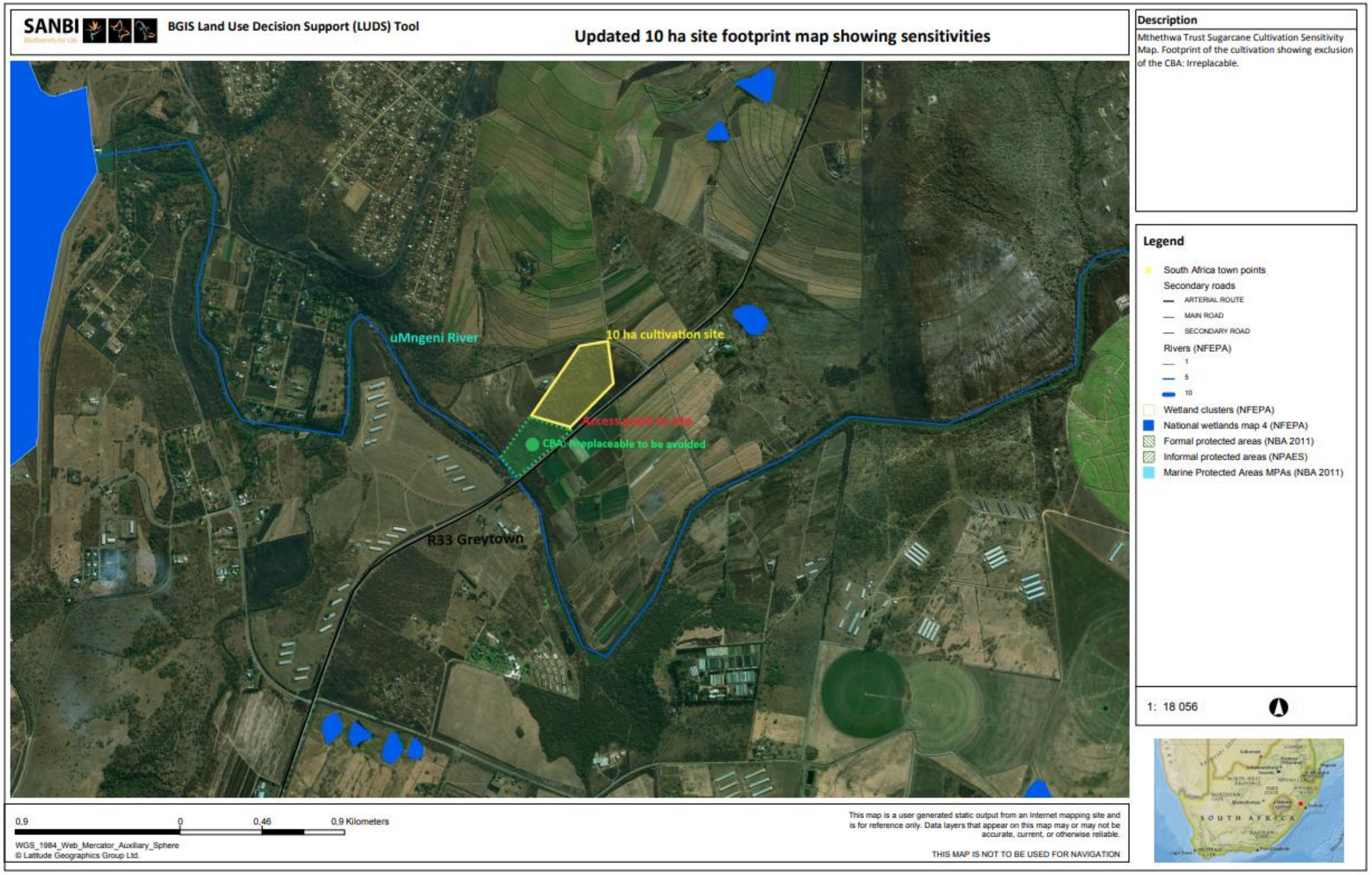
Map B-1: Locality of the 14 ha Broughton Farm site (of which 10 ha to be cultivated), near Albert Falls, KwaZulu-Natal

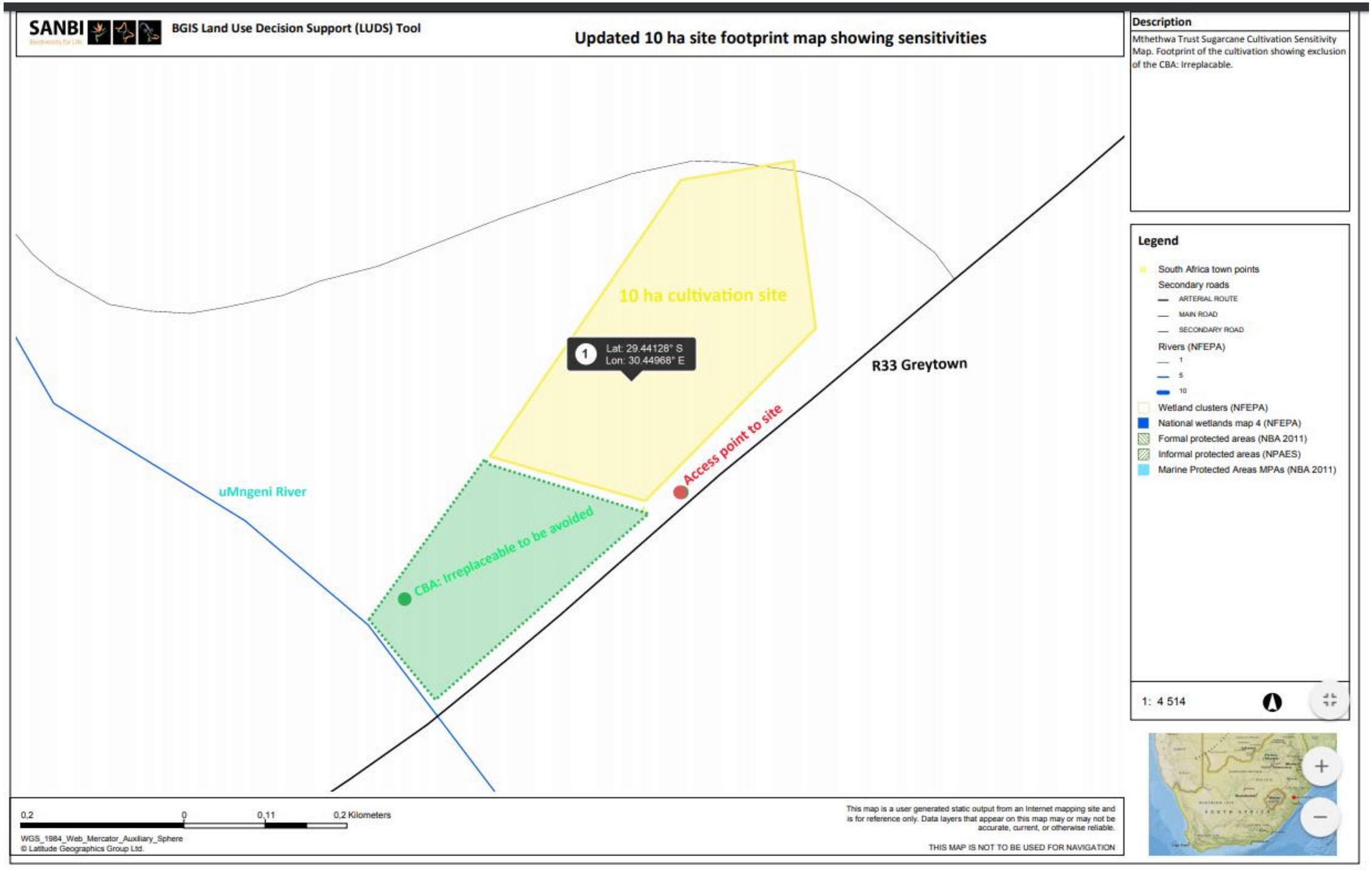


Map B-2: The site sensitivities indicating areas to be avoided (CBA: Irreplacable)



Map B-3: The Mthethwa Trust's updated proposed site layout plan, avoiding the ~4.8 ha CBA area (as indicated in Map E2 above)




SANBI
BGIS Land Use Decision Support (LUDS) Tool
Updated 10 ha site footprint map showing sensitivities
10 ha cultivation site
1
Lat: 29.44128° S
Lon: 30.44968° E
R33 Greytown
Access point to site
uMngeni River
CBA: Irreplaceable to be avoided
Description
Mthethwa Trust Sugarcane Cultivation Sensitivity Map. Footprint of the cultivation showing exclusion of the CBA: Irreplacable.
Legend
South Africa town points
Secondary roads
ARTERIAL ROUTE
MAIN ROAD
SECONDARY ROAD
Rivers (NFEPA)
1
5
10
Wetland clusters (NFEPA)
National wetlands map 4 (NFEPA)
Formal protected areas (NBA 2011)
Informal protected areas (NPAES)
Marine Protected Areas MPAs (NBA 2011)
1: 4 514
0,2 0 0,11 0,2 Kilometers
WGS_1984_Web_Mercator_Auxiliary_Sphere
© Latitude Geographics Group Ltd.
This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

BASIC ASSESSMENT REPORT

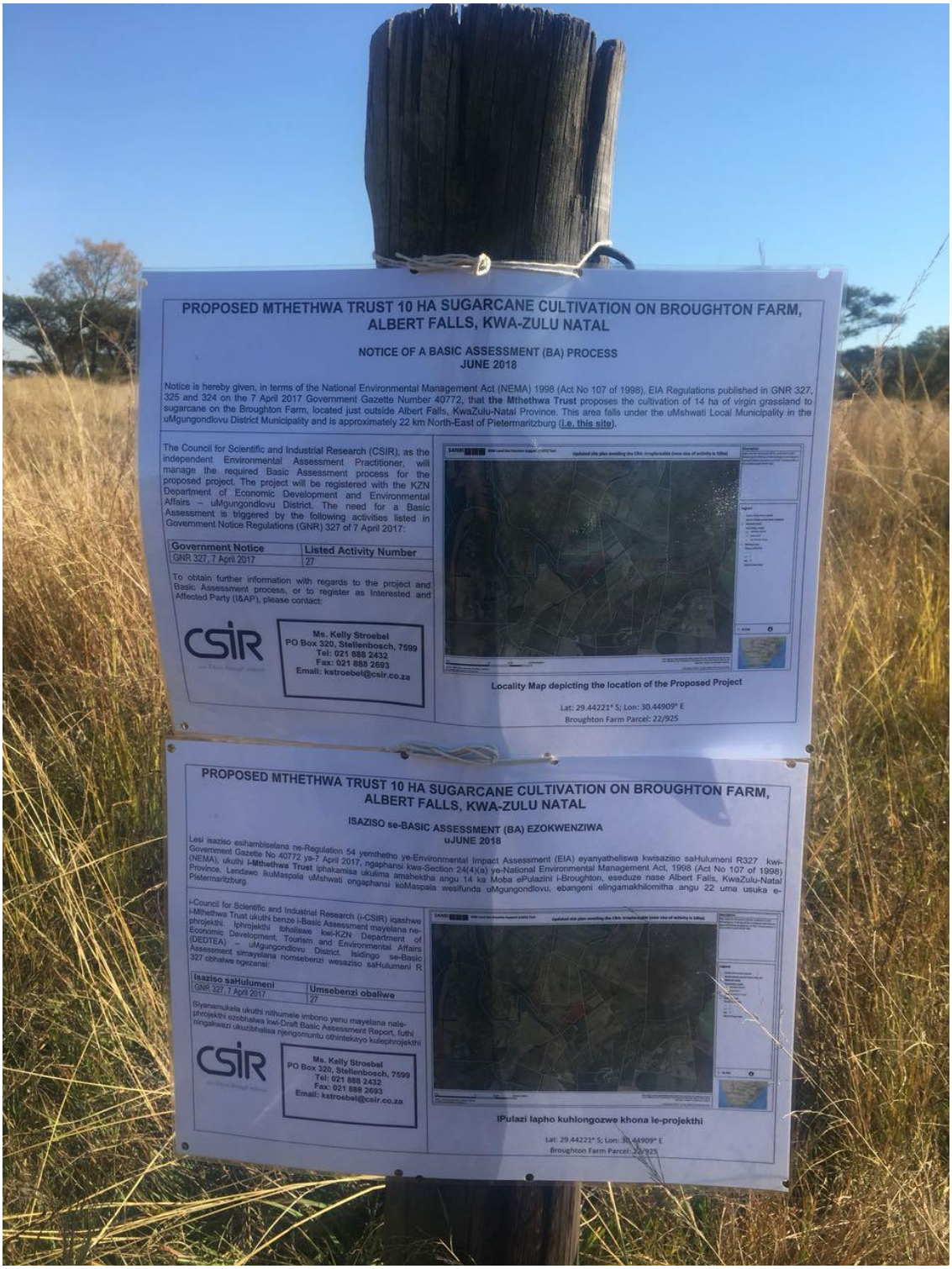
APPENDIX C: PUBLIC PARTICIPATION INFORMATION

CONTENTS

C-1. Proof of Site Notices

Proof of English and IsiZulu Site notices placed at the entrance of the site

Co-ordinates of site notices: 29°26'33"S; 30°27'0"E




PROPOSED MTHETHWA TRUST 10 HA SUGARCANE CULTIVATION ON BROUGHTON FARM, ALBERT FALLS, KWA-ZULU NATAL
NOTICE OF A BASIC ASSESSMENT (BA) PROCESS
JUNE 2018
CSIR
PROPOSED MTHETHWA TRUST 10 HA SUGARCANE CULTIVATION ON BROUGHTON FARM, ALBERT FALLS, KWA-ZULU NATAL
ISAZISO se-BASIC ASSESSMENT (BA) EZOKWENZIWA
iJUNE 2018
CSIR

Contents of the English Site notice

PROPOSED MTHETHWA TRUST 10 HA SUGARCANE CULTIVATION ON BROUGHTON FARM, ALBERT FALLS, KWA-ZULU NATAL

NOTICE OF A BASIC ASSESSMENT (BA) PROCESS
JUNE 2018

Notice is hereby given, in terms of the National Environmental Management Act (NEMA) 1998 (Act No 107 of 1998), EIA Regulations published in GNR 327, 325 and 324 on the 7 April 2017 Government Gazette Number 40772, that **the Mthethwa Trust** proposes the cultivation of 14 ha of virgin grassland to sugarcane on the Broughton Farm, located just outside Albert Falls, KwaZulu-Natal Province. This area falls under the uMshwati Local Municipality in the uMgungondlovu District Municipality and is approximately 22 km North-East of Pietermaritzburg (**i.e. this site**).

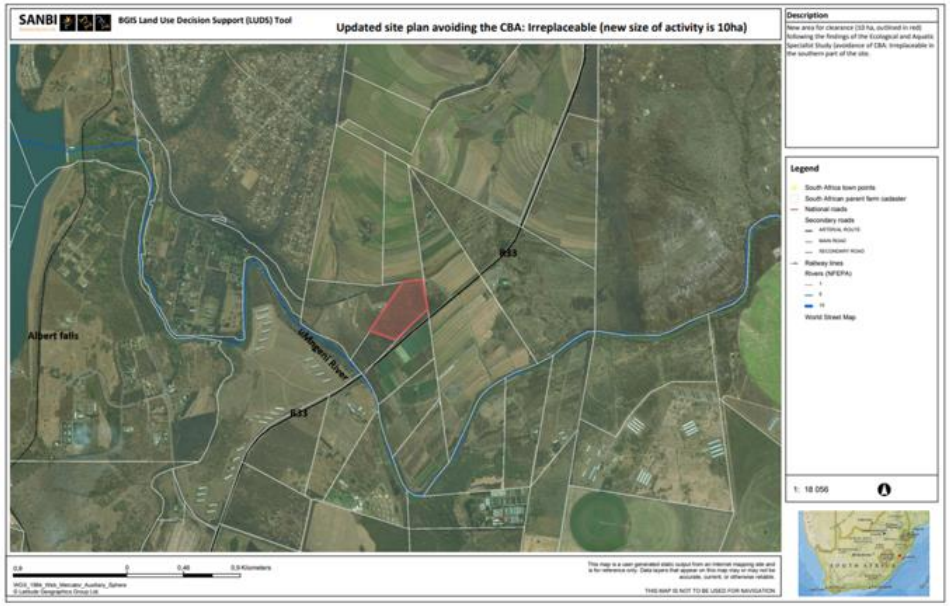
The Council for Scientific and Industrial Research (CSIR), as the independent Environmental Assessment Practitioner, will manage the required Basic Assessment process for the proposed project. The project will be registered with the KZN Department of Economic Development and Environmental Affairs – uMgungondlovu District. The need for a Basic Assessment is triggered by the following activities listed in Government Notice Regulations (GNR) 327 of 7 April 2017:

Government Notice	Listed Activity Number
GNR 327, 7 April 2017	27

To obtain further information with regards to the project and Basic Assessment process, or to register as Interested and Affected Party (I&AP), please contact:

our future through science

Ms. Kelly Stroebel
PO Box 320, Stellenbosch, 7599
Tel: 021 888 2432
Fax: 021 888 2693
Email: kstroebel@csir.co.za



Locality Map depicting the location of the Proposed Project

Lat: 29.44221° S; Lon: 30.44909° E
Broughton Farm Parcel: 22/925

Contents of the IsiZulu Site notice

PROPOSED MTHETHWA TRUST 10 HA SUGARCANE CULTIVATION ON BROUGHTON FARM, ALBERT FALLS, KWA-ZULU NATAL

ISAZISO se-BASIC ASSESSMENT (BA) EZOKWENZIWA uJUNE 2018

Lesi isaziso esihambiselana ne-Regulation 54 yemthetho ye-Environmental Impact Assessment (EIA) eyanyatheliswa kwisaziso saHulumeni R327 kwi-Government Gazette No 40772 ya-7 April 2017, ngaphansi kwa-Section 24(4)(a) ye-National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA), ukuthi **i-Mthethwa Trust** iphakamisa ukulima amahektha angu 14 ka Moba ePulazini i-Broughton, eseduze nase Albert Falls, KwaZulu-Natal Province. Lendawo ikuMaspala uMshwati ongaphansi koMaspala wesifunda uMgungondlovu, ebangeni elingamakhilomitha angu 22 uma usuka e-Pietermaritzburg.

i-Council for Scientific and Industrial Research (i-CSIR) iqashwe i-Mthethwa Trust ukuthi benze i-Basic Assessment mayelana ne-phrojekthi. Iphrojekthi ibhaliswe kwi-KZN Department of Economic Development, Tourism and Environmental Affairs (DEDTEA) – uMgungondlovu District. Isidingo se-Basic Assessment simayelana nomsebenzi wesaziso saHulumeni R 327 obhalwe ngezansi:

Isaziso saHulumeni	Umsebenzi obaliwe
GNR 327, 7 April 2017	27

Siyanamukela ukuthi nithumele imbono yenu mayelana nale-phrojekthi ezobhalwa kwi-Draft Basic Assessment Report, futhi ningakwazi ukuzibhalisa njengomuntu othintekayo kulephrojekthi

Ms. Kelly Stroebel
PO Box 320, Stellenbosch, 7599
Tel: 021 888 2432
Fax: 021 888 2693
Email: kstroebel@csir.co.za

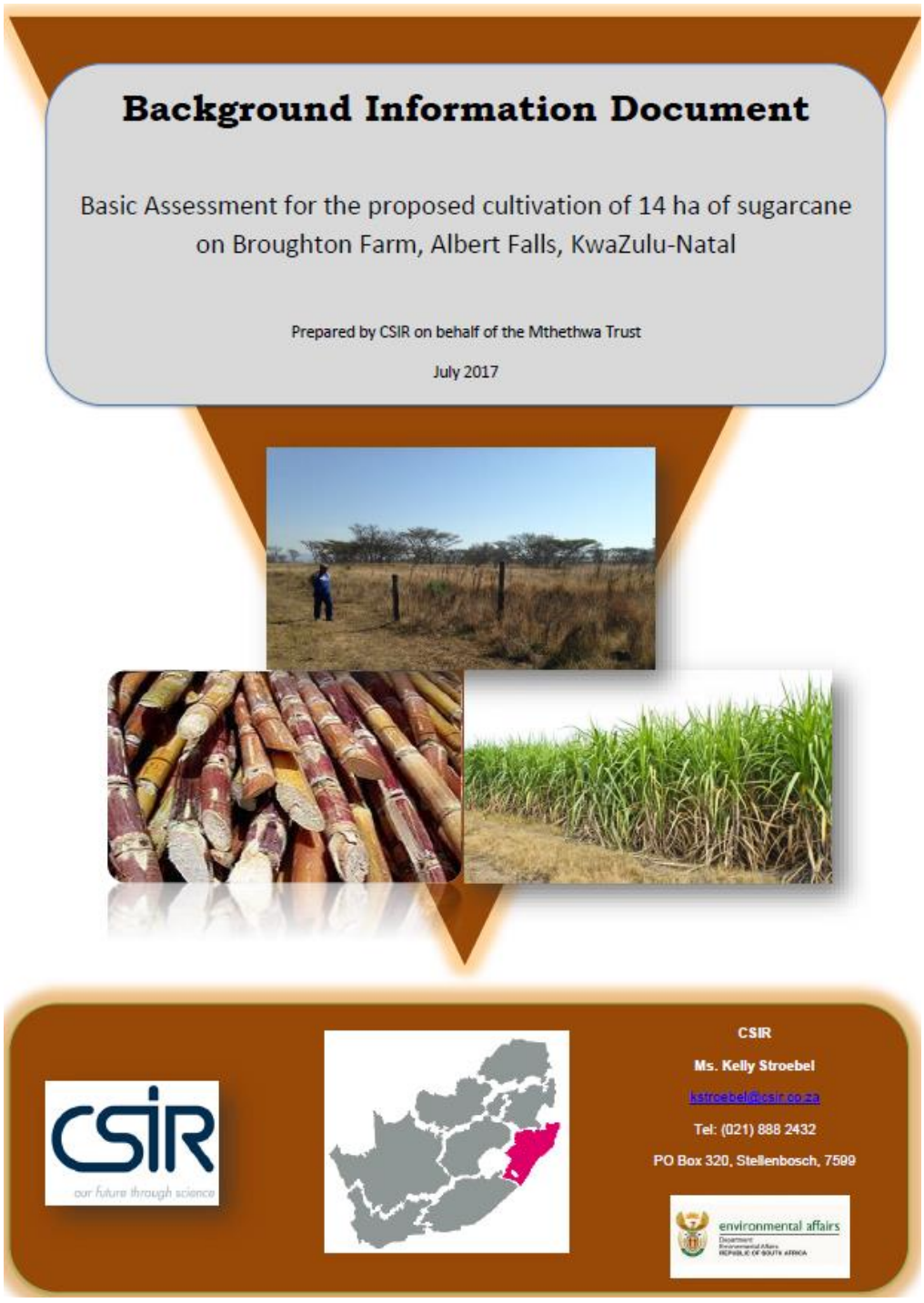
IPulazi lapho kuhlongozwe khona le-projekthi

Lat: 29.44221° S; Lon: 30.44909° E
Broughton Farm Parcel: 22/925

C-2. Written notices issued as required in terms of the regulations

Background Information Document (BID) on the project sent (05/09/17) to I&APs as part of Project Announcement

(**Note:** the BID was released before the pre-applicatrion meeting was held, and some content differs form the Draft BA Report i.e.e listed activities. The accurate and current project information is what is contained in this Draft BA Report)



You are invited to participate in the following process:

Basic Assessment for the proposed cultivation of 14 ha of sugarcane on Broughton Farm, Albert Falls, KwaZulu-Natal

INTRODUCTION TO THE PROPOSED PROJECT

The Mthethwa Trust is proposing the cultivation of 14 ha of virgin grassland to sugarcane on the Broughton Farm, located just outside Albert Falls, KwaZulu-Natal Province. This area falls under the uMshwati Local Municipality in the uMgungondlovu District Municipality and is approximately 22 km North-East of Pietermaritzburg (Figure 1). The proposed project will include the following components:

- Removal of 14 ha of indigenous vegetation (land zoned agricultural) for the planting and cultivation of sugarcane via rain-fed irrigation.
- Already existing municipal infrastructure (access roads).

Site Location Information

Please see Figure 1 on Page 4 of this document for a location map for the proposed site. The site has the following locational information:

- Lat: 29.44221° S
- Lon: 30.44909° E
- Broughton Farm Parcel 22/925
- SG code: N0FT00000000092500022
- Street address: Access off the R33 Greytown

Sugarcane is a strategic crop for Kwazulu-Natal comprising nearly 50% of field crop gross farming income. The South African sugar industry makes an important contribution to employment and sustainable socio-economic development, particularly in rural areas. This is built on its agricultural and industrial investments, foreign exchange earnings, labour intensity, and linkages with major suppliers, support industries and customers. The Mthethwa Trust is being provided *pro-bono* environmental services by the DEA/CSIR's Special Needs and Skills Development Programme, which aims to assist small-medium micro-enterprises with obtaining Environmental Authorization in order to enhance local economic development.

SUMMARY OF THE BASIC ASSESSMENT PROCESS

In terms of the National Environmental Management Act (NEMA) EIA Regulations published in GNR 327, 325 and 324 on the 7 April 2017 Government Gazette Number 40772, a Basic Assessment (BA) process is required as the project applies to the following listed activities (detailed in Table 1 below).

Table 1: Listed activities relating to the proposed project

Relevant notice:	Activity No (s) (in terms of the relevant notice) :	Description of each listed activity as per the Government Notice:
GN R327	27	The clearance of 1 hectares or more, but less than 20 hectares of indigenous vegetation.
GN R324	12	The clearance of an area of 300 m² or more of indigenous vegetation except where such clearance is required for maintenance purposes undertaken in accordance with a maintenance plan. d. KwaZulu-Natal v. Critical biodiversity areas (CBA)

The proposed project requires Environmental Authorization (EA) from the KZN Department of Economic Development, Tourism and Environmental Affairs (DEDTEA). The Basic Assessment process that will be undertaken for this project is summarised in the following steps below:

Step 1: Notify Authorities and potential Interested and affected parties (I&APs) (30 days) *(current stage)*
The first stage in the process entails notifying all potential I&APs of the proposed project, by sending out a Background Information Document (BID), and providing I&APs with an opportunity to register as an I&AP. I&APs are required to register their interest on the project database within 30 days hereof (excluding public holidays).

Step 2: Basic Assessment Report (BAR) for Public Comment (30 days)
The BA process is undertaken in order to identify and assess potential environmental impacts, both positive and negative, that may be associated with the project. Mitigation and management measures will be identified to reduce potential negative impacts and will be included in the Environmental Management Programme (EMPr) for this project. The BAR will include comments received from all I&APs on this document and findings of the specialist study.

Step 3: BAR to be submitted to DMR for decision-making
The BAR will be drafted and will be submitted to DEDTEA for decision-making. The comments and issues raised will be included in the BAR. All I&APs will be provided with written notification on whether the project has been granted or refused EA and about the appeal process.

HOW CAN YOU GET INVOLVED?

1. By mailing, emailing or faxing comments to the Environmental Assessment Practitioner indicated below/telephonically contacting the Environmental Assessment Practitioner if you have a query, comment, or require further information regarding the BA process.
2. By reviewing the various reports and provide comments within the stipulated comment periods provided (i.e. the BID and Draft BAR).

To register as a stakeholder or to comment on the project, please kindly send all written comments to Ms. Kelly Stroebel on or before Monday 9 October 2017:

Ms. Kelly Stroebel
Email: kstroebel@csir.co.za
Tel: 021-888-2432
Fax: 021-888-2693
Address: CSIR, PO Box 320, Stellenbosch, 7599
Website: https://www.csir.co.za/environmental-impact-assessment


SANBI
BGIS Land Use Decision Support (LUDS) Tool
Location of Proposed 14 ha Sugarcane Cultivation on Broughton Farm, Albert Falls, KZN
Albert Dam
Albert Falls
Diamond
R103
Mpolweni
Description
Legend

Letter sent (05/09/17) to I&APs as part of Project Announcement and BID Release

CSIR Specialist Services
PO Box 320
Stellenbosch
7599
South Africa
Tel: +27 21 888 2432
Fax: +27 21 888 2693
Email: kstroebel@csir.co.za

5 September 2017

Dear Interested and/or Affected Party

PROJECT ANNOUNCEMENT

BASIC ASSESSMENT FOR THE PROPOSED CULTIVATION OF 14 HA OF SUGARCANE ON BROUGHTON FARM, ALBERT FALLS, KWAZULU-NATAL

The National Department of Environmental Affairs (DEA) and the Council for Scientific and Industrial Research (CSIR) have initiated the Special Needs and Skills Development Programme, whereby small-medium micro-enterprises and community trusts who are lacking financial means are provided with *pro-bono* environmental services to decrease the burden of the cost associated with starting a business. **The Mthethwa Trust** has been identified as an eligible client for this service and is proposing the cultivation of 14 ha of virgin grassland to sugarcane on the Broughton Farm, located just outside Albert Falls, KwaZulu-Natal Province.

In terms of the National Environmental Management Act (NEMA) EIA Regulations published in GNR 327, 325 and 324 on the 7 April 2017 Government Gazette Number 40772, Environmental Authorisation from the Competent Authority, in this case the KZN Department of Economic Development, Tourism and Environmental Affairs (DEDTEA), is required prior to the undertaking of any activity triggered within GNR 327, 325 and 324. The CSIR, as the independent Environmental Assessment Practitioner (EAP), will be managing the Basic Assessment and Public Participation Process for this proposed project.

In line with the Environmental Impact Assessment requirements of April 2017 (as amended), Interested and Affected Parties (I&APs) must be notified and are requested to register for this project in order to receive future correspondence on this project and/or provide comments on issues of concern that will be considered during the Basic Assessment process. Please find enclosed with this letter a **Background Information Document (BID)** with more information regarding this project and the BA process. You have until on or before **9th October 2017** to register and submit any comments for this project. To register for the project please provide your full name, contact details (preferred method of notification, e.g., full postal or email address), fax/phone number(s) and an indication of any direct business, financial, personal or other interest you have in the application to the contact person listed below.

Please note that an application for EA for this project has not yet been lodged with the Competent Authority, and I&APs can kindly use the project name above as reference until that time. All registered stakeholders will be notified of release of all Reports for public comment going forward and will be able to provide comments.

Yours sincerely,

Ms. Kelly Stroebel (Project Manager)

Postal address: PO Box 320, Stellenbosch, 7599, South Africa
Tel: 021 888 2432
Fax: 021 888 2693
E-mail: kstroebel@csir.co.za
Website: http://www.csir.co.za/ems/specialneeds/

Email sent (05/09/17) to I&APs as part of Project Announcement and BID Release

From: Kelly Stroebel
To:
BC mrabothata@environment.gov.za; SHlela@environment.gov.za; tnemarude@environment.gov.za; Nozizwe.Makgalemele@drdlr.gov.za; christopher.nyangintsimbi@drdlr.gov.za; bonginkosi.zulu@drdlr.gov.za; ShibuR@daff.gov.za; mashuduma@daff.gova.za; MohapiN@dwa.gov.za; MuthraparsadN@dwa.gov.za; reka.kallicharan@kzndard.gov.za; Kraigen.govindasamy@kzndard.gov.za; melissa.packree@kznedtea.gov.za; Mavis.Padayachee@kznedtea.gov.za; jeffreyzikhali@hotmail.com; KarenM@daff.gov.za; ThembileD@daff.gov.za; JeffreyMAI@daff.gov.za; Nandiphas@daff.gov.za; seokwangM@nda.agric.za; AyandaM@daff.gov.za; trmabaso@ruraldevelopment.gov.za; BPMpisane@ruraldevelopment.gov.za babhekile.mpisane@drdlr.gov.za; KMNzimande@ruraldevelopment.gov.za; roy.ryan@kzntransport.gov.za; Mngoma-MadibeJ@dws.gov.za; StarkeyA@dws.gov.za; moonsamyc@dwa.gov.za; leburun@dwa.gov.za; michele.schmid@kzntransport.gov.za; ncumisa.mafunda@kznworks.gov.za; Nqobile.khanyile@Dmr.gov.za; frikkie.brooks@kzncogta.gov.za; sibusiso.khuzwayo@umdm.gov.za; lindiwen@umshwathi.gov.za; mabason@umshwati.gov.za; info@umshwati.gov.za; info@oroprojects.co.za; GeerinJH@eskom.co.za; data@kznwildlife.com; nerissa.pillay@kznwildlife.com; moniquec@zcci.co.za; 2009zeal@gmail.com; nwilson@wwf.org.za; cheek@sanbi.org; lindim@amafapmb.co.za; bernadetp@amafapmb.co.za; advocacy@birdlife.org.za; admin@grasslands.org.za; conservation@wessakzn.org.za; albert.falls@msinsi.co.za; howard.hendricks@sanparks.org; research@kznwildlife.com
Date: 05/09/2017 15:56
Subject: Notice of BA process: Mthethwa Trust KZN
Attachments: Letter to I&APs_BID_5Sept2017.pdf; Mthethwa Trust BID 5 Sept 2017.pdf

Dear Stakeholder,

Project announcement
Basic Assessment for the proposed cultivation of 14 ha of sugarcane on Broughton Farm, Albert Falls, KwaZulu-Natal
Please see the attached letter and Background Information Document notifying you of the initiation of the Basic Assessment Process for the above-mentioned project. In terms of the National Environmental Management Act (NEMA) EIA Regulations published in GNR 327, 325 and 324 on the 7 April 2017, Environmental Authorisation from the Competent Authority, in this case the KZN DEDTEA, is required prior to the undertaking of any activity.For more information, you may contact the project manager using the contact details stipulated in the attached letter.

Kind Regards,

Kelly Stroebel
Environmental Assessment Practitioner (EAP)
CSIR Stellenbosch
_____
kstroebel@csir.co.za
Tel. : 021 888 2432
PO Box 320, Stellenbosch, 7599

Proof email delivery sent on 5 September 2017

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zcci.co.za	Transferred	05/09/2017 15:56	
BC: moniquec@zcci.co.za(moniquec@zcci.co.za)			

Postal List for mail sent 05/09/17: Project Announcement documents (BID, Letter dated 5th September 2017, and Registration/Comment Form)

Department of Economic Development, Tourism and Environmental Affairs	Reka Kallicharan	8 Warwick Road, Cascades	Private Bag X07, Pietermaritzburg, 3202
Department of Agriculture, Forestry and Fisheries – KZN	Thembile Dlungwana	185 Longmarket Street Old Mutual Building Pietermaritzburg 3202	Private Bag X9029, Pietermaritzburg, 3200
Department of Rural Development and Land Reform – KZN	Babhekile Mpisane	200 Church Street, Pitermaritzburg, 3201	Private Bag X9000, Pietermaritzburg, 3200
Department of Water Affairs– KZN	Ashley Starkey	Southern Life Building 9th Floor 88 Joe Slovo Street DURBAN 4000	Southern Life Building 9th Floor 88 Joe Slovo Street DURBAN 4000
Umgungundlovu District Municipality	T.L.S Khuzwayo	242 Longmarket Street, Pitermaritzburg 3201	Private Bag 3235, Pietermaritzburg, 3201
uMshwati Local Municipality	Municipal Manager	Main Street, New Hanover	Private Bag X29, Wartburg 3233
Client	Mr. Z. Mthethwa		PO Box 182, Cramond, 3220
Landowner	Mrs. VP Webster		21D Duckbill Road, Newlands East, Durban, 4037
Farmyard Organics	Nearby landowner		Shaley Farm District Rd 239 Cramond 3220
Ezemvelo KZN Wildlife	Head Integrated Environmental Planning	1 Peter Brown Drive	Ezemvelo KZN Wildlife 1 Peter Brown Drive P.O. BOX 13053 Cascades 3200

C-3. Copy of the Register of I&APs (current as of the time of the release of the DBAR)

COMPANY/ORGANISATION	NAME	PHYSICAL ADDRESS	POSTAL	EMAIL
Department of Environmnetal Affairs- National	Mmatlala Rabothata	Fedsure Building, Pretoria, 0002	Fedsure Building Private Bag X447 315 Pretorius Street Pretoria 0002	
	Sibusisiwe Hlela	Fedsure Building, Pretoria, 0002	Fedsure Building Private Bag X447 315 Pretorius Street Pretoria 0002	
	Takalani Nemarude	Fedsure Building, Pretoria, 0002	Fedsure Building Private Bag X447 315 Pretorius Street Pretoria 0002	
Department of Rural Development and Land Reform	Dr Nozizwe Makgalemele		Fedsure Building Private Bag X833 315 Pretorius Street Pretoria 0001	
Department of Rural Development and Land Reform	Christopher Nyangintsimbi		Fedsure Building Private Bag X833 315 Pretorius Street Pretoria 0001	
Department of Rural Development and Land Reform	Bonginkosi Zulu		Fedsure Building Private Bag X833 315 Pretorius Street Pretoria 0001	
Department of Agriculture, Forestry and Fisheries	NRM	20 Steve Biko (Formerly Beatrix) Street Arcadia Pretoria 0002	Private Bag X138 Pretoria 0001	
Department of Agriculture, Forestry and Fisheries	Mashudu Marubini	20 Steve Biko (Formerly Beatrix) Street	Private Bag X138 Pretoria	

COMPANY/ORGANISATION	NAME	PHYSICAL ADDRESS	POSTAL	EMAIL
		Arcadia Pretoria 0002	0001	
Department of Agriculture, Forestry and Fisheries	Ms Thoko Buthelezi		Private Bag X120, Pretoria, 0001	
National Department of Water Affairs	Ms Ndileka K mohapi		Private Bag X313 Pretoria 0001	
	Namisha Muthraparsad		Private Bag X313 Pretoria 0001	
Department of Economic Development, Tourism and Environmental Affairs- HOD	Carol Coetzee	270 Jabu Ndlovu Street, Pietermaritzburg	Private Bag X9152 Pietermaritzburg 3200	
Department of Economic Development, Tourism and Environmental Affairs	Reka Kallicharan	8 Warwick Road, Cascades	Private Bag X07, Pietermaritzburg, 3202	
Department of Economic Development, Tourism and Environmental Affairs	Kraigen Govindasamy	8 Warwick Road, Cascades	Private Bag X07, Pietermaritzburg, 3202	
Department of Economic Development, Tourism and Environmental Affairs: South Region KZN	Melissa Packree			
Department of Economic Development, Tourism and Environmental Affairs: South Region KZN	Mavis Padayachee	270 Jabu Ndlovu Street, Pietermaritzburg		
Department of Agriculture, Forestry and Fisheries – KZN	Jeffrey Zikhali			
Department of Agriculture, Forestry and Fisheries – KZN	Karen Moodley	185 Longmarket Street Old Mutual Building Pietermaritzburg 3202	Private Bag X9029, Pietermaritzburg, 3200	
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Department of Water & Sanitation	R J Madibe	Southern Life Building, 88 Joe Slovo Street, Durban 4000	PO Box 1018, Durban, 4000	
Department of Water Affairs– KZN	Ashley Starkey	Southern Life Building 9th Floor 88 Joe Slovo Street DURBAN 4000	Southern Life Building 9th Floor 88 Joe Slovo Street DURBAN 4000	
Department of Water Affairs– KZN	Colleen Moonsamy	88 Field Street, Southern Life Building, 7th Floor, Durban 4000	PO Box 1018, Durban, 4000	
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Umgungundlovu District Municipality	T.L.S Khuzwayo	242 Longmarket Street, Pitermaritzburg 3201	Private Bag 3235, Pietermaritzburg, 3201	
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uMshwati Local Municipality	Phumlani Gwala	Main Street, New Hanover	Private Bag X29, Wartburg 3233	
uMshwati Local Municipality	Ward Councillor: Albert Falls	Main Street, New Hanover	Private Bag X29, Wartburg 3233	
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COMPANY/ORGANISATION	NAME	PHYSICAL ADDRESS	POSTAL	EMAIL
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Albert Falls Nature Reserve				

Notes on Public Particpation

- The proof of newspaper advertisments will be included in the Final BA Report, as the advertisments are being released at the same time as this Draft BA Report.
- The project has received no comments to date, thus there is no comments and reponses trail in this Draft BA Report. The Final BA Report will include all comments revieved on the DBAR.
- The Final BA Report will also include all correspondence relating to the Draft BA Report release.

DRAFT BASIC ASSESSMENT REPORT – PROPOSED MTHETHWA TRUST 10 HA SUGARCANE CULTIVATION ON BROUGHTON FARM, ALBERT FALLS, KWA-ZULU NATAL

DRAFT BASIC ASSESSMENT REPORT

APPENDIX D: TERRESTRIAL AND AQUATIC ECOLOGICAL ASSESSMENT OF BROUGHTON FARM, ALBERT FALLS

TERRESTRIAL AND AQUATIC ECOLOGICAL ASSESSMENT OF BROUGHTON FARM, ALBERT FALLS

DRAFT REPORT

January 2018

PROJECT REF: GTB178

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Report Issue	Draft report		
Consultant Ref Number	GTB178-17012018-01		
Title	**Terrestrial and Aquatic Ecological Assessment of Broughton Farm, Albert Falls**		
Prepared by:	GroundTruth Water, Wetlands and Environmental Engineering		
Consultant sign-off	**Name / Prof. Reg.**	**Signature**	**Date**
Author(s)	Gary de Winnaar	Include only for final print/hardcopy version	17/01/2018
Director	Dr Mark Graham		17/01/2018
Prepared for:			
Client sign-off	**Name**	**Signature**	**Date**
Document Reviewer			
Approved by			
Reference No			

Copyright

Indemnity

The project deliverables, including the reported results, comments, recommendations and conclusions, are based on the author's professional knowledge, as well as available information. The study is based on assessment techniques and investigations that are limited by time and budgetary constraints applicable to the type and level of survey undertaken. GroundTruth therefore reserves the right to modify aspects of the project deliverables if and when new/additional information may become available from research or further work in the applicable field of practice, or pertaining to this study.

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1 Project deliverables (including electronic copies) comprise *inter alia*: reports, maps, assessment and monitoring data, ESRI ArcView shapefiles, and photographs.

Declaration of Independence

GroundTruth Water, Wetlands and Environmental Engineering (GroundTruth) hereby acknowledge that it does not have any invested interests in the following project, and is thus independent to the proponent as required in terms of Section 33 of Government Notice Regulation 358 published under Section 24 of the National Environmental Management Act (Act 107 of 1998). Furthermore, in line with Appendix 6 of the 2014 EIA regulations (GN R982), I, Gary de Winnaar, as the specialist representing GroundTruth for this project, declare that:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a) to (e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).

Signed:  Date: 16 January 2018

Gary de Winnaar
Pr. Sci. Nat. (Ecology) Reg. No. 400454/13

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1. INTRODUCTION

GroundTruth Water, Wetlands and Environmental Engineering (GroundTruth) were appointed by the CSIR to undertake a **terrestrial and aquatic ecological assessment** of the Broughton Farm Parcel 22/925 (hereafter referred to as "the site") located near Albert Falls Dam, KwaZulu-Natal. The land owner of the site is planning to transform approximately 14 hectares (i.e. the entire site) of natural land for sugarcane cultivation, and requires a Basic Assessment to be undertaken in accordance with the National Environmental Management Act (no. 107 of 1998).

The main objective of this study is to characterise the terrestrial and freshwater ecological features occurring within the study area, and to assess the potential impacts that may arise from the proposed development.

1.1 Study Scope and Approach

The following **scope of work** was defined for the study:

Collection of available data to establish the ecological/biodiversity context of the study area;

Undertake a field investigation to identify, map and assess biodiversity features, and to provide a baseline description of the site's biodiversity in terms of vegetation, fauna and flora, and aquatic habitats;

Identify and assess impacts associated with the proposed development according to the CSIR's standard impact assessment methodology; and

Document the findings and results from this investigation, and provide recommendations to address impacts that may result from the development.

1.2 Methodology

The aforementioned scope and objectives for this study were investigated following the collection of desktop and infield data. This information was then used to characterise and spatially define ecological and biodiversity features associated with the site, and to a lesser degree, the broader surrounding landscape. The methods employed during this study are summarised in the following sections.

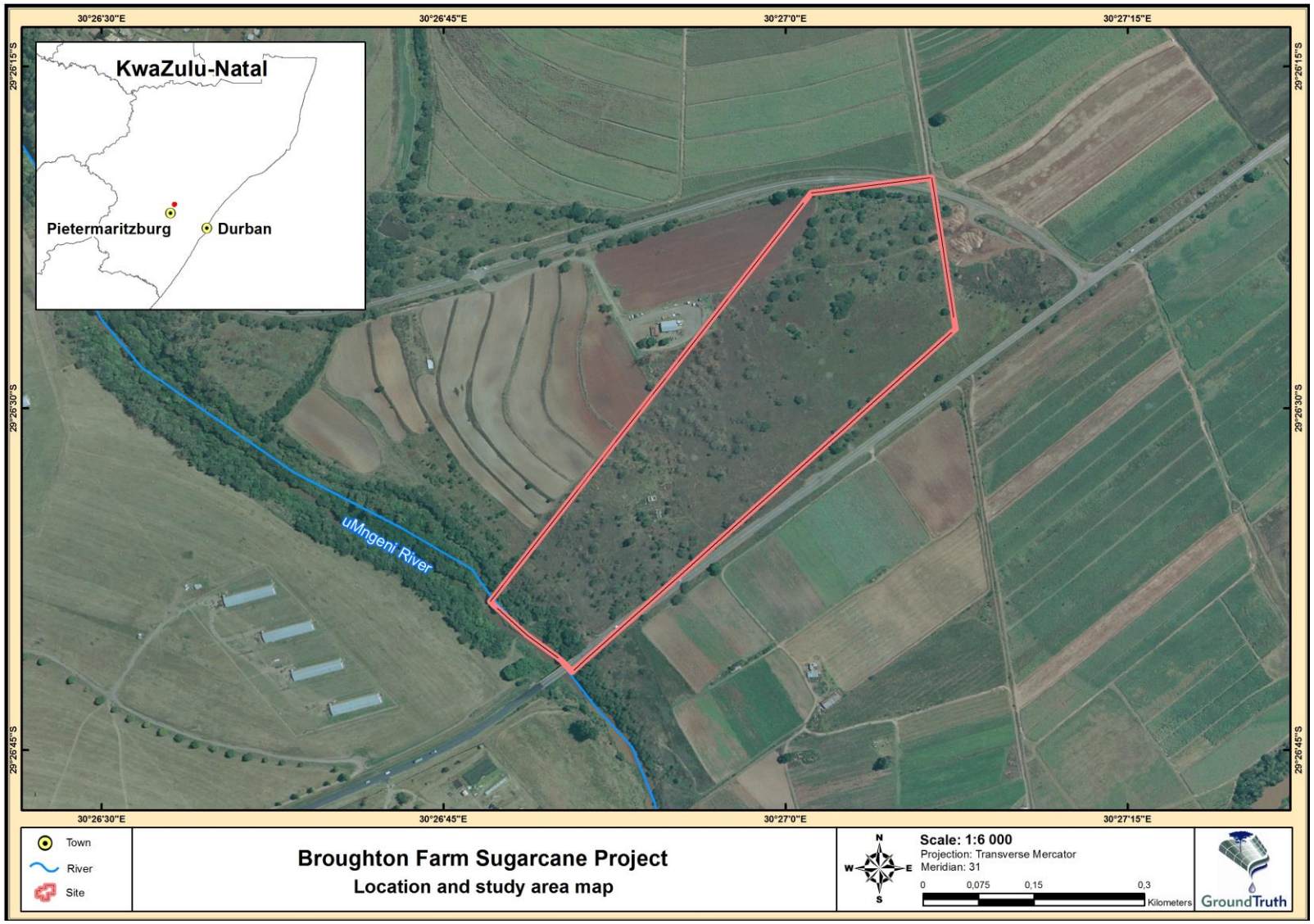

Figure 1-1 Site map showing the location of the Broughton Farm and its surroundings

1.2.1 Desktop Assessments

Available information/data was sourced, and used to identify and characterise the reference (i.e. original) and present-day ecology and biodiversity of the study area. This was achieved using data from, *inter alia*:

Classification systems and maps of vegetation types for South Africa (Mucina and Rutherford, 2006) and KwaZulu-Natal (Scott-Shaw and Escott, 2011);

Threatened and protected ecosystems (SANBI and DAEA, 2009); and

Ezemvelo KwaZulu-Natal Wildlife's (EKZNW) Systematic Conservation Assessment/ Planning (SCA) (EKZNW, 2016).

All spatially relevant data (e.g. habitats/ecosystems, vegetation communities, sensitive areas/ecosystems, etc.) were mapped at a desktop level using ESRI ArcMap 10. Verification of the desktop mapping was provided through interrogation of high-resolution aerial imagery, as well as through ground-truthing during the site visit.

Conservation important fauna and flora potentially occurring within the study area were identified using available literature, including:

Plants (Raimondo *et al.*, 2009; Scott-Shaw, 1999; SANBI, 2015);

Butterflies (Mecenero *et al.*, 2013);

Amphibians (du Preeze and Carruthers, 2009; Minter *et al.*, 2004).

Reptiles (Branch, 1998; Bates *et al.*, 2014);

Birds (Taylor *et al.*, 2015; SABAP2); and

Mammals (Friedmann and Daly, 2004; Monadjem *et al.*, 2010).

1.2.2 Field-based Assessments

A site visit was conducted on the 13th of October 2017 to provide site-specific details in order to verify and validate findings from the desktop assessment process. During the site visit the presence and condition of vegetation/habitats occurring on-site was confirmed. Additional information obtained included observed plant species diversity, presence of ecological indicators (including alien invasive species), occurrences of species of conservation concern, as well as any additional detail that may facilitate the overall study and impact assessment. The information obtained from the site visit also provided a validation of habitats that potentially support fauna.

1.2.3 Delineation and assessment of aquatic ecosystems

The desktop assessment process revealed that the site is only expected to contain instream and riparian habitat along the uMngeni River. Indicators used to determine the extent of riparian habitat (i.e. to mark the boundary of the aquatic ecosystem) include:

landscape position;

alluvial soils and recently deposited material;

topography of the riparian area; and

vegetation associated with the riparian area.

Topography and vegetation are the two main indicators typically used, while alluvial soils/deposits provide some verification of extent of flooding, i.e. the minimum extent of the riparian zone. In a natural setting, the riparian zones extend from the edge of the active channel to the outer edge of the macro-channel, with flood benches developing along the continuum as a result of alluvial deposition (see **Figure 1-2**). However, topographical features such as benches are more clearly defined in medium to large rivers.

The riparian habitat that extends through the property was delineated in accordance with the Department of Water and Sanitation (DWS – previously DWAF) guideline document (DWAF, 2008). The basic steps set out in the guideline document for riparian delineation were followed. These are summarised as follows:

1. Is the site relatively undisturbed (follow steps 2 to 5) or has the site been extensively altered (refer to step 6);
2. Working from the edge of the active channel, locate the edge of the riparian zone using obligate riparian plant species[2];
3. Check for any signs of wetness in the soils (hydric) and presence of unconsolidated alluvial material;
4. Use preferential[3] and/or facultative[4] riparian plant species to refine the edge of the riparian zone;
5. Examine the geomorphology (physical structure) of the channel and banks to determine the outer edge of the macro channel, and make note of any changes in slope from the riparian area to the upland terrestrial area; and
6. In the case of highly altered sites (i.e. there is a lack of indigenous vegetation or where the banks have been heavily engineered), use a reference site to make

2 Plant species that occur almost exclusively in the riparian zone (> 90% probability), and seldom occur in non-riparian areas, but where they are outside of riparian areas they still indicate wetness.

3 Plant species that occur preferentially, but not exclusively, in the riparian zone (>75% probability). They show progressive reductions in abundance, stature and vigour beyond the riparian zone.

4 Plant species that occur in both riparian and upland areas (>25% probability of occurrence in riparian zones).

inferences to the extent of the riparian zone. Reference sites need to be nearby and of a similar sized system to the site being assessed.

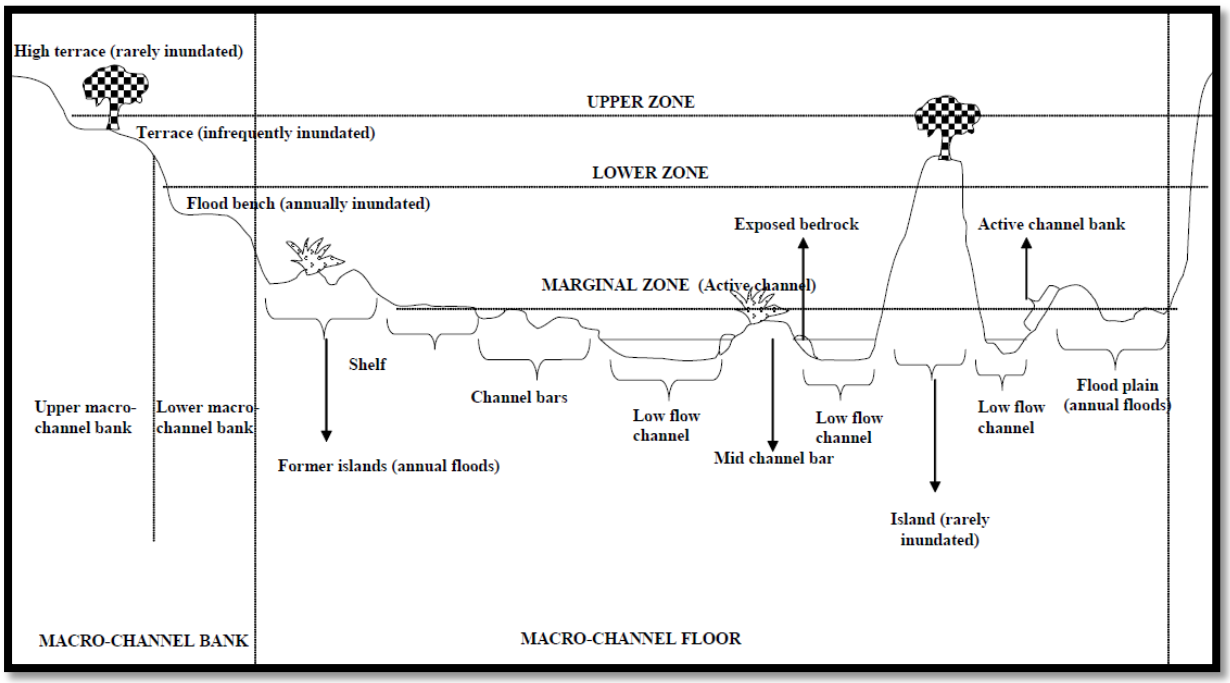

Figure 1-2 Concept cross section of a riparian zone (Kleynhans *et al.*, 2008a)

The Index of Habitat Integrity (IHI) methodology developed by Kleynhans *et al.* (2008b) was used to assess the present ecological state of the uMngeni River and the associated habitats (i.e. instream and riparian) within the site. Habitat integrity of a river refers to *"the maintenance of a balanced composition of physicochemical and habitat characteristics on a temporal and spatial scale that are comparable to the characteristics of natural habitats of the region*" (Kleynhans *et al.*, 2008b). Consequently, the habitat integrity of a river system provides the background for the biotic condition to be understood. The IHI method was applied for the current, pre-development scenario.

The basis of the habitat integrity assessment is the deviation from the reference (or natural) state (Kleynhans *et al.*, 2008b). The reference state is defined as the condition of the site, river or delineation prior to anthropogenic change (Kleynhans and Louw, 2008). The habitat integrity assessment is divided into instream and riparian components, and is based on the deviation of the present state from natural or reference conditions. The intensity and extent of anthropogenic effects are used to interpret the impact on the integrity of the system components. This interpretation is then formulated according to metric groups. The model operates in an integrated manner, using results from the assessment of a metric within a group or the group itself, for the assessment of the other appropriate metric groups. Intensity and extent of anthropogenic impacts on the system are recorded to

interpret the change in the system from reference condition. These impacts are deduced in terms of modification of drivers in the system, particularly hydrology, geomorphology and physicochemical conditions (Kleynhans *et al.*, 2008b). The severity of the impacts on habitat integrity will vary according to the natural characteristics of the river with certain rivers being more sensitive to certain impacts (Kleynhans *et al.*, 2008b). The impacts were then scored based on the impact, and then represented as Present Ecologic State (PES) categories as outlined in **Table 1-1**.

Table 1-1 Summary of the Index of Habitat Integrity (IHI) (Kleynhans *et al.*, 2008b)

Eco-Classification	Description	IHI Score	PES Category
Natural	Unmodified, natural.	90-100	A
Good	Largely natural with few modifications. A small change from natural habitats and biota may have taken place, but the ecosystem functions are essentially unchanged.	80-89	B
Fair	Moderately modified. A loss of and change from natural habitats and biota has occurred, but the basic ecosystem functions are still predominantly unchanged.	60-79	C
Poor	Largely modified. A large loss of natural habitats, biota and basic ecosystem functions has occurred.	40-59	D
Seriously Modified	The losses of natural habitats, biota and basic ecosystem functions are extensive but some features are still recognizable.	20-39	E
Critically Modified	Modifications have reached a critical level and the system has been completely modified, with an almost complete loss of natural habitats and biota. In the worst instances, basic ecosystem functions have been destroyed and the changes are irreversible.	0-19	F

2. BACKGROUND REVIEW AND REGIONAL CONTEXT

2.1 Reference Vegetation

The original, reference vegetation defining the broader landscape comprises two principle vegetation types, namely **Dry Coast Hinterland Grassland** (a subclass of Ngongoni Veld) occupying the northern parts of the study area, and **KwaZulu-Natal Hinterland Thornveld** in the south (Mucina and Rutherford, 2006; Scott-Shaw and Escott, 2011 – see **Figure 2-1**). Both are considered Vulnerable by Rutherford *et al.* (2006), however, the more recent and regionally appropriate assessments by Scott-Shaw and Escott (2011) have characterised Dry Coast Hinterland Grassland as Vulnerable and KwaZulu-Natal Hinterland Thornveld as Least Threatened.

Dry Coast Hinterland Grassland can be described (using the description of Ngongoni Veld by Rutherford *et al.*, 2006) as dense, tall grassland that is dominated by the unpalatable grass, *Aristida junciformis*, and a low species diversity owing to an *Aristida* monodominance. At lower altitudes, where the vegetation transitions into KwaZulu-Natal Hinterland Thornveld, there tends to be higher occurrences of woody vegetation. **Table 2-1** provides a list of plant species that typically characterise Dry Coast Hinterland Grassland/Ngongoni Veld. The South African National Biodiversity Institute (SANBI) and the Department of Environmental Affairs and Tourism (DEAT) (2009), in accordance with Section 52 of the National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004), also lists Dry Coast Hinterland Grassland/Ngongoni Veld as a threatened ecosystems. This is on the basis that 61% of the original extent (approximately 10,000 km^2) remains, with less than 1% under formal protection – it is more likely that the remaining extent is less than 61% as estimated by SANBI and DEAT (2009).

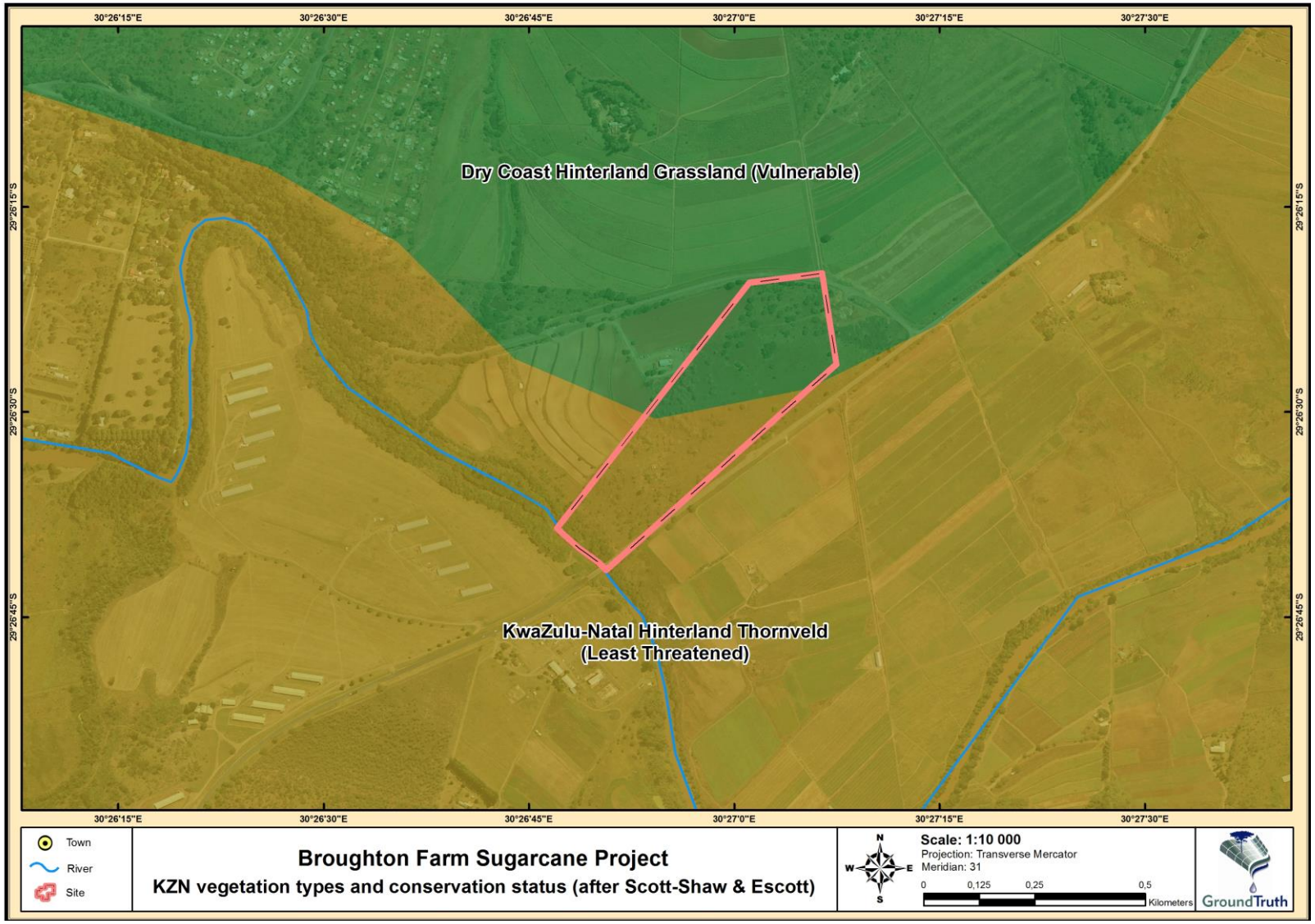

Figure 2-1 Map of reference vegetation and their present conservation status' for the Broughton Farm site and surrounding landscape

Table 2-1 List of important plant taxa defining Dry Coast Hinterland Grassland/Ngongoni Veld (after Rutherford et al., 2006) (Mucina *et al*., 2006)

Plant growth form	Species
Important taxa[5] - 27 species	
Small trees	*Acacia natalitia*, *A. nilotica* and *A. sieberiana var. woodii* (3 species).
Low Shrubs	*Agathisanthemum bojeri*, *Euryops laxus* and *Gnidia anthylloides* (3 species).
Graminoids	*Aristida junciformis subsp. junciformis* (d), *Bothriochloa insculpta*, *Eragrostis curvula*, *Hyparrhenia hirta*, *Panicum maximum*, *Paspalum scrobiculatum*, *Sporobolus africanus*, *S. pyramidalis* and *Themeda tri*and*ra* (9 species).
Herbs	*Chamaecrista mimosoides*, *Conostomium natalense*, *Gerbera ambigua*, *Helichrysum allioides*, *Hermannia gr*and*istipula*, *Pentanisia prunelloides*, *Selago tarachodes*, *Senecio exuberans* and *Vernonia galpinii* (9 species).
Geophytic Herb	*Hypoxis argentea* and *Watsonia densiflora* (2 species).
Succulent Herb	*Aloe minima* (1 specie)

Typical dominant species are denoted using (d)

KwaZulu-Natal Hinterland Thornveld is described by Rutherford *et al.* (2006) as open "thornveld" dominated by *Acacia* trees on undulating plains found on upper margins of river valleys. Compared to Dry Coast Hinterland Grassland, the more savanna-like KwaZulu-Natal Hinterland Thornveld generally supports a greater floristic richness of trees, shrubs, climbers, herbs and grasses. **Table 2-2** provides a list of plant species that characterise KwaZulu-Natal Hinterland Thornveld (after Rutherford *et al.*, 2006).

Table 2-2 List of important, biogeographically important and endemic plant taxa defining the KwaZulu-Natal Hinterland Thornveld (after Rutherford *et al*., 2006)

Plant growth form	Species
Important taxa - 45 species	
Tall tree	*Acacia robusta* (1 species)
Small trees	*Acacia natalitia* (d), *A. nilotica* (d), *Combretum molle* (d), *Ziziphus mucronata* (d), *Brachylaena elliptica*, *Cussonia spicata* and *Erythrina latissimi* (7 species).
Succulent trees	*Aloe marlothii subsp. marlothii* and *Euphorbia ingens* (2 species)
Tall Shrubs	*Calpurnia aurea*, *Coddia rudis*, *Diospyros dichrophylla*, *Ehretia rigida subsp. rigida*, *Grewia occidentalis*, *Gymnosporia buxifolia*, *Hibiscus calyphyllus* and *Rhus pentheri* (8 species).
Low Shrubs	*Barleria obtusa*, *Chaetacanthus setiger*, *Cross*and*ra greenstockii* and *Justicia flava* (4 species).
Soft Shrub	*Hypoestes aristata* (d) (1 species)
Woody Climbers	*Jasminum breviflorum*, *Putterlickia verrucosa* and *Tecoma capensis* (3 species).

5 Species (and lower taxa) that have a high abundance, a frequent occurrence or are prominent in the landscape.

Plant growth form	Species
Woody Succulent Climber	*Sarcostemma viminale* (1 species)
Graminoids	*Aristida junciformis subsp. junciformis* (d), *Eragrostis curvula* (d), *Hyparrhenia hirta* (d), *Melinis nerviglumis* (d), *Themeda tri*and*ra* (d), *Cymbopogon nardus*, *Eragrostis capensis*, *E. chloromelas*, *E. racemosa*, *E. superba*, *Heteropogon contortus*, *Panicum maximum*, *Sporobolus fimbriatus*, *S. pyramidalis* and *Tristachya leucothrix* (15 species).
Herbs	*Commelina Africana* and *Ruellia patula* (2 species).
Geophytic Herb	*Sansevieria hyacinthoides* (1 specie)
Biogeographically important taxa[6] - one specie	
Low shrub	*Barleria elegans* (1 specie)
Endemic taxa[7] - one specie	
Succulent herb	*Aloe pruinosa* (1 specie)

Dominant species are denoted using (d)

2.2 Areas of Conservation Importance

Ezemvelo KwaZulu-Natal Wildlife's (EKZNW's) Systematic Conservation Assessment (SCA, also referred to as systematic conservation planning) highlights areas that vary in terms of conservation importance as identified and mapped under the KZN biodiversity spatial planning terms and processes (EKZNW, 2016). This includes areas that are proclaimed as conservation areas or formally protected areas (e.g. provincial reserves, private reserves and stewardship sites), as well as unprotected areas that are considered a priority in terms of containing important biodiversity features. In terms of the latter, areas within KZN are subdivided into Planning Units (PUs) of varying spatial scales each supporting/potentially supporting biodiversity features (e.g. conservation important species, vegetation types, etc.). The SCA broadly classifies areas of biodiversity value/importance using two categories, namely **Critical Biodiversity Area's (CBA's)** and **Ecological Support Areas (ESAs)**. CBAs comprise two subcategories, CBA: Irreplaceable and CBA: Optimal. PUs designated as CBA: Irreplaceable represent the only localities where conservation targets for specific biodiversity features can be met under the current conservation planning scenario. CBA: Optimal areas represent the best localities that provide critical linkages for CBA: Irreplaceable areas. ESAs represent areas that support and sustain the ecological functioning of the CBAs thereby ensuring the persistence and maintenance of biodiversity patterns and ecological processes.

6 Taxa that are not necessarily endemic, and are important, but carry additional importance being limited to a small group of vegetation units, they are listed a regionally endemic in an established Centre of Endemism, they occur at the limits of their distribution area and they show a very disjunct distribution pattern.

7 Plant taxa that occur exclusively within the vegetation unit concerned (i.e. KwaZulu-Natal Coastal Belt).

The southern third (~ 4.8 ha) of the Broughton site contains land that is classified as **CBA: Irreplaceable** according to the latest SCA (**Figure 2-2**). Thus, from a conservation perspective, the area is considered irreplaceable in terms of maintaining biodiversity targets. This may appear to contradict the status of vegetation, which suggests that the northern section is more sensitive (i.e. Dry Coast Hinterland Thornveld as Vulnerable vegetation type). Reason for this is due to more localised and more concerning biodiversity features that are of greater importance in terms of meeting biodiversity targets within KZN. **Figure 2-2** illustrates that distribution and extent of formally protected areas and CBAs in relation to the site.

2.3 Flora of Conservation Importance

A number of biogeographically important and endemic taxa are associated with the reference vegetation as described in Section 2.1. In addition to these, there are several conservation important plant species (i.e. Red Listed, rare and endemics, and protected species) that may occur within the study area based on associated occurrences with Ngongoni Veld and KwaZulu-Natal Hinterland Thornveld (Raimondo *et al.*, 2009; SANBI, 2017). A number of these are listed as **Threatened species**[8], for example:

> *Alepidea cordifolia* (Endangered), *Aloe neilcrouchii* (Endangered), *Aloe pruinosa* (Vulnerable), *Argyrolobium longifolium* (Vulnerable), *Brachystelma franksiae* subsp. *franksiae* (Vulnerable), *Brachystelma gerrardii* (Endangered), *Cineraria atriplicifolia* (Vulnerable), *Cineraria glandulosa* (Vulnerable), *Dierama nixonianum* (Vulnerable), *Drimia echinostachya* (Vulnerable), *Euphorbia gerstneriana* (Vulnerable), *Gerbera aurantiaca* (Endangered), *Helichrysum oligopappum* (Vulnerable), *Hermannia sandersonii* (Vulnerable), *Kniphofia latifolia* (Endangered), *Polygala praticola* (Vulnerable), *Senecio dregeanus* (Vulnerable), *Sisyranthus fanniniae* (Vulnerable), *Woodia verruculosa* (Vulnerable).

The aforementioned list of Threatened species obviously excludes a greater number of other conservation important species (e.g. species that are listed as Near Threatened or Data Deficient, rare and endemic species, as well as protected species). This highlights the potential for the site to support a fair number of important and sensitive plant species.

8 Threatened species – species facing a high risk of extinction as classified using the IUCN categories, i.e. Critically Endangered, Endangered or Vulnerable is a threatened species

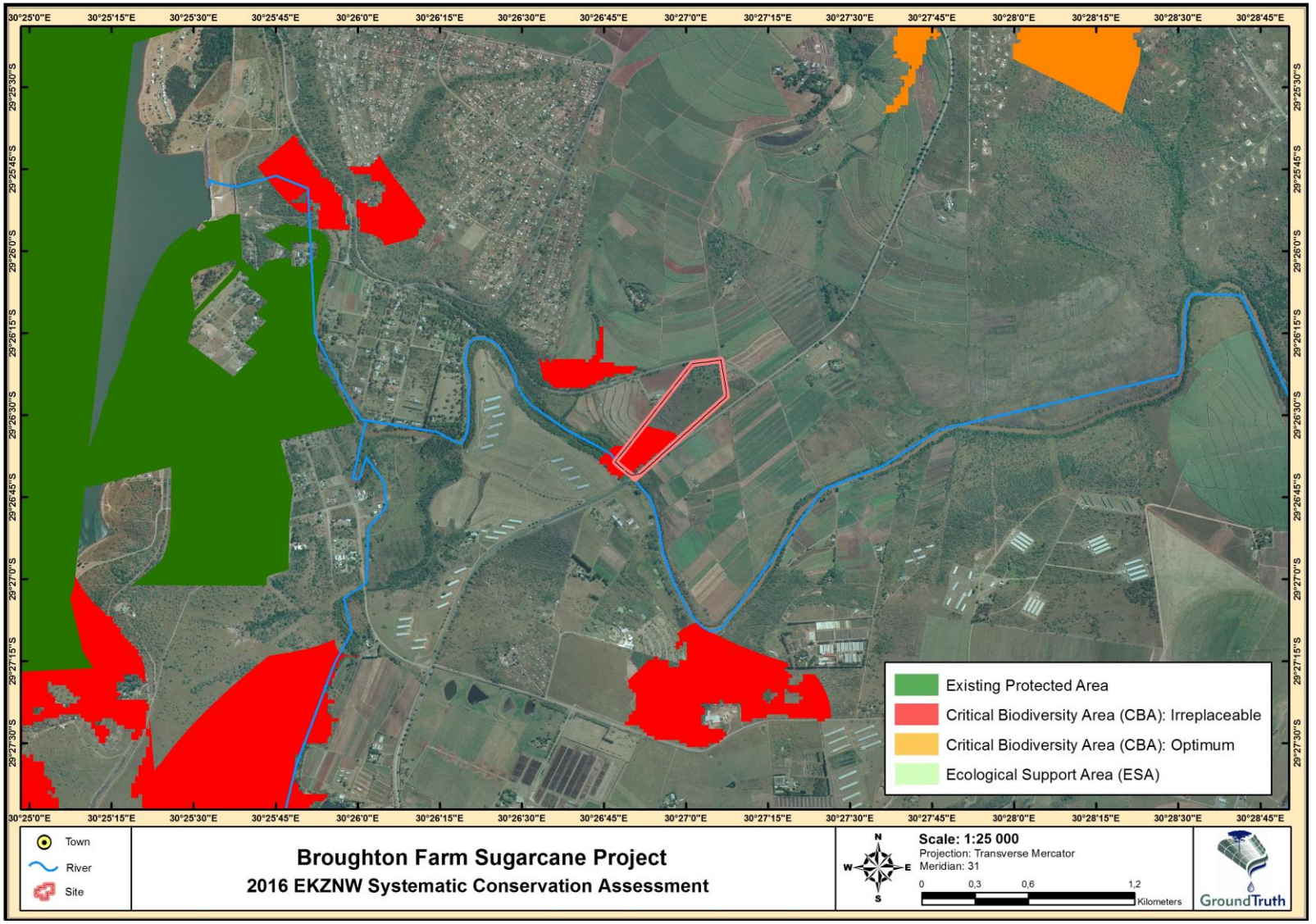

Figure 2-2 Overview of important conservation areas associated with the Broughton Farm and its surroundings (after EKZNW, 2016)

2.4 Fauna of Conservation Importance

The following points present a summary of conservation important fauna, listed according to respective indicator groups/taxa that potentially occur within the broader landscape under natural/untransformed conditions:

Butterflies – Up to 150 species of butterfly have been recorded from the broader study area based on the 2930AD quarter degree cell within which the Broughton Farm is located (ADU, 2017). This represents about 30% of the butterfly diversity in KZN. Only a single Red Listed species is known to occur within the broader study area, i.e. Karkloof Blue *Orachrysops ariadne* (Endangered).

Amphibians – Approximately 35 species of amphibian potentially occur within the area under natural conditions. This represents about 50% of the frog diversity in KZN. A small fraction of the potential amphibian diversity includes species of conservation concern, namely: Natal Leaf-folding Frog *Afrixalus spinifrons* subsp. *spinifrons* (Near Threatened) and Spotted Shovel-nosed Frog *Hemisus guttatus* (Vulnerable) (Minter *et al.*, 2004).

Reptiles – Up to 60 species of reptile potentially occur within the area under natural conditions, and represents about 30% of the diversity in KZN. The list of potential reptiles includes 34 snakes, 23 lizards, one tortoise and one terrapin. According to Bates *et al.* (2014), four of these species are Red Listed, namely: Stripped Harlequin Snake *Homoroselaps dorsalis* (Near Threatened), Natal Black Snake *Macrelaps microlepidotus* (Near Threatened), KwaZulu Dwarf Chameleon *Bradypodion melanocephalum* (Vulnerable) and Large-scaled Grass Lizard *Chamaesaura macrolepis* (Near Threatened).

Birds – According to the South African Bird Atlas Project 2 (SABAP2), up to 280 bird species have been recorded from Pentad 2925_3025 within which the Broughton Farm is located (SABAP2, 2017). This includes 13 Red Listed species – four are Endangered, six are Vulnerable and three are Near Threatened (Taylor *et al.*, 2015). Most of these birds are only occasionally recorded in the area (recorded <5% of the time). Grey Crowned Crane *Balearica regulorum* (Endangered), Lanner Falcon *Falco biarmicus* (Vulnerable) and Southern Bald Ibis *Geronticus calvus* (Vulnerable) are generally encountered more frequently (SABAP2, 2017).

Mammals – Approximately 60 species of mammal potentially occur within the area under natural conditions. This represents about 30% of the mammal diversity in KZN. About 60% of this diversity is made up of small and/or crepuscular/nocturnal species that are generally difficult to detect (e.g. rodents, shrews and bats). Of the potential diversity, 24 are Red Listed of which 19 are rodents, shrews and bats that are listed as Data Deficient and Near Threatened (Friedmann and Daly, 2004; Monadjem *et al.*, 2010). Two Threatened species potentially occurring in the broader area include Oribi *Ourebia ourebi* (Endangered) and Rough-haired Golden Mole *Chrysospalax villosus* (Critically Endangered).

2.5 National Freshwater Ecosystems Priority Areas (NFEPAs)

National Freshwater Ecosystem Priority Areas (NFEPAs) are areas that have been classified to assist in the conservation and sustainable use of South Africa's freshwater ecosystems, including rivers, wetlands and estuaries. Furthermore, they are utilised in water resource planning, assisting in the implementation of the National Water Act, the National Environmental Management: Biodiversity Act and the Protected Areas Act (Nel et al., 2011). The freshwater ecosystems have been classified according to their Present Ecological State (PES). Wetlands are classified as 'AB', 'C', and 'DEF' or 'Z' categories, depending on whether the systems are considered to be in good, moderately modified or heavily modified condition, respectively (Nel et al., 2011). These categories have not been based on field data, as there is insufficient data at a national scale. Thus, the NFEPA process modelled the ecological categories to serve as a guideline to inform the selection of NFEPAs.

According to the available NFEPA coverage, there are no NFEPA wetland or river systems within the site study, as well as within the immediate vicinity of the site (i.e. within a 500 m radius of the site as recommended by the Department of Water and Sanitation, DWS) (Nel *et al.*, 2011). Only a few small, "low priority" wetlands are located a short distance outside of the 500 m DWS radius, and Albert Falls Dam is classified as a FEPA on the basis that it is an important water resource from an socio-economic perspective.

Appendix 1 illustrates the distribution and extent of wetland and river systems in relation to the site, including NFEPA wetland systems based on national scale mapping and classification, as well as desktop mapping of aquatic features (riparian and instream habitats, wetlands, and dams) that occur within the 500 m DWS radius. The desktop mapping shows that the actual site contains riparian and riverine habitats along the southern boundary of the site, and it is highly unlikely that other aquatic ecosystems (e.g. wetland habitat) occur elsewhere on-site.

3. PRESENT ECOLOGICAL STATE OF THE SITE

The following sections provide descriptions of the site in terms of vegetation, available habitats and potential to support biodiversity, occurrence of sensitive features, present ecological state and ecological importance.

3.1 Vegetation Description and Plant Species Composition

The vegetation occurring within and adjacent to the site is characterised by a mosaic of grassland and open savanna/woodland (**Figure 3-1** and **Figure 3-2**). The open savanna/woodland component comprises a well-defined tree layer that is dominated by *Acacia sieberiana* trees interspersed by a number of exotic Syringa trees (*Melia azederach*). The understorey layer contains mostly weedy/ruderal species, including invasive alien plants such as *Bidens pilosa*, *Lantana camara* and *Tagetes minuta*.

The grassland areas adjacent to the open savanna/woodland support a more moderate diversity of herbs, with the following species found to be dominant across the site at the time of the site visit: *Ajuga ophrydis*, *Becium obovatum*, *Eriosema cordatum*, *Gerbera ambigua*, *Helichrysum nudifolium*, *Hypoxis hemerocallidea*, *Kohautia amatymbica*, *Ledebouria floribunda*, *Ruellia cordata*, *Thunbergia atriplicifolia* and *Zornia capensis* (see also **Figure 3-3**). A reasonable proportion of the species recorded are characteristic of Ngongoni Veld and KwaZulu-Natal Hinterland Thornveld, as defined by Rutherford *et al.* (2006). These include the distinctive tree: *Acacia sieberiana*; the herbs/geophytic herbs: *Chaetacanthus setiger*, *Gerbera ambigua*, *Hermania grandistipula* and *Hypoxis argentea*. Several grasses were also observed, but could not be accurately identified due to a lack of inflorescences. These include species from the following genera: *Aristida*, *Eragrostis*, *Hyparrhenia*, *Panicum* and *Sporobolus* – it is likely that several grass species are also indicative of the natural vegetation types for the area (i.e. Ngongoni Veld and KwaZulu-Natal Hinterland Thornveld).

Localised disturbances in the form of sites cleared of vegetation, and to a lesser extent felled *Acacia sieberiana* trees and solid waste dumping have given rise to pioneer and weedy species with a small to moderate infestation by invasive alien plants (IAPs) (see **Figure 3-2**).

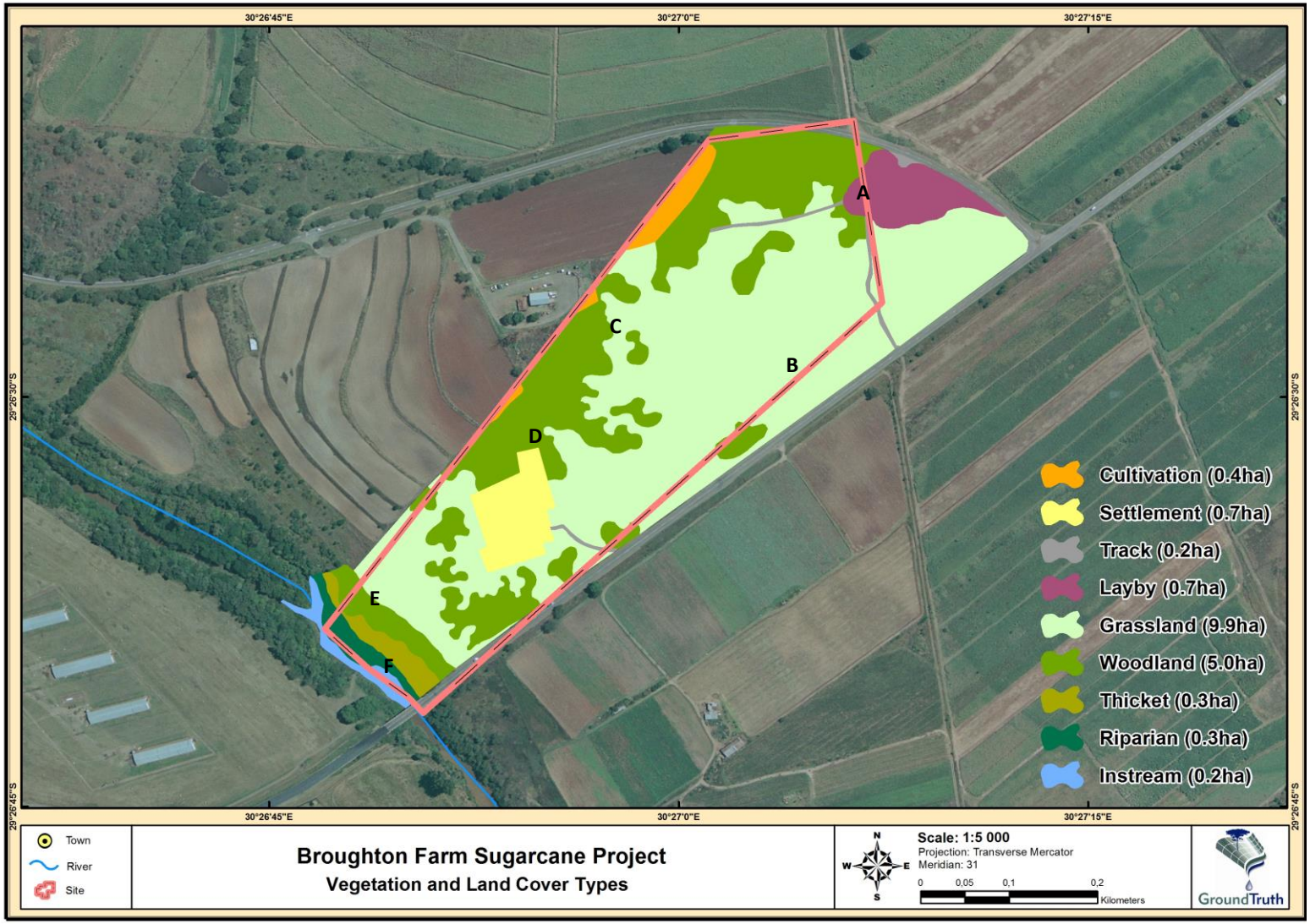

Figure 3-1 Map showing the distribution and extent of various land cover and vegetation types for the Broughton Farm study with cross references to site photographs shown in Figure 3-2

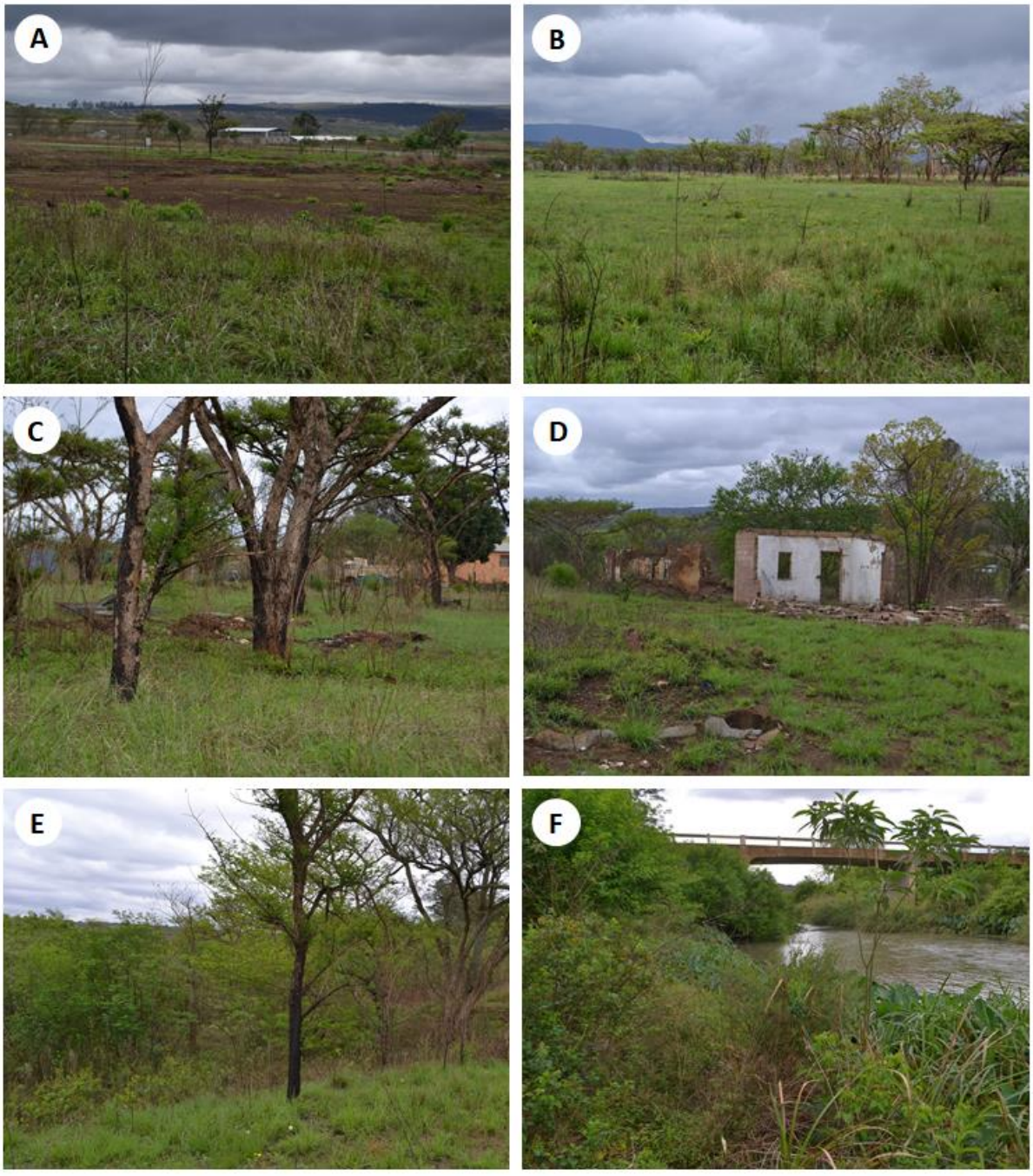

Figure 3-2 Photographs taken from Broughton Farm on the 13th of October 2017 with cross-references to Figure 3-1 illustrating: A) the disturbed area used as an informal layby; B) typical grassland leading into savanna/woodland; C) illegal dumping amongst *Acacia sieberiana* trees; D) abandoned historic homestead; E) transition from savanna/woodland into the riparian area; and F) riparian vegetation long the uMngeni River.

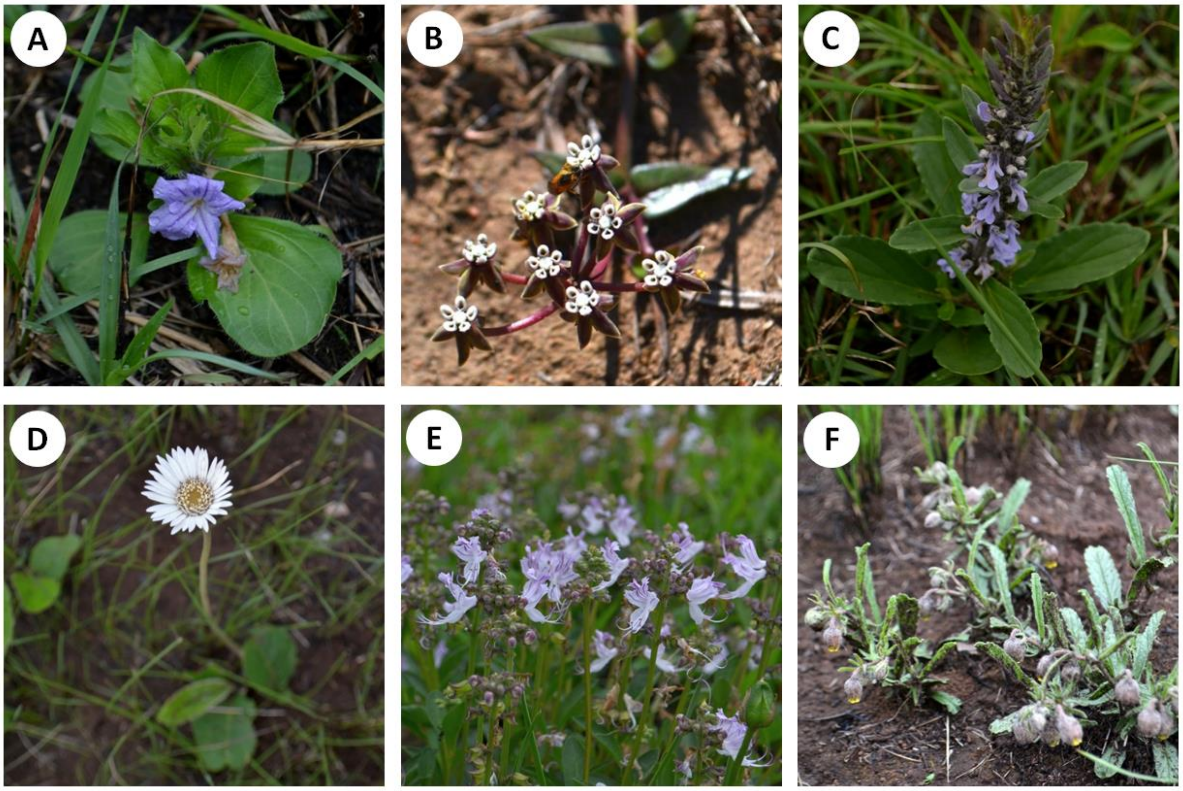

Figure 3-3 Photographs of some herbs that occur within the grassland component at Broughton Farm: A) Veld Violet *Ruellia cordata*; B) Doily Cartwheel *Asclepia multicaulis*; C) Bugle Plant *Ajuga ophrydis*; D) Pink and White Gerbera *Gerbera ambigua*; E) Cat's Whisters *Becium obovatum*; and F)Yellow Granny Bonnets *Hermania grandistipula*

Appendix 2 presents a detailed list of the plant species as recorded from the site. A total of 83 plant species were recorded at the Broughton Farm during the site visit – a significant proportion (~30%) of this diversity includes invasive alien plants (see Section 3.1.2). A number of the observed indigenous plants are fairly common to the broader KZN region, and also provide confirmation that the site's vegetation is more characteristic of Dry Coast Hinterland Grassland (or Ngongoni Veld) with around 33% of the indicator species for Ngongoni Veld (Rutherford *et al.*, 2006) recorded from the site. A small proportion (<5%) of the observed plant diversity includes conservation important species (see Section 3.1.1). It is expected that site supports a greater diversity of indigenous plants, and the true diversity can only be established following repeated plant surveys conducted at other times of the year. Nevertheless, the October 2017 site visit provides a good understanding of the site in terms of vegetation characteristics.

Overall, the grassland vegetation occurring on the Broughton Farm was found to be in a good condition, despite localised disturbances, and supports a relatively good diversity of herbs and grasses. The savanna/woodland component is in a more moderate condition owing to the presence of weedy/ruderal species. The riparian vegetation along the uMngeni River is currently in a poor condition due to high infestations of IAPs. The

following sections provide further detail describing the characteristics of the site's vegetation.

3.1.1 Important and/or sensitive plants

Only two conservation important plants, both of which are listed under the KZN Nature Conservation Ordinance (NCO) (no. 15 of 1974), namely:

Orange River Lily *Crinum bulbispermum* – Several clumps of Orange River Lily occurin and around the historic homestead located near the centre of the site. Most crinum lilies generally occur near rivers, wetlands, pans and in damp depressions. It is possible that these plants may have been planted on-site historically. Crinum lily populations are experiencing declines throughout South Africa largely as a result of medicinal plant harvesting.

Common Soap Aloe *Aloe maculata* – All aloes are regionally protected under the NCO. A number of *Aloe maculata* plants were also recorded in the vicinity of the historic homestead. *A. maculata* is extremely common and widespread and currently there are no threats to the species.

3.1.2 Invasive/alien plant species

A number of invasive alien plants (IAPs) were observed throughout the site, making up approximately 30% of the overall plant diversity (see **Appendix 2**). IAP infestations tend to only be concentrated in certain areas of the site. Specific areas within the site that are infested by IAPs are as follows (see also **Figure 3-1** and **Figure 3-2**):

There is a very high infestation of the IAPs along the uMngeni River with *Cardiospermum grandiflorum*, *Gleditsia triacanthos*, *Melia azedarach*, *Passiflora subpeltata*, *Rubus cuneifolius*, *Solanum mauritianum* and *Tagetes minuta* dominating the riparian areas.

The layby area at the junction of the R33 and the P9 roads also has a high infestation of *Amaranthus thunbergii*, *Argemone mexicana*, *Chenopodium album*, *Conyza sumatrensis*, *Datura stramonium* and *Ipomeae* cf. *purpurea*.

Low to moderate infestations are associated with the areas in, and around the historic homestead, as well as the open savanna/woodland areas.

3.2 Fauna

The purpose of the site visit was to assess the available habitats associated with the site in terms of potentially supporting conservation important fauna, rather than assessing the actual faunal diversity through detailed surveys of various faunal groups. On this basis, the grassland/savanna mosaic, together with the riparian habitat along the uMngeni River

provide a reasonable diversity of habitats that potentially can support a fair number of species. However, at any one point in time, the actual diversity and abundance of fauna is expected to be relatively low due to the effects of land transformation, habitat fragmentation and disturbances by people, machines and vehicles in areas immediately adjacent to the site. Habitat transformation and fragmentation within the broader landscape is particularly high – approximately 60% of the area within a 10 km radius from the site is transformed largely as a result of sugarcane cultivation and plantations, and more localised urbanisation. Thus, movement and dispersal opportunities for certain groups of fauna is somewhat restricted. Although a reasonable degree of connectivity is provided by along the uMngeni River riparian corridor, but this corridor terminates a short distance upstream where it meets Albert Falls Dam. A summary of the key faunal groups, and potential for occurrences based on the available habitat template, is as follows:

3.2.1 Butterflies and other invertebrates

The site does not contain suitable habitat for the Endangered Karkloof Blue *Orachrysops ariadne*. This species of butterfly inhabits Midlands Mistbelt Grassland on relatively moist and cool south-facing slopes which contain both the host plant (*Indigofera woodii* var. *laxa*) and the host ant (*Camponotus natalensis*) (Mecenero *et al.*, 2013).

The site has the potential to support range-restricted species from other invertebrate taxonomic groups, and which have been incorporated into conservation planning (e.g. earthworms, millipedes and snails). Most notable is number of millipede species that may occur on-site based on known distributions, namely Visible Keeled Millipede *Gnomeskelus spectabilis*, Urban Lumpy Keeled Millipede *Gnomeskelus tuberosus urbanus*, Destroyed Slender Spined Millipede *Spinotarsus drestructus*, Glomerate Slender Spined Millipede *Spinotarsus glomeratus*, Maritzburg Slender Spined Millipede *Spinotarsus maritzburgensis*, Resembling Two-toothed Slender Spined Millipede *Patinatius bidentatus simulator*, Wandering Black Millipede *Doratogonus peregrinus*, Cristulate Black Millipede *Doratogonus cristulatus* and Flat-toothed Shagreened Millipede *Camaricoproctus planidens*.

Other conservation important invertebrates include the earthworms *Tritogenia sulcata* and *Geogenia caementerii*, and the snails *Gulella euthymia* and *Gulella separata*.

3.2.2 Amphibians

Although the site appears to lack suitable amphibian habitat, the potential for up to at least 20 species occurring on-site is fairly good. The dense, wooded vegetation along the uMngeni River provides suitable habitats for a variety of amphibians with preference for riverine habitats and dense vegetation (e.g. Bush Squeaker *Arthroleptis wahlbergii*, Bronze Caco *Cacosternum nanum* and Common River Frog *Amietia quecketti*). It is also expected

that certain other species will utilise habitats within the adjacent grasslands/savanna mosaic to forage and hibernate (e.g. Bushveld Rain Frog *Breviceps adspersus*, Striped Caco *Cacosternum striatum* and Natal Sand Frog *Tomopterna natalensis*).

Of the two species of conservation concern, only Spotted Shovel-nosed Frog *Hemisus guttatus* (Vulnerable) is likely to inhabit the site, where as Natal Leaf-folding Frog *Afrixalus spinifrons* subsp. *spinifrons* (Near Threatened) is more dependent on wetlands, dams, pools and pans (du Preez and Carruthers 2009). Spotted Shovel-nosed Frog, if present, is likely to be restricted to the riparian and adjacent terrestrial habitats along the uMngeni River, although it capable of foraging over extensive distances, and in diverse habitats. Breeding habitat would be more confined to the margins of the uMngeni River – breeding habitat suitability, however, is largely compromised by the high infestations of IAPs (see Section 3.2). More suitable habitat for Spotted Shovel-nosed Frog is located about 600 metres north-east of the site, and movement between the sites is prevented largely by the roads and sugarcane fields.

3.2.3 Reptiles

The site has the potential to support a fair diversity of reptiles within the grassland and savanna/woodland mosaic, as well as within the riparian areas along the uMngeni River. There is a very limited presence of termite mounds and rock outcrops that would otherwise provide suitable habitats for certain habitat specialists (e.g. Black-headed Centipede-eater *Aparallactus capensis,* Spotted Harlequin Snake *Homoroselaps lacteus* and Bibron's Blind Snake *Afrotyphlops bibronii*). The dense woody vegetation, reeds and sedges along the banks of the uMngeni River, along with the sandy alluvial soils and leaf litter provide suitable habitats for other species (e.g. Red-sided Skink *Trachylepis homalocephala*, Mozambique Dwarf Burrowing Skink *Scelotes mossambicus* and Wahlberg's Snake-eyed Skink *Afroablepharus wahlbergii*). Suitable habitat is provided for two of the four species of conservation concern that potentially occur in the area, namely:

KwaZulu Dwarf Chameleon *Bradypodion melanocephalum* (Vulnerable) – this small chameleon inhabits a range of vegetation types including grasses, bushes, thickets, trees and roadside verges, but tends to favour riverine bush, tall grasses in undisturbed grassland, and reedbeds in and around wetlands (Bates *et al.*, 2014; Branch, 1998). The core of the species distribution centres on Durban where it is under threat by continued transformation and fragmentation of its remaining habitats (Armstrong, 2008). If present on-site, their numbers would be very low and restricted to the dense vegetation along the uMngeni River.

Natal Black Snake *Macrelaps microlepidotus* (Near Threatened) – a semi-fossorial species that prefers moist leaf litter and humic soils dense/forested vegetation (Bates *et al.*, 2014; Branch, 1998). At lower altitudes it tends to occur in dense bush, especially

damps areas near water. Habitat availability on-site is not ideal, but possibly limited to the riparian areas adjacent to the uMngeni River.

3.2.4 Birds

The broader area has the potential to support a reasonable bird diversity (~280 species), including up to 13 Red Listed species. Of the Red Listed, Grey Crowned Crane *Balearica regulorum* (Endangered) is most common to the area, followed by Lanner Falcon *Falco biarmicus* (Vulnerable) and Southern Bald Ibis *Geronticus calvus* (Vulnerable). Other Red Listed species are rarely encountered. This site is not considered an important area for avifauna, particularly in terms of supporting breeding populations, and the actual diversity is expected to be made up of moderate numbers of more common and widespread species. On occasion, some of the more sensitive species may be encountered foraging onsite, however, the actual dependence on the site is probably very low.

3.2.5 Mammals

The site has a relatively low potential to support a notable abundance and diversity of mammals, and occurrences will mostly be in the form of small, crepuscular/nocturnal mammals (e.g. rodents, shrews and bats). Larger mammals that are expected to occur occasionally on-site include widespread species such as Vervet Monkey and Common Duiker.

The only two Threatened and highly sensitive species represented for the broader area (i.e. the Endangered Oribi *Ourebia ourebi* and the Critically Endangered Rough-haired Golden Mole *Chrysospalax villosus*) are not likely to inhabit the site, even on occasion due to either the lack of suitable habitat and/or the very limited opportunities that allow movement and dispersal of populations.

Several Near Threatened and Data Deficient listed mammals may occur on-site include: African Striped Weasel *Poecilogale albinucha* (Data deficient), Common Dasymys *Dasymys incomtus* (Near Threatened), Common Grammomys *Grammomys dolichurus* (Data Deficient), Geoffroy's Horseshoe Bat *Rhinolophus clivosus* (Near Threatened), Greater Dwarf Shrew *Suncus lixus* (Data Deficient), Greater Red Musk Shrew *Crocidura flavescens* (Data Deficient), Hottentot Golden Mole *Amblysomus hottentotus* (Data Deficient), Least Dwarf Shrew *Suncus infinitesimus* (Data Deficient), Lesser Dwarf Shrew *Suncus varilla* (Data Deficient), Lesser Red Musk Shrew *Crocidura hirta* (Data Deficient), Natal Long-fingered Bat *Miniopterus natalensis* (Near Threatened), Serval *Leptailurus serval* (Near Threatened), Single-Striped Mouse *Lemniscomys rosalia* (Data Deficient) and Swamp Musk Shrew *Crocidura mariquensis* (Data Deficient). Occurrences of these species on-site, if at all, are expected to be rare.

3.3 Assessment of Riparian Habitat along the uMngeni River

The only aquatic ecosystem occurs along the site's southern boundary and comprises of the uMngeni River and associated riparian habitat on the left bank of the watercourse. Located about four kilometres downstream of Albert Falls Dam, the ecological functions and processes of the system have been influenced by the operational regime of the dam since construction in 1976. Paramount to this has been the significant alteration of the natural flow regime exhibiting a reversed hydrograph with high flow releases in winter and lower volumes in the summer wet season (Dickens *et al.*, 2008). Structure of the riparian vegetation community has undergone significant change with a notable decrease in grass/reed cover and an increase in shrubs and trees. This is congruent with the observations made from the October 2017 site visit. 0ther components of the system have also been affected, such as reduced diversity of fish and changes in the aquatic invertebrate communities.

3.3.1 Extent of riparian habitat

At the site, the riparian zone (including the active channel) ranges from 30 to 45 metres in width. The active channel, which has a width of up to 20 metres in places, comprises a main channel and a smaller side channel that is separated from the main channel by a small island of largely *Phragmites australis* and a variety of shrubs and trees (predominantly exotic species). The general cross section profile of the riparian zone is defined by fairly steep banks leading from the terrestrial zone, through a series of terraces leading down into the riparian zone. Flood events that typically

The following points were noted during the process of defining the outer edge of the riparian zone within the site:

- The edge of the uMngeni River's active channel, and the outer edge of macro channel was recorded using a global positioning system (GPS). The edge of the macro channel was determined using typical riparian indicators (i.e. obligate plant species, alluvial deposition, fluvial geomorphic features, etc.).
- Only a few indicator trees were recorded, namely the obligate riparian tree *Combretum erythrophyllum*, which is fairly abundant within the site, and facultative riparian trees *Gymnosporia buxifolia* and *Ziziphus mucronata*. *Combretum erythrophyllum* trees provided a fairly good indication of the extent of the riparian zone. However, it was not always possible to define the upper boundary based on vegetation alone as the plant species composition has been severely altered by alien plant infestations, notably: *Cardiospermum*

grandiflorum, *Gleditsia triacanthos*, *Melia azederach*, *Morus alba* and *Solanum mauritianum*.

- The geomorphology/geomorphic features of the channel and banks provides a good indication of the riparian zonations through the presence of terraces/flood benches and sites of alluvial deposition. However, it is acknowledged that the upper banks are not activated as frequently as they would have under the natural flow regime prior to Albert Falls Dam. Flood event of such proportions occur very rarely due to the buffering capacity of Albert Falls Dam.

Through integration of the aforementioned points, it was possible to map the outer edge within an acceptable degree of confidence. The mapped extent of the riparian zone within the site is illustrated in **Figure 3-1**.

3.3.2 Integrity of instream and riparian habitats

IHI utilises various parameters associated with water quality and habitat. The initial IHI score is considered to be 100%, and the extent to which each parameter has an impact on the habitat integrity is calculated and subtracted from this initial score; the greater the impacts the lower the overall IHI score will be.

The following notable impacts were observed for the riparian and instream components:

- ***Vegetation removal –*** a small amount of riparian vegetation has been removed within the assessed reach due to cattle paths and informal fishing sites. Additional removal has resulted from the R33 road crossing immediately downstream of the site.
- ***Exotic vegetation –*** there is a very high infestation of IAPs (see Sections 3.1.2 and 3.3.1) that are outcompeting indigenous vegetation due to their more vigorous growth. The infestations are exacerbated by the loss of periodic floods that would scour and remove large shrubs and trees, providing opportunities for other plants to establish. Exotic vegetation also results in various impacts such as bank instability, reduced buffering to the channel and downstream and loss of biodiversity.
- ***Bank erosion –*** there is a moderate degree of erosion within the riparian zone which is largely attributed to the infestation of IAPs and exacerbated by trampling by livestock.
- ***Flow modification –*** the significant alteration of the flow regime due to regulated releases from Albert Falls Dam has had a significant impact on the

riparian vegetation within the site. This has resulted in an encroachment by woody species, most notably IAPs.

- ***Physico-chemical inputs*** **–** the water quality is influenced (both positively and negatively) by the dam, with certain water quality parameters being affected more so than others (e.g. removal of suspended solids and certain nutrients, and elevations metals such as manganese. The influences of the dam are also dependent on whether the dam in spilling or not, as well as whether the dam is thermally stratified or not (e.g. warmer and/or cooler water than natural expected). It is expected that there are localised impacts on water quality due to land use activities in the immediate landscape, particularly nutrients from agricultural practices.

Taking into account the aforementioned (and other) impacts, the riparian and instream habitats that are associated with the site were determined to be in a D and C Ecological Category. This indicates that the riparian zone is 'largely modified' denoting that there has been a reasonably large loss of natural habitats, biota and basic ecosystem functions within the system. The findings are also somewhat congruent with the 2014 DWS PES EI ES assessment, which rated the 9.5 km reach of the uMngeni River within which the site is located as a C Ecological Category (DWA, 2014).

4. DISCUSSION

4.1 Assumptions and Limitations

This report was produced following a single site visit conducted during October 2017. It is therefore possible that certain biotic elements, notably plant species, were undetected due to the timing of the site visit, as well as the limited presence of flowering material. Despite this, it is likely that this study provides a reasonable representation of the present ecological state and expected biodiversity for the site.

4.2 Identification and Assessment of Impacts

Impacts to biodiversity that are expected as a result of the proposed project are discussed in the following sections. The identified impacts were assessed using specialist impact assessment criteria provided by the CSIR as presented in **Appendix 3**. Each impact was assessed in terms of spatial extent, intensity, duration, reversibility, irreplaceability, probability, significance, status, and confidence. Impacts may be reduced through appropriate mitigation (see Section 4.3). The actual evaluation and assessment of impacts to biodiversity is presented in Section 4.4.

4.2.1 Loss of natural vegetation and habitats supporting biodiversity

Almost the entire site (i.e. 90% of the Broughton Farm, or 12.7 ha) is made up of natural vegetation comprising largely of grassland and savanna/woodland, ranging in condition from good (~53%) to moderate (17%) to poor (20%) – the vegetation on-site is more characteristic of Ngongoni Veld, but has some affinities with KZN Hinterland Thornveld. The remaining 10% of the site is either degraded (e.g. layby and historic homestead areas) or completely transformed (e.g. roads and cultivation). Ultimately the project would result in a significant loss (~40%) of natural vegetation from the immediate landscape, while from a regional perspective the loss is considered negligible (~0.01%). The following key considerations, however, carry more weight in terms of establishing the importance of the sites vegetation and associated habitats:

- ***Critical Biodiversity Area*** **–** approximately 4.5 ha (or 32%) of the site is classified as a CBA (see Section 2.2), and regardless of condition, this area is considered **irreplaceable** and of a **very high significance** in terms maintaining biodiversity conservation targets in the province (EKZNW, 2013). This essentially represents a fatal flaw, and additional effort will be required to avoid these areas.

- ***Threatened ecosystem* –** up to 7.0 ha (or 50%) of the site is a listed threatened ecosystem according to SANBI and DEAT (2009) (see Section 2.1) based on the mapped extent of Ngongoni Veld, and following confirmation from the field investigation. This represents a **medium significance** on the basis that Ngongoni Veld is listed as Vulnerable, which is mitigatable through biodiversity offsetting.
- ***Ecological connectivity* –** although the site does not intercept any macro-corridors in the form of Ecological Support Areas (ESAs), it does provide connectivity as a micro-corridor along the uMngeni River riparian areas. This connectivity aids species movements and dispersal mechanisms across an already highly fragmented landscape.

4.2.2 Impacts to fauna and flora

The site has the potential to support a reasonable diversity of plants and animals, including a small number of conservation important species (see Sections 3.1 and 3.2). Impacts to fauna and flora will be mostly direct through mortality/removal of individuals, which will predominantly take place as a result of clearing the site during the construction phase.

Although the site supports low numbers of conservation important plant species (see Section 3.1.1), there is still a good diversity of herbs present – majority of the herbs occur within the grassland component. Thus, a fair number and diversity of herbs will be removed during construction. No Threatened (i.e. Critically Endangered, Endangered and Vulnerable) plant species were observed, and none are expected to occur on-site based on the knowledge and understanding gained from the field surveys.

In the case of fauna, impacts would also result mainly from earthwork activities, however, indirect impacts will also be experienced as a result of added noise and other disturbances associated with farming practices. Earthworks would mainly affect fossorial fauna (i.e. animal adapted to living underground) such as Spotted Shovel-nosed Frog (Vulnerable), Hottentot Golden Mole (Data Deficient) and various invertebrates (see Section 3.2). It is expected that larger, more mobile fauna (e.g. birds and mammals) will mostly likely avoid the areas directly disturbed during construction by relocating and inhabiting other areas in the surrounding landscape. The more indirect impacts will influence fauna in the immediate surroundings throughout the life of the project, however, the significance will be somewhat low due to the lack of good faunal habitat surrounding the site.

4.2.3 Impacts to aquatic ecosystems

The following impacts on the riparian and instream habitats associated with the uMngeni River may occur as a consequence of developing the site for sugarcane cultivation:

- ***Habitat loss and transformation –*** loss and modification of riparian habitat may occur as a result of:
    - Potential loss of riparian habitat and associated buffer areas – only around 0.2 ha of riparian habitat occurs on-site, within an additional 0.25 ha using a minimum 20 m buffer[9] from the edge of the riparian habitat (see **Appendix 1**);
    - Disturbance of vegetation and further infestation by IAPs; and
    - Introduction of contaminants into the aquatic environment, such as, sediments (particularly during construction), nutrients, toxic organic compounds.
- ***Increased stormwater runoff –*** resulting from cleared vegetation cover, which will impact negatively on the riparian and instream habitats leading to localised reductions in ecological integrity and functioning of these habitats.
- ***Exacerbated erosion and increased instability of banks –*** increased stormwater runoff would also exacerbate erosion within both the riparian area. This could lead to further channel incision, bed scouring, bank collapse in the immediate vicinity.

The aforementioned impacts will vary according to the project phases. For example, removal of vegetation/habitats will take place during the construction phase, whereas alien plant infestations will tend to be associated with the operation phase. Collectively, these issues have the potential to negative affect the ecological functioning and integrity of the riparian areas within the study area.

4.2.4 Spread of invasive alien plants

As areas continue to become more disturbed and/or transformed through development, so will opportunities for the spread of IAPs increase, particularly those species observed on-site (see Section 3.1.2). IAPs that already occur in the area are likely to invade newly disturbed areas such as around edges of sugarcane fields, extending out into areas adjacent to the site. IAP infestation has the potential to further degrade existing natural vegetation thereby compromising the establishment and survival of indigenous fauna and flora. The riparian area along the uMngeni River was found to have the highest concentrations of problematic

9 The estimated desktop buffer requirement determined using the buffer determination tool developed by Macfarlane et al. (2014) is 135 m. This more extensive buffer incorporates approximately 2.0 ha of land on-site, which comprises of riparian, thicket, savanna/woodland and grassland vegetation (see Appendix 1).

IAPs, which reduces the biodiversity patterns and processes associated with this area of the site.

4.3 Recommendations for impact avoidance and/or mitigation

The following recommendations are provided to avoid and/or mitigate impacts that may arise from the proposed Project:

- Ensure, as far as possible, that the development footprint avoids the southern portion of the site that contains the CBA (approximately 4.6 ha of grassland, savanna/woodland, riparian habitat, thicket and disturbed/transformed land. Should this not be possible, then it would be necessary to commence discussions with EKZNW regarding options for offsetting, bearing in mind that offset rations of 1:30 will most likely be applied. This sort of offset translates to an area of approximately 145 ha that is similar in nature would need to be secured and managed as conservation land. It may be possible to reduce the offset ratio for the portion of land that contains the historic homestead. This offset process may be subject to additional studies to help inform the significance of the CBA portion of the site for important biodiversity features, notably invertebrates as per Section 3.2.1.
- In addition to the above, and assuming that the project would most likely want to maximise the area of the site for sugarcane cultivation, a further 8.9 ha of Ngongoni Veld will need to be considered as part of a biodiversity offset process in consultation with EKZNW.
- Inclusive of the CBA constraints, all land that contains riparian habitat, as well as the minimum 20 m buffer area, should be avoided accordance with the National Water Act (Act no. 36 of 1998).
- During the construction phase, and only once the project has been authorised, all sugarcane fields must be clearly demarcated to ensure that all earthworks and construction activities are restricted to these developable areas. Any disturbances outside of these direct impact zones should be prohibited, and regulated by a competent Environmental Control Officer (ECO).
- All waste material/solid waste should be disposed in an appropriate and sensible manner off-site.
- An invasive alien plant (IAP) control programme should be devised for the site based on the finalised development layout. The programme should then be implemented to control problematic IAPs that will most likely invade new areas in response to disturbance of land during the construction phase. The object is to prevent further spread and establishment of IAPs. Alien plant control

programme will require routine follow-ups to limit re-growth and re-establishing, and will need to be carried out by a competent contractor/s until soil-vegetation conditions have stabilised within the relevant areas. Routine monitoring will be required to track success and progress of the control programme, with management feedback mechanisms to correct any unforeseen aspects.

- Should any areas containing grassland vegetation need to be cleared, then it is recommended that a plant rescue operation be conducted by a competent team of botanists (e.g. CREW – Custodians of Rare and Endangered Wildflowers and/or BotSoc – Botanical Society of South Africa) to recover herbs that can then be relocated to a suitable, nearby habitat where practical.
- A permit will be required from EKZNW for removal and/or relocation of plant species listed under Schedule 12 of the KZN Nature Conservation Ordinance (NCO) (no. 15 of 1974), i.e. Orange River Lily *Crinum bulbispermum* and Common Soap Aloe *Aloe maculata*.
- Conduct focused surveys of terrestrial invertebrates (focussed on millipedes and snails) and herpetofauna (amphibians and reptiles) to determine presence and absence of sensitive species on-site.
- Appointment of a suitably qualified and experienced Environmental Control Officer (ECO) will be essential to minimise unnecessary impacts and disturbance during construction.

4.4 Impact evaluation

The evaluation of impacts is summarised in **Table 4-1** (for the construction phase) and

Table 4-2 (for the operational phase) below, and follows on from the identification and assessment of impacts as presented in Section 4.2. Ratings defined for each impact metric is based on the specialist impact assessment criteria provided by the CSIR for the purpose of this project. The metric ratings were used to determine the overall significance that each of the identified impacts (direct, indirect and cumulative) for both construction and operational phases. Probable benefits from incorporating a sufficient amount of mitigation are taken into consideration as per Section 4.3 above with comparative impact significance score defined accordingly.

Table 4-1 Rating of biodiversity impacts that are expected from the **construction phase** of the proposed Broughton Farm project

Description	Mitigation	Extent	Intensity	Duration	Reversibility	Irreplaceability	Probability	Significance (Status)		Confidence
								Without mitigation	With mitigation	
Direct impacts										
Loss of natural vegetation and habitats within the CBA	• Avoid the CBA, alternatively offset for the losses	Regional	High	Permanent	Non-reversible	Highly irreplaceable	Definite	High (-ve)	Low (-ve)	High
Loss of Vulnerable Ngongoni Veld that is also a listed Threatened ecosystem	• Avoid the grassland and savanna/ woodland vegetation, alternatively offset for the losses	Regional	High	Permanent	Non-reversible	Highly irreplaceable	Definite	Medium (-ve)	Low (-ve)	High
Removal of flora (including species of conservation importance)	• Obtain permit from EKZNW for removal/ relocation of listed NCO species • Conduct a search and rescue operation to recover and relocate suitable wild flowers/ herbs	Site	Medium	Permanent	Low reversibility	Moderately irreplaceable	Definite	Low (-ve)	Low (+ve)	Medium
	• Avoid the lower portion of the site based on the 135m aquatic buffer to retain a portion of the available habitat on-site • Avoid disturbance /activities outside of the direct footprint									

Description	Mitigation	Extent	Intensity	Duration	Reversibility	Irreplaceability	Probability	Significance (Status)		Confidence
								Without mitigation	With mitigation	
Faunal mortality and disturbance (including possible conservation important species)	• Conduct focused surveys of terrestrial invertebrates (millipedes and snails) and herpetofauna (amphibians and reptiles) to determine presence and absence of sensitive species • Restrict and control the movement of people/vehicles outside of designated areas • As far as possible, the ECO should relocate fauna to suitable nearby habitat as and when encountered during earthworks	Local	Medium	Temporary to Long term	Low reversibility	Moderately irreplaceable	Highly probable	Medium (-ve)	Low (-ve)	Low
Loss of riparian habitat and buffer zone for the uMngeni River	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity)	Regional	Medium	Permanent	Moderate reversibility	Moderately irreplaceable	Highly probable	Medium (-ve)	Low (-ve)	Medium

Description	Mitigation	Extent	Intensity	Duration	Reversibility	Irreplaceability	Probability	Significance (Status)		Confidence
								Without mitigation	With mitigation	
Indirect impacts										
Disturbance to fauna from noise, light and other disturbances	• Minimise lighting on-site, use pressure sodium vapour lights/or LED lights, and angle/face into working areas. Infrared and/or sensor lights and security systems should be used as far as possible to limit need for permanent lighting. • Ensure minimal or no disturbance outside of footprint areas	Local	Low	Short term	High reversibility	Moderately irreplaceable	Probable	Low (-ve)	Low (-ve)	Medium
Loss of habitat integrity due to spread of IAPs	• Develop and implement and invasive alien plant control programme, with routine follow-ups, monitoring, and should be implemented by a competent contractor (special care is essential when working within the riparian/aquatic environments)	Local	Medium	Long term	Moderate reversibility	Low irreplaceability	Highly probable	Medium (-ve)	Low (-ve)	High

Description	Mitigation	Extent	Intensity	Duration	Reversibility	Irreplaceability	Probability	Significance (Status)		Confidence
								Without mitigation	With mitigation	
Loss of ecological connectivity and dispersal/movement	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity)	Regional	Medium	Permanent	Low-reversibility	Moderately irreplaceable	Highly probable	Medium (-ve)	Low (-ve)	Medium
Water quality impacts (including sedimentation) to the uMngeni River system	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity) • Limit earthworks to the winter season	Regional	Medium	Short term	Medium-reversibility	Moderately irreplaceable	Highly probable	Medium (-ve)	Low (-ve)	Medium

Description	Mitigation	Extent	Intensity	Duration	Reversibility	Irreplaceability	Probability	Significance (Status)		Confidence
								Without mitigation	With mitigation	
Cumulative impacts										
Additional loss of natural vegetation and habitat compromising abilities for the conservation of biodiversity in the Province	• Avoid the grassland and savanna/woodland vegetation, particularly within the CBA. Alternatively, offset for the losses to ensure no-net-loss.	Regional	High	Permanent	Non-reversible	Highly irreplaceable	Definite	High (-ve)	Low (-ve)	High
Loss of ecological connectivity and dispersal/movement	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity)	Regional	Medium	Permanent	Low-reversibility	Moderately irreplaceable	Highly probable	Medium (-ve)	Low (-ve)	Medium

Table 4-2 Rating of biodiversity impacts that are expected from the **operational phase** of the proposed Broughton Farm sugarcane project

Description	Mitigation	Extent	Intensity	Duration	Reversibility	Irreplaceability	Probability	Significance (Status)		Confidence
								Without mitigation	With mitigation	
Direct impacts										
Faunal mortality and disturbance (including possible conservation important species)	• Restrict and control the movement of people/vehicles outside of operational/working areas	Local	Low	Long term	Moderate reversibility	Low irreplaceable	Probable	Low (-ve)	Low (-ve)	Low
Indirect impacts										
Disturbance to fauna from noise, light and other disturbances	• Minimise lighting on-site, use pressure sodium vapour lights/or LED lights, and angle/face into working areas. Infrared and/or sensor lights and security systems should be used as far as possible to limit need for permanent lighting. • Ensure minimal or no disturbance outside of footprint areas	Local	Low	Long term	High reversibility	Moderately irreplaceable	Probable	Low (-ve)	Low (-ve)	Medium

Description	Mitigation	Extent	Intensity	Duration	Reversibility	Irreplaceability	Probability	Significance (Status)		Confidence
								Without mitigation	With mitigation	
Loss of habitat integrity due to spread of IAPs	• Develop and implement and invasive alien plant control programme, with routine follow-ups, monitoring, and should be implemented by a competent contractor (special care is essential when working within the riparian/aquatic environments)	Local	Medium	Long term	Moderate reversibility	Low irreplaceability	Highly probable	Medium (-ve)	Low (-ve)	High
Water quality impacts (including sedimentation) to the uMngeni River system	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity) • Limit earthworks to the winter season	Regional	Medium	Long term	Medium-reversibility	Moderately irreplaceable	Highly probable	Medium (-ve)	Low (-ve)	Medium

5. CONCLUSION

This study highlights the biodiversity/ecological features that are considered important within the context of the proposed Broughton Farm sugarcane project. Although the actual extent of the site and the proposed project footprint is relatively small, the consequences for biodiversity loss is potentially significant. Thus, impacts on certain biodiversity features is considered to be very high, despite that fact that these features are in some parts degraded. In some cases, the impacts cannot be mitigated through on-site actions and interventions. Should these unmitigable impacts not be avoided, then further steps will need to be followed to ensure that the impacts are appropriately offset.

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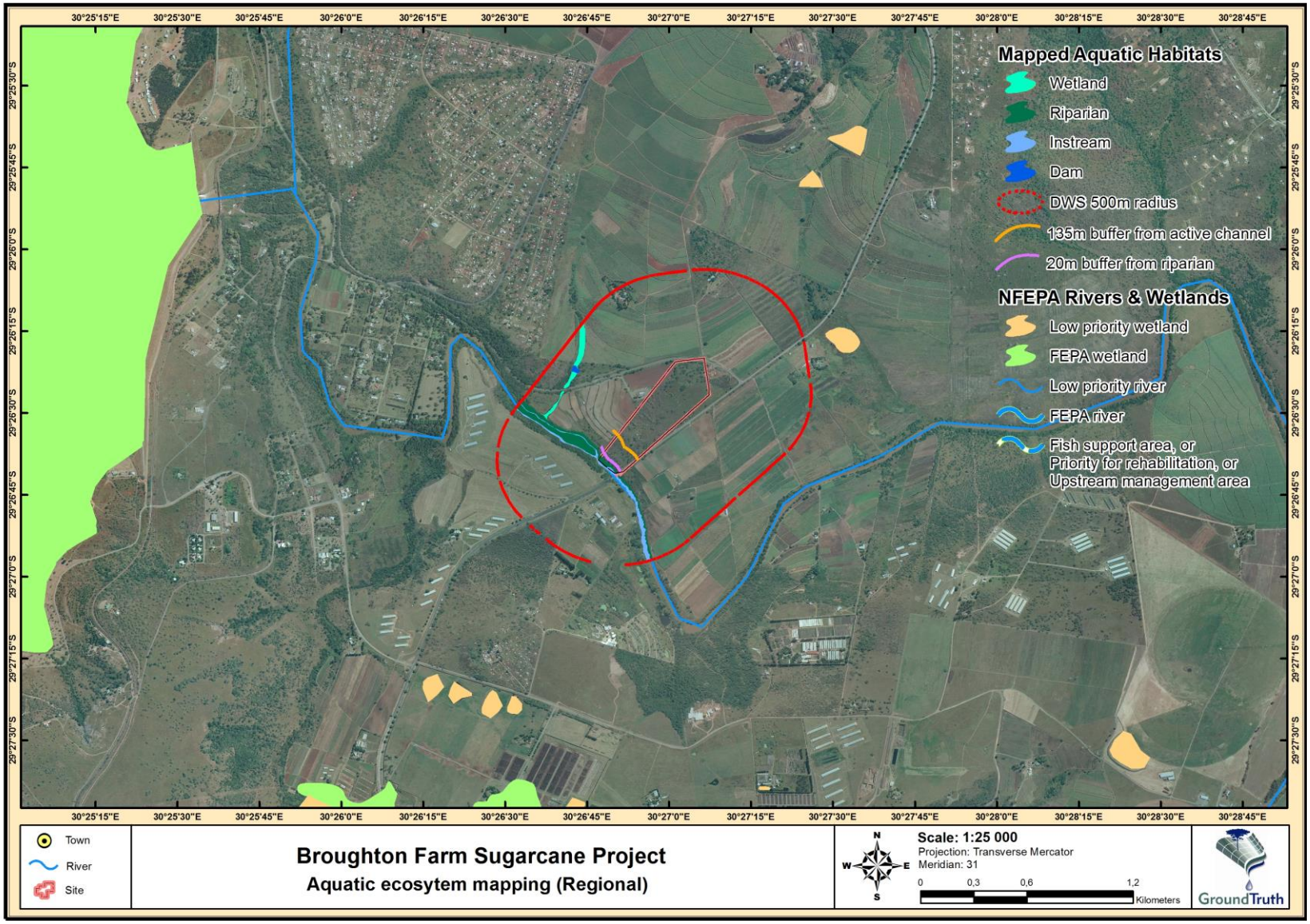
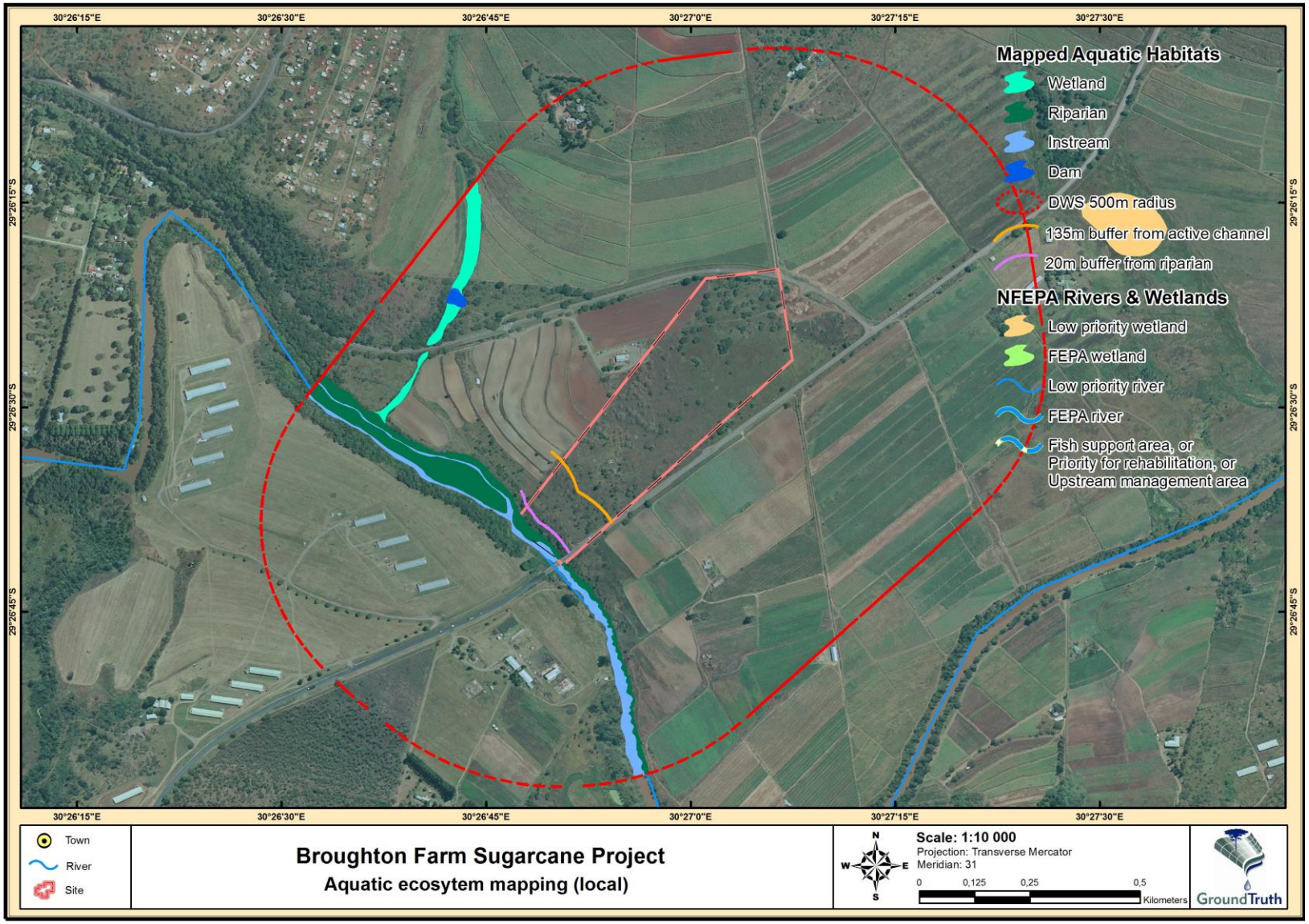
7. APPENDICES

APPENDIX 1: Overview of NFEPA systems within the broader study area (regional view), as well as the more immediate vicinity of the site (local view). More detailed desktop mapping of aquatic ecosystems is also show relative to the site and the 500 m Department of Water and Sanitation (DWS) radius


Mapped Aquatic Habitats
Wetland
Riparian
Instream
Dam
DWS 500m radius
135m buffer from active channel
20m buffer from riparian
NFEPA Rivers & Wetlands
Low priority wetland
FEPA wetland
Low priority river
FEPA river
Fish support area, or
Priority for rehabilitation, or
Upstream management area
30°25'15"E
30°25'30"E
30°25'45"E
30°26'0"E
30°26'15"E
30°26'30"E
30°26'45"E
30°27'0"E
30°27'15"E
30°27'30"E
30°27'45"E
30°28'0"E
30°28'15"E
30°28'30"E
30°28'45"E
29°25'30"S
29°25'45"S
29°26'0"S
29°26'15"S
29°26'30"S
29°26'45"S
29°27'0"S
29°27'15"S
29°27'30"S
Town
River
Site
Broughton Farm Sugarcane Project
Aquatic ecosytem mapping (Regional)
N
W
E
S
Scale: 1:25 000
Projection: Transverse Mercator
Meridian: 31
0
0,3
0,6
1,2
Kilometers
GroundTruth


30°26'15"E
30°26'30"E
30°26'45"E
30°27'0"E
30°27'15"E
30°27'30"E
29°26'15"S
29°26'30"S
29°26'45"S
Mapped Aquatic Habitats
Wetland
Riparian
Instream
Dam
DWS 500m radius
135m buffer from active channel
20m buffer from riparian
NFEPA Rivers & Wetlands
Low priority wetland
FEPA wetland
Low priority river
FEPA river
Fish support area, or
Priority for rehabilitation, or
Upstream management area
Town
River
Site
Broughton Farm Sugarcane Project
Aquatic ecosytem mapping (local)
N
W
E
S
Scale: 1:10 000
Projection: Transverse Mercator
Meridian: 31
0
0,125
0,25
0,5
Kilometers
GroundTruth

APPENDIX 2: List of plants recorded from the Broughton Farm on the 13th of October 2017 along with their respective growth form and status (i.e. indicator, protected or invasive alien species)

Family	Scientific Name	Growth form	Status [a b c]
Fabaceae	*Acacia sieberiana*	Tree	NgVld
Acanthaceae	*Adhatoda andromeda*	Herb	
Lamiaceae	*Ajuga ophrydis*	Herb	
Cyperaceae	*Albigardia cf. lacunosa*	Sedge	
Hyacinthaceae	*Albuca fastigiata*	Geophytic herb	
Asphodelaceae	*Aloe maculata*	Succulent	NCO
Fabaceae	*Alysicarpus rugosus*	Herb	
Amaranthaceae	*Amaranthus thunbergii*	Herb	IAP
Papavaraceae	*Argemone mexicana*	Herb	IAP
Poaceae	*Aristida junciformis* subsp. *junciformis*	Grass	NgVld; KZNHT
Asclepiadaceae	*Asclepia multicaulis*	Herb	
Asparagaceae	*Asparagus intricatus*	Herb	
Lamiaceae	*Becium obovatum*	Herb	
Asteraceae	*Berkheya sertifera*	Herb	
Asteraceae	*Bidens pilosa*	Shrub	IAP
Cannaceae	*Canna indica*	Herb	IAP - 1B
Sapindaceae	*Cardiospermum grandiflorum*	Climber	IAP - 3
Acanthaceae	*Chaetacanthus setiger*	Herb	KZNHT
Chenopodiaceae	*Chenopodium album*	Herb	IAP
Asteraceae	*Cirsium vulgare*	Shrub	IAP - 1B
Araceae	*Colocasia esculenta*	Geophytic herb	IAP
Combretaceae	*Combretum erythophylum*	Tree	
Asteraceae	*Conyza sumatrensis*	Herb	IAP
Tiliaceae	*Corchorus asplenifolius*	Herb	
Amaryllidaceae	*Crinum bulbispermum*	Geophytic herb	NCO
Poaceae	*Cynodon dactylon*	Grass	
Boraginaceae	*Cynoglossum cf. geometricum*	Herb	
Cyperaceae	*Cyperus latifolia*	Sedge	
Cyperaceae	*Cyperus sphaerospermus*	Sedge	
Solanaceae	*Datura stramonium*	Herb	IAP
Mesembryanthemaceae	*Delosperma sp.*	Herb	
Hyacinthaceae	*Drimiopsis maculata*	Geophytic herb	
Poaceae	*Eragrostis sp.*	Grass	NgVld; KZNHT
Fabaceae	*Eriosema cordatum*	Herb	
Asteraceae	*Gazania krebsiana*	Herb	
Asteraceae	*Gerbera ambigua*	Herb	NgVld
Asteraceae	*Gerbera piloselloides*	Herb	
Fabaceae	*Gleditsia triacanthos*	Tree	IAP
Celastraceae	*Gymnosporia buxifolia*	Small tree/shrub	
Asteraceae	*Helichrysum nudifolium*	Herb	

Family	Scientific Name	Growth form	Status [a b c]
Malvaceae	*Hermania grandistipula*	Herb	NgVld
Malvaceae	*Hibiscus pusillus*	Herb	
Poaceae	*Hyparrhenia sp.*	Grass	NgVld; KZNHT
Hypoxidaceae	*Hypoxis argentea*	Geophytic herb	NgVld
Hypoxidaceae	*Hypoxis hemerocallidea*	Geophytic herb	
Hypoxidaceae	*Hypoxis rigidula*	Geophytic herb	
Fabaceae	*Indigofera hilaris*	Shrub	
Convulvulaceae	*Ipomeae cf. purpurea*	Climber	IAP - 1B
Rubiaceae	*Kohautia amatymbica*	Herb	
Asteraceae	*Lactuca inermis*	Herb	
Verbenaceae	*Lantana camara*	Shrub	IAP - 1B
Verbenaceae	*Lantana rugosa*	Shrub	
Hyacinthaceae	*Ledebouria floribunda*	Geophytic herb	
Meliaceae	*Melia azederach*	Tree	IAP - 1B
Moraceae	*Morus alba*	Small tree/shrub	IAP - 2
Onagraceae	*Oenothera tetraptera*	Herb	IAP
Oxalidaceae	*Oxalis cf. latifolia*	Herb	IAP
Poaceae	*Panicum maximum*	Grass	NgVld; KZNHT
Passifloraceae	*Passiflora suberosa*	Climber	IAP - 1B
Passifloraceae	*Passiflora subpeltata*	Climber	IAP - 1B
Poaceae	*Phragmites australis*	Reed	
Poaceae	*Pennisetum clandestinum*	Grass	
Plantaginaceae	*Plantago major*	Herb	IAP
Lamiaceae	*Plectranthus verticulatus*	Herb	
Polygalaceae	*Polygala amatymbica*	Herb	
Rosaceae	*Rubus cuneifolius*	Climber	IAP - 1B
Acanthaceae	*Ruellia cordata*	Herb	
Anacardiaceae	*Searsia dentata*	Small tree/shrub	
Asteraceae	*Senecio paucicalyculatus*	Herb	
Asclepiadaceae	*Sisyranthus sp.*	Herb	
Solanaceae	*Solanum mauritianum*	Shrub	IAP - 1B
Solanaceae	*Solanum panduriforme*	Herb	
Poaceae	*Sporobolus sp.*	Grass	NgVld; KZNHT
Asteraceae	*Tagetes minuta*	Herb	IAP
Acanthaceae	*Thunbergia atriplicifolia*	Herb	
Asphodelaceae	*Trachyandra gerrardii*	Herb	
Ulmaceae	*Ulmus parviflora*	Tree	IAP
Verbenaceae	*Verbena aristigera*	Herb	
Verbenaceae	*Verbena bonariensis*	Herb	
Asteraceae	*Vernonia capensis*	Herb	
Asclepiadaceae	*Xysmalobium tysonianum*	Herb	
Asclepiadaceae	*Xysmalobium undulatum* var. *undulatum*	Shrub	
Rhamnaceae	*Ziziphus mucronata*	Tree	KZNHT

Family	Scientific Name	Growth form	Status [a b c]
Fabaceae	*Zornia capensis*	Herb	

a) Indicator species of Ngongoni Veld (NgVld) and KwaZulul-Natal Hinterland Thornveld (KZNHT)

b) Listed protected plant species according to the KZN Nature Conservation Ordinance (NCO; Act no. 15 of 1974)

c) Invasive Alien Plant (IAP) listed according to the 2016 categories as defined by NEMBA (Act 10 of 2004):

- **Category 1a:** High priority emerging plant species requiring compulsory control
- **Category 1b:** Widespread invasive plant species controlled by a management programme
- **Category 2:** Invasive plant species controlled by area. Can be grown under permit conditions in a demarcated area
- **Category 3:** Ornamental plants and other species that are permitted on a property but may no longer be planted or sold

APPENDIX 3: Specialist Impact Assessment Criteria

The identification of potential impacts should include impacts that may occur during the construction and operational phases of the activity. The assessment of impacts is to include direct, indirect as well as cumulative impacts.

In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed activity is well understood so that the impacts associated with the activity can be understood. The process of identification and assessment of impacts will include:

- Determine the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determine future changes to the environment that will occur if the activity does not proceed;
- An understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts which are likely to occur if the activity is undertaken.

As per DEA *Guideline 5: Assessment of Alternatives and Impacts* the following methodology is to be applied to the prediction and assessment of impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.
- **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.
- **Spatial extent** – The size of the area that will be affected by the impact:
    - Site specific;
    - Local
    - Regional (within 30 km of site); or
    - National.
- **Intensity** –The anticipated severity of the impact:
    - High (severe alteration of natural systems, patterns or processes);
    - Medium (notable alteration of natural systems, patterns or processes; or
    - Low (negligible alteration of natural systems, patterns or processes).
- **Duration** –The timeframe during which the impact will be experienced:
    - Temporary (less than 1 year);

  - Short term (1 to 6 years);
  - Medium term (6 to 15 years);
  - Long term (the impact will only cease after the operational life of the activity); or
  - Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient).
- **Reversibility of impacts -**
  - High reversibility of impacts (impact is highly reversible at end of project life);
  - Moderate reversibility of impacts;
  - Low reversibility of impacts; or
  - Impacts are non- reversible (impact is permanent).
- **Irreplaceability of resource loss caused by impacts –**
  - High irreplaceability of resources (project will destroy unique resources that cannot be replaced);
  - Moderate irreplaceability of resources;
  - Low irreplaceability of resources; or
  - Resources are replaceable (the affected resource is easy to replace/ rehabilitate.

Using the criteria above, the impacts will further be assessed in terms of the following:

- **Probability** – The probability of the impact occurring:
  - Improbable (little or no chance of occurring);
  - Probable (<50% chance of occurring);
  - Highly probable (50 – 90% chance of occurring); or
  - Definite (>90% chance of occurring).
- **Significance** – Will the impact cause a notable alteration of the environment?
  - Low to very low (the impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
  - Medium (the impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated); or
  - High (the impacts will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making).
- **Status** - Whether the impact on the overall environment (social, biophysical and economic) will be:
  - Positive - environment overall will benefit from the impact;
  - Negative - environment overall will be adversely affected by the impact; or
  - Neutral - environment overall will not be affected.

- **Confidence** – The degree of confidence in predictions based on available information and specialist knowledge:
    - Low;
    - Medium; or
    - High.

Impacts will then be collated into an EMP and these will include the following:

- Management actions and monitoring of the impacts;
- Identifying negative impacts and prescribing mitigation measures to avoid or reduce negative impacts; and
- Positive impacts will be identified and enhanced where possible.

Other aspects to be taken into consideration in the assessment of impact significance are:

- Impacts will be evaluated for the construction and operation phases of the development. The assessment of impacts for the decommissioning phase will be brief, as there is limited understanding at this stage of what this might entail. The relevant rehabilitation guidelines and legal requirements applicable at the time will need to be applied;
- The impact evaluation will, where possible, take into consideration the cumulative effects associated with this and other facilities/projects which are either developed or in the process of being developed in the local area; and
- The impact assessment will attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.
- Impacts should be assessed for all layouts and project components.
- **IMPORTANT**: Impacts should be described both before and after the proposed mitigation and management measures have been implemented. The assessment of the potential impact "before mitigation" should take into consideration all management actions that are already part of the project design (which are a given). The assessment of the potential impact "after mitigation" should take into consideration any additional management actions proposed by the specialist, to minimise negative or enhance positive impacts.

DRAFT BASIC ASSESSMENT REPORT – PROPOSED MTHETHWA TRUST 10 HA SUGARCANE CULTIVATION ON BROUGHTON FARM, ALBERT FALLS, KWA-ZULU NATAL

DRAFT BASIC ASSESSMENT REPORT

APPENDIX E: DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

DRAFT BASIC ASSESSMENT REPORT – PROPOSED MTHETHWA TRUST 10 HA SUGARCANE CULTIVATION ON BROUGHTON FARM, ALBERT FALLS, KWA-ZULU NATAL

APPENDIX E

ENVIRONMENTAL MANAGEMENT PROGRAMME

Prepared for:
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CONTENTS

1 INTRODUCTION

1.1 Purpose of the Environmental Management Programme

This Draft Environmental Management Programme (EMPr) is prepared as part of the requirements of the Environmental Impact Assessment (EIA) Regulations (December 2014, as amended in April 2017) promulgated under the National Environmental Management Act (NEMA) (Act 107 of 1998, as amended). The purpose of this EMPr is to ensure "good environmental practice" by taking a holistic approach to the management and mitigation of environmental impacts during the "construction"/clearing and operation phase of the Mthethwa Trust's proposed 10 ha sugar cane cultivation. This EMPr therefore sets out the methods by which proper environmental controls are to be implemented by management. The Draft EMPr is to be submitted to the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (KZN-EDTEA) as part of the Application for Environmental Authorisation for the Mthethwa Trusts proposed 10 ha sugar cane cultivation project on Broughton Farm near Albert Falls in KwaZulu-Natal.

This EMPr is considered as a document that can be updated as new information becomes available during the "construction", operational and decommissioning phases, if applicable, of the proposed development. Mitigation measures need to be implemented as addressed in this EMPr, except where they are not applicable, and additional measures should be considered when necessary. The EMPr identifies the following:

- Construction and Operation activities that will impact on the environment;
- Specifications with which Mthethwa Trust management shall comply in order to protect the environment from the identified impacts; and
- Actions that shall be taken in the event of non-compliance.

This EMPr incorporates management plans for the "construction" and operation phases of the project, which consist of the following components:

- **Impact**: The potential positive or negative impact of the development that needs to be enhanced, mitigated or eliminated.
- **Objectives**: The objectives necessary in order to meet the goal; these take into account the findings of the specialist studies.
- **Mitigation/Management Actions**: The actions needed to achieve the objectives, taking into consideration factors such as responsibility, methods, frequency, resources required and prioritisation.
- **Monitoring**: The key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting.

1.2 Contents of the EMPr

This EMPr specifies the management actions necessary to ensure minimal environmental impacts, as well as procedures for monitoring these impacts associated with the proposed activity. In terms of legal compliance, this EMPr aims to satisfy appendix 4 of Government Notice Regulation 982 of 4 December 2014, presented in Table 1-1 below.

Table 1-1: Compliance with Appendix 4 of Government Notice Regulation 326 of 7 April 2017 and Section 24N of the National Environmental Management Act 107 of 1998.

Requirements according to Appendix 4 of GNR 982 of 4 December 2014	Section
(1) An EMPr must comply with section 24N of the Act and include- a) details of - (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 2 Appendix A
b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 3
c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;	Section 3, Figure 3-2
d) a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	Section 5
(i) planning and design;	Section 5
(ii) pre-construction activities;	Section 5
(iii) construction activities;	Section 5
(iv) rehabilitation of the environment after construction and where applicable post closure; and	Section 5
(v) where relevant, operation activities;	Section 5
e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 5
f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to – (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Section 5
(ii) comply with any prescribed environmental management standards or practices;	Section 5
(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	N/A
(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	N/A
g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5
h) frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5
i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 5
j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 5
k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 5
l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 5
m) an environmental awareness plan describing the manner in which- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 6
n) any specific information that may be required by the competent authority.	N/A

2 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Organisation	Council for Scientific and Industrial Research (CSIR)
Postal Address	PO Box 320, Stellenbosch, 7599
Email	kstroebel@csir.co.za
Telephone No.	021 888 2432
Fax	021 888 2693

Project Team:

Name	**Qualification & Expertise**
Minnelise Levendal (***Reviewer***)	• MSc Biological Science (Botany) (Stellenbosch University) • 16 years of experience in Environmental Management • Inclusive of 10 years' experience in conducting Environmental Assessments • SACNASP registered: 117078 (Pr.Sci.Nat)
Kelly Stroebel (***Project Manager)***	• BSc (Hons) Environmental Science (Rhodes University) • 4+ years' experience in the environmental management field (Environmental Impact Assessment) • 4+ years' experience conducting Basic Assessments • SACNASP registered: 100151/14 (Cand.Sci.Nat)

Please see **Appendix A** for full CV's of the EAPs and the EAP Declaration.

The Council for Scientific and Industrial Research has been one of the leading organisations in South Africa contributing to the development and implementation of environmental assessment and management methodologies. The CSIR's Environmental Management Services (EMS) unit has over 20 years of experience in environmental management practices, involving conducting environmental assessment and management studies in over 15 countries in Africa. Key sectors of CSIR's work include renewable energy, infrastructure, natural resource management, mining, industrial development and oil and gas. CSIR's environmental assessments are conducted with national legal requirements as well as those of international agencies such as the World Bank, International Finance Corporation and World Health Organisation.

3 PROJECT DESCRIPTION

3.1 Project Overview

The Mthethwa Trust is an agricultural business located on Broughton Farm, 22km from Pietermaritzburg (See Figure 2-1.) in the uMshwati Local Municipality, KwaZulu-Natal. Access to the site is via the existing R33 towards Greytown (from Pietermaritzburg). The Trust consists of 3 members, and is a 100% black-owned and operated family entity. The current land-use of Broughton Farm is zoned for agriculture and is currently consisting of indigenous vegetation and no infrastructure. The farm "borders" the uMngeni River to the South and is bordered and surrounded by agricultural practises.

Property Details	Farm Name	Surveyor General 21 Digit Code	Site Co-ordinates
	Broughton Farm	N0FT00000000092500022	29 26' 31.08"S 30 26' 58.22"E

The footprint of the proposed cultivation is ~10 hectares (see Figure 2.2) of the 14 ha Broughton Farm site. The proposed development will include the clearance of vegetation, ploughing, planting and harvesting of sugar cane. The sugar cane crops will be rain fed. In terms of harvesting, sugarcane field burning will be carried out prior to harvesting. Thereafter cane cutters will come in and the bell loader will load the sugarcane onto the truck which will then be transported to the mill. The harvested cane will be supplied to a local mill. The project is estimated to produce approximately 30 tonnes per hectare, depending on climate and other agricultural factors.

Road access to the cultivated land will be directly onto the site off the R33 (towards Greytown) from Pietermaritzburg. The project will not include the development of any new roads, and will not require electricity or any other municipal services. The proposed project will also not entail any infrastructure development or building on site.

3.2 Listed Activities

As part of the proposed sugar cane cultivation, listed activities defined under the National Environmental Management Act, Act No. 107 of 1998 (NEMA, 1998), as amended, in terms of the Environmental Impact Assessment (EIA) Regulations, Government Notice (GNR) 326 of 7 April 2017 there under will take place. Relevant listed activities triggered by the proposed activities are described as follows:

GNR. 327 Activity 27: *The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except 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.

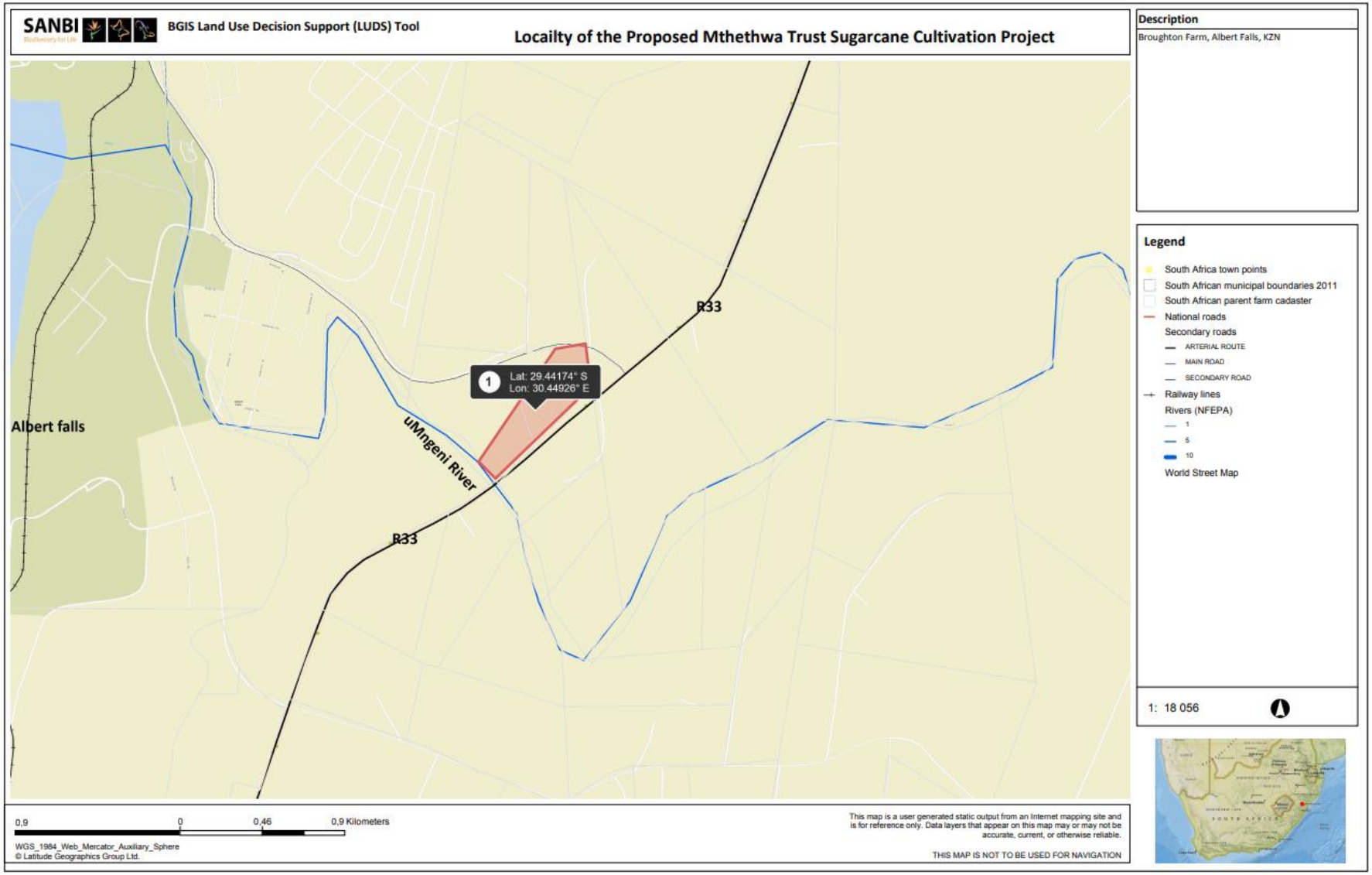

Figure 3-1: The Mthethwa Trust's Site Location (Broughton Farm, 14 ha), of which 10 ha is being developed (see below), near Albert Falls, KZN.

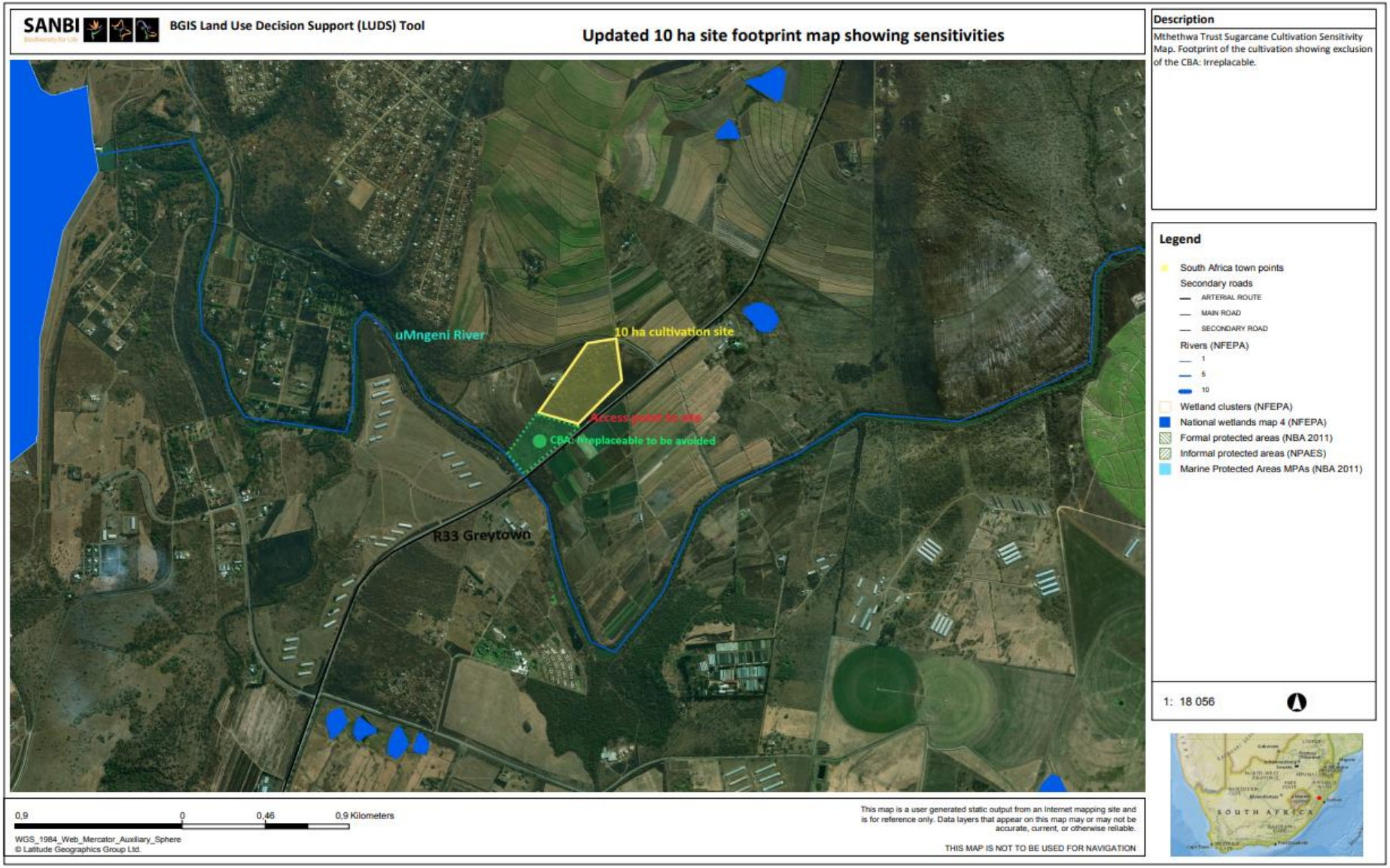

Figure 3-2: The Mthethwa Trust's Site Layout (yellow), including sensitivities on site.

4 ENVIRONMENTAL MANAGEMENT STRUCTURE

The Mthethwa Trusts management will develop an Environmental Management Structure, in line with this EMPr, that is appropriate to the size and scale of the project to develop and implement roles and responsibilities with regards to environmental management.

Roles and Responsibilities
Key roles and responsibilities in order to meet the overall goal for environmental management of the development are as follows:

The Mthethwa Trust (hereafter referred to as "Management")
Management is responsible for the overall environmental monitoring and implementation of the EMPr, and ensuring compliance thereof with the specifications of the Environmental Authorisation (EA) issued in terms of NEMA. Management should also ensure that any other permits or licences required as part of this project are obtained and complied with. The Mthethwa Trust may, however, at their own costs, render the services of an external environmental consultant to oversee the implementation of the documented mitigation measures of this EMPr. It is also expected that management will appoint an Environmental Control Officer, Environmental Health and Safety Officer, and "Construction" Manager.

Environmental Control Officer
The Environmental Control Officer (ECO) will be the responsible person for ensuring that the provisions of the EMPr as well as the EA are complied with at all times. The ECO must fully communicate the environmental management processes associated with the project, particularly the EMPr, as well as review and ensure compliance with the conditions of the EMPr. The ECO will be responsible for issuing instructions to contractors and employees in terms of actions required with regards to environmental considerations. The ECO shall, on a regular basis, prepare and submit written reports to Management and the Competent Environmental Authority (KZN-EDTEA) as required.

Environmental Health & Safety (EHS) Officer
The responsibility of the EHS Officer includes overseeing the implementation of the EMPr during the construction and operational phases, monitoring environmental impacts, record-keeping and updating of the EMPr as and when necessary. The EHS officer is also responsible for monitoring compliance with the conditions of the Environmental Authorisation that may be issued to The Mthethwa Trust.

During "construction" **(i.e. all activities associated with clearing the land for cultivation**), the EHS Manager will be responsible for the following:

- Meeting on site with the Construction Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones.
- Daily or weekly monitoring of site activities during "construction" to ensure adherence to the specifications contained in the EMPr and Environmental Authorisation (should such authorisation be granted by KZN-EDTEA), using a monitoring checklist that is to be prepared at the start of the "construction" phase.
- Preparation of the monitoring report based on the daily or weekly site visit.
- Reporting of any non-conformances within 48 hours of identification of such non-conformance to the relevant agents.

- Conducting an environmental inspection on completion of the construction period and 'signing off' the construction process with the Construction Manager.

During operation, the EHS Manager will be responsible for:

- Overseeing the implementation of the EMPr and monitoring programmes for the operation phase.
- Reviewing the findings of the monitoring and highlight concerns to management where necessary.
- Ensuring compliance with the Environmental Authorisation conditions.
- Ensuring that the necessary environmental monitoring takes place as specified in the EMPr.
- Updating the EMPr and ensuring that records are kept of all monitoring activities and results.

At the time of preparing this EMPr, the EHS Manager appointment is still to be made by the applicant. The appointment of the EHS Officer is dependent upon the project proceeding to the "construction" phase.

Construction Manager[1]

The construction manager will be responsible for the following:

- Overall construction programme, project delivery and quality control for the construction of the facility.
- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project construction.
- Promoting total job safety and environmental awareness to employees, contractors and sub-contractors and stress to all employees and contractors and sub-contractors the importance that the project proponent attaches to safety and the environment.
- Ensuring that each subcontractor employs an Environmental Officer (or have a designated Environmental Officer function) to monitor and report on the daily activities on-site during the "construction" period.
- Ensuring that safe, environmentally acceptable working methods and practices are implemented and that sufficient machinery and equipment is made available, is properly operated and maintained in order to facilitate proper access and enable any operation to be carried out safely.
- Meeting on site with the EHS Officer prior to the commencement of "construction" activities to confirm the procedure and designated activity zones.
- Ensuring that all appointed contractors and sub-contractors are aware of this EMPr and their responsibilities in relation to the programme.
- Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in the EMPr, to the satisfaction of the EHS Officer.

At the time of preparing this Final EMPr, a construction manager has not been appointed and appointment will depend on the project receiving Environmental Authorisation and proceeding to the construction phase.

[1] Note that "construction" in this reference for this project refers to the activities associated with clearing the land for cultivation, as NO buildings will be constructed.

5 ENVIRONMENTAL MANAGEMENT PLAN

As part of environmental management and enhancement, an identification and description of impact management objectives must be developed, inclusive of the proposed methods and effective management and mitigation measures required during the "construction" (i.e. land clearing for cultivation) and operational phases of the proposed sugar cane project. The table below lists potential impacts and mitigation measures recommended for The Mthethwa Trust's proposed development at the different phases.

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
"Construction"/Clearing Phase					
Loss of natural vegetation and habitats within the CBA	To minimise loss of vegetation, specifically in sensitive areas.	• Development planning must ensure loss of vegetation and disturbance is restricted to within the recommended site layout footprint. • Avoid the CBA (see Figures above and Appendix B for a map of this)	• The Mthethwa Trust Management to ensure development layout adheres to the proposed mitigation measures of this EMPr.	During planning and clearing phase	Management
Loss of Vulnerable Ngongoni Veld that is also a listed Threatened ecosystem	To prevent loss of species of conservation concern.	• Avoid the grassland and savanna/ woodland vegetation.	• The Mthethwa Trust Management to verify implementation of the mitigation measures proposed in this EMPr.	During planning	Management Botanist/Horticulturalist/ Ecologist
Removal of flora (including species of conservation importance)	To prevent loss of species of conservation concern.	• Obtain permit from EKZNW for removal/ relocation of listed NCO species • Conduct a search and rescue operation to recover and relocate suitable wild flowers/ herbs • Avoid the lower portion of the site based on the 135m aquatic buffer to retain a portion of the available habitat	• The Mthethwa Trust Management to verify implementation of the mitigation measures proposed in this EMPr.	During planning	Management Botanist/Horticulturalist/ Ecologist

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		on-site Avoid disturbance /activities outside of the direct footprint			
Faunal mortality and disturbance (including possible conservation important species)	To prevent the mortality of species.	• Conduct focused surveys of terrestrial invertebrates (millipedes and snails) and herpetofauna (amphibians and reptiles) to determine presence and absence of sensitive species • Restrict and control the movement of people/vehicles outside of designated areas • As far as possible, the ECO should relocate fauna to suitable nearby habitat as and when encountered during earthworks	• The Mthethwa Trust Management to verify implementation of the mitigation measures proposed in this EMPr.	During planning and clearing phase	Management
Loss of riparian habitat and buffer zone for the uMngeni River	To prevent the disturbance to the riparian habitat and river.	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity)	• The Mthethwa Trust Management to ensure cultivation layout verifies the proposed mitigation measures of this EMPr.	During planning and clearing phase	Management
Disturbance to fauna from noise, light and other disturbances	To prevent disturbance to fauna	• Minimise lighting on-site, use pressure sodium vapour lights/or LED lights, and angle/face into working areas. Infrared and/or sensor lights and security systems should be used as far as possible to limit need for permanent lighting. • Ensure minimal or no disturbance outside of footprint areas	• The Mthethwa Trust Management to verify implementation of the mitigation measures proposed in this EMPr.	During planning and clearing phase	Management

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
Loss of habitat integrity due to spread of IAPs	To prevent the spreading and increase of alien invasive species.	• Develop and implement and invasive alien plant control programme, with routine follow-ups, monitoring, and should be implemented by a competent contractor (special care is essential when working within the riparian/aquatic environments)	• The Mthethwa Trust Management to ensure that this is taken into consideration during the planning of the proposed development.	All phases	Management ECO
Loss of ecological connectivity and dispersal/movement	To prevent the disturbance to the ecological system	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity)	• The Mthethwa Trust Management to ensure cultivation layout verifies the proposed mitigation measures of this EMPr.	Planning and construction	Management ECO Construction manager
Water quality impacts (including sedimentation) to the uMngeni River system	To prevent the loss and minimise the disturbance of natural habitats, and ultimately prevent the loss of ecosystem function on site.	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary • Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity) Limit earthworks to the winter season	• The Mthethwa Trust Management to verify implementation of the mitigation measures proposed in this EMPr. • ECO to ensure compliance.	During planning and construction	Management Ecologist ECO
Noise disturbance as a result of tractor and/or machinery activities.	To prevent noise generation on site.	• Activities that will generate the most noise should be limited to during the day in order to minimise disturbance to the neighbours. • The noise created by the proposed activities is not expected to be significant, given the agricultural nature of the area. If required, noise reduction	• ECO to ensure compliance and reporting thereof.	During the clearing phase	Construction Crew Management ECO

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		measures will have to be implemented in compliance with the Noise Regulations. • No sound amplification equipment to be used on site, except in emergency situations. • Limit vehicles travelling to and from the site to minimise traffic noise to the surrounding environment. • A complaints register should be kept on site, with records of complaints received and manner in which the complaint was addressed.			
Degradation of ambient air quality as a result of dust and other emissions generated.	To minimise the impact on the ambient air quality as a result of development activities.	• Implement effective and environmentally friendly dust control measures, such as mulching or periodic wetting of the exposed areas. • Clearing should be done in a strategic manner to avoid large areas of non-stratified soils.	• Air emissions to be monitored throughout the construction phase. • Ensure regular maintenance of construction vehicles to allow for 'cleaner' emissions from these vehicles, including equipment maintenance.	Daily during the clearing phase	Construction Crew Management
Impact on features of heritage importance.	To protect heritage resources.	• Should any features of heritage be identified on site, these should not be disturbed; all development should cease until further notice and would be immediately reported to a Heritage specialist and Amafa (KZN Heritage). • No structures older than sixty years or parts thereof are allowed to be demolished altered or extended without a permit from Amafa.	• Report any features of heritage significance.	N/A	Management ECO

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
Operational Phase					
Faunal mortality and disturbance (including possible conservation important species)	To minimise mortality and disturbance to fauna.	• Restrict and control the movement of people/vehicles outside of operational/working areas	• The Mthethwa Trust Management to verify implementation of the mitigation measures proposed in this EMPr.	When necessary during operation	Management
Disturbance to fauna from noise, light and other disturbances	To prevent the loss and minimise the disturbance of natural habitats, and ultimately prevent the loss of ecosystem function on site.	• Minimise lighting on-site, use pressure sodium vapour lights/or LED lights, and angle/face into working areas. Infrared and/or sensor lights and security systems should be used as far as possible to limit need for permanent lighting. • Ensure minimal or no disturbance outside of footprint areas	• The Mthethwa Trust Management to verify implementation of the mitigation measures proposed in this EMPr. • ECO to developa management plan to prevent faunal disturbance and displacement. • An assessment should be undertaken to determine and monitor sensitive animals on site.	Regular inspection every six months	Management ECO
Loss of habitat integrity due to spread of IAPs	To prevent the spreading and increase of alien invasive species.	• Develop and implement and invasive alien plant control programme, with routine follow-ups, monitoring, and should be implemented by a competent contractor (special care is essential when working within the riparian/aquatic environments).	• ECO to verify that mitigation measure proposed in this EMPr are implemented and submit a report thereof on a monthly basis.	When necessary during operation	Management/ Contractor/EHS Officer ECO
Water quality impacts (including sedimentation) to the uMngeni River system	The avoidance of water quality detriment.	• Avoid all riparian areas and adjacent land up to a minimum of 20m from the riparian boundary	• Regular monitoring and site inspections to be conducted and ensure adherence to this	Daily during the operational phase	Management ECO

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		• Extent the minimum buffer area up to 135m to maximise the buffering functions and processes for the uMngeni (high ecological importance; very high ecological sensitivity) • Limit earthworks to the winter season	EMPr.		
Noise disturbance as a result of tractor/loader and/or machinery activities.	To minimise noise generation on site.	• Activities that will generate the most noise should be limited to during the day in order minimise disturbance to the neighbours. • The noise created by the proposed activities is not expected to be significant, given the agricultural nature of the area. If required, noise reduction measures will have to be implemented in compliance with the Noise Regulations. • No sound amplification equipment to be used on site, except in emergency situations. • Limit vehicles travelling to and from the site to minimise traffic noise to the surrounding environment. • A complaints register should be kept on site, with records of complaints received and manner in which the complaint was addressed.	• ECO to ensure compliance and reporting thereof. • A complaints register must be kept on the farm, in which any noise complaints from the public must be logged.	Daily during the operation phase	Construction Crew Management ECO
Potential for spread of fires as a result of cane burning.	To prevent fire outbreaks on site	• Ensure effective fire management plans. • Establish and implement a fire management plan with emergency fire procedures.	• Ensure effective fire management plans and equipment to deal with fire incidence is readily available at all times on site.	Daily during the operation phase	Management ECO EHS Officer

Impact Description	Environmental Objective	Management/Mitigation Measures	Monitoring Compliance & Reporting	Monitoring Frequency	Responsibility
		• Maintain an effective fire break between the development area and the surrounding natural environment. • Educate workers about the plan and emergency procedures with regular training and notices.			
Degradation of ambient air quality as a result of dust and other emissions generated.	To minimise the impact on the ambient air quality as a result of development activities.	• Implement effective and environmentally friendly dust control measures, such as mulching or periodic wetting of the exposed areas. • Clearing should be done in a strategic manner to avoid large areas of non-stratified soils.	• Air emissions to be monitored throughout the operation phase. • Ensure regular maintenance of construction vehicles to allow for 'cleaner' emissions from these vehicles, including equipment maintenance. • Monitor traffic control measures and report non-compliance. • A complaints register must be kept on the farm, in which any dust complaints from the public must be logged.	Daily during the operation phase	Construction Crew Management ECO
Potential injury to workers and safety being compromised due to handling equipment, machinery, and health issues as a result of smoke emissions.	To protect workers' safety.	• Worker to wear Personal Protective Equipment (PPE).	• EHS to create safety awareness and monitor non-compliance.	Daily during all phases	EHS Management

6 ENVIRONMENTAL AWARENESS AND TRAINING PLAN

The Mthethwa Trust Management has to appoint an independent Environmental Control Officer (ECO) whose duty is to also implement an effective environmental awareness plan aimed to educate workers and contractors in terms of the biodiversity on site, environmental risks associated with the proposed development and land management of the site. Training and/or awareness should be raised and effectively communicated prior to the commencement of the clearing phase. Training sessions should incorporate the management plans addressed in this EMPr as well as any new information and documentation provided by the ECO, as well as that of the Environmental Health & Safety (EHS) Officer. The ECO would be the most suitable person to conduct these training sessions, identifying sensitive environments as well as all the risks and impacts associated with the sugar cane development and the methods in which to deal with the impacts in order to avoid environmental degradation. Training sessions can be monitored by providing an attendance register indicating the workers that received training as well as evidence of the training and/or awareness received. These sessions would also need to be carried out throughout the operational phase of the development, at least once a year, as new information becomes available or new staff appointed.

BASIC ASSESSMENT REPORT

APPENDIX F:

OTHER INFORMATION

CONTENTS

F-1. Query Q/2016/107/UMSHW that was responded to by EDTEA for this project on 8 February 2017

edtea
Department:
Economic Development, Tourism and Environmental Affairs
PROVINCE OF KWAZULU-NATAL

Enquiries: Nontokozo Mvelase
Reference: Q/2016/107/Umshw
Date: 17 March 2017
Physical Address: 8 Warwick Road, Cascades
Tel: (033) 347 1820, Fax: (033) 347 1826
Postal Address: Private Bag X07, Pietermaritzburg, 3202
www.kznded.gov.za

Directorate: Environmental Services: uMgungundlovu District

P. O. Box 182
Cramond
3200

ATTENTION: **Zwelikababa Mthethwa/ Ntwenhle Mthethwa**
Telephone: **(082) 646 3404 or (082) 740 9076**
Email: **MisterMthethwa@gmail.com**

Dear Sir/s

RE: Q/2016/107/UMSHW: PROPOSED CULTIVATION OF 14 HECTARES OF LAND FOR SUGARCANE ON BROUGHTON FARM IN UMSHWATHI LOCAL MUNICIPALITY.

The abovementioned query dated 08 February 2017, refers. The Department of Economic Development, Tourism and Environmental Affairs (herein referred to as 'this Department') has reviewed the query and responds below.

Development Proposal:

The development proposal is as follows:

- Cultivation of 14 hectares of indigenous vegetation.
- Land zoned as agricultural.
- The GPS Co-ordinates for the proposed development site are 29° 26' 31.08" S; 30° 26' 58.22" E.

The following activity may be applicable to the proposed development:

GNR 983 of 04 December 2014 Activity Number 12

The development of-

(i) canals exceeding 100 square metres in size;

(ii) channels exceeding 100 square metres in size;

(iii) bridges exceeding 100 square metres in size;

(iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size;

(v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size;

(vi) bulk stormwater oulet structures exceeding 100 square metres in size;
(vii) marinas exceeding 100 square metres in size;
(viii) jetties exceeding 100 square metres in size;
(ix) slipways exceeding 100 square metres in size;
(x) buildings exceeding 100 square metres in size;
(xi) boardwalks exceeding 100 square metres in size; or
(xii) infrastructure or structures with a physical footprint of 100 square metres or more;
Where such development occurs-

(a) Within a watercourse;
(b) In front of a development setback line; or
(c) If no development setback exist, **within 32 metres of a watercourse, measured from the** edge of a watercourse;-

Excluding-
(aa) the development of infrastructure or structures within existing port or harbours that will not increase the development footprint of the port or harbour;
(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;
Activities in activity 14 in listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;
(dd) where such development occurs within an urban area; or
(ee) Where such development occurs within existing roads or road reserves.

This Department would like to bring to your attention that any infrastructure or structures exceeding a physical footprint of 100 square metres or more associated with the cultivation of land may occur within the watercourse, or within 32 metres of a watercourse as the above activity will be triggered.

GNR 983 of 04 December 2014 Activity Number 19

The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shell grit, pebbles or rock of more than 5 cubic metres from –

(i) A watercourse;
(ii) The seashore; or
(iii) The littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater-

But excluding where such infilling, depositing, dredging, excavation, removal or moving-
(a) Will occur behind development setback;

(b) Is for maintenance purposes undertaken in accordance with a maintenance plan; or

(c) Falls within the ambit of Activity 21 in this Notice, in which case that activity applies.

The above will not apply provided that there will be no infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, pebbles or rock of more than 5 cubic metres from a watercourse.

GNR 983 of 04 December 2014 Activity Number 27

The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except 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.

-The above will apply as the proposed cultivation of land is more than is more than 1 hectare of land viz: 14 hectares.

GNR 984 of 04 December 2014 activity Number 15

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.

-The above will not apply as it is proposed to cultivate 14 hectares of land, which is less than an area of 20 hectares as specified in the above threshold. Should your future farm plans require an

GNR 985 of 04 December 2014 activity Number 12

The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.
(b) In KwaZulu-Natal:
i. Trans-frontier protected areas managed under international conventions;
ii. Community Conservation Areas;
iii. Biodiversity Stewardship Programme Biodiversity Agreement areas;
iv. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;
v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;
vi. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line in urban areas;
vii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning;
viii. A protected area identified in terms of NEMPAA, excluding conservancies;
ix. World Heritage Sites;

x. Sites or areas identified in terms of an International Convention;
xi. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;
xii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or
xiii. In an estuarine functional zone.

-Whilst it is proposed to clear 14 ha of land which is more than 300 square metres of indigenous vegetation, the above activity will not apply as the proposed cultivation site is not zoned open space or conservation but rather agriculture.

Decision:

Based on the information provided and following a review of the abovementioned inquiry, this Department advises as follows:

1) This Department is of the view that the proposed activity as outlined in your inquiry **is an activity** that is listed in terms of Government Notice No. 983 Item No. 27 of 4 December 2014. As such it requires Environmental Authorisation in terms of the National Environmental Management Act No. 107 of 1998 (as amended).
2) As the applicant you are required to appoint an Environmental Assessment Practitioner (EAP) to undertake a **Basic Environmental Assessment Process** as detailed in Government Notice No. R982 (Section 19/20) to investigate, assess and evaluate the impact of the proposed cultivation viz; Item No. 27 of GNR 983 of 04 December 2014.
3) In respect of the above your attention is drawn to the **Special Needs And Development Programme** which is currently being undertaken by the Department Of Environmental Affairs and the Council For Scientific And Industrial Research (CSIR) and which is aimed at providing *pro bono* Environmental Impact Assessments (EIAs) for people who are classified as special needs clients or applicants, specifically Small, Medium And Micro Enterprises (SMMEs), Community Trusts, individual or Government programmes.
4) This Department advises you to contact the CSIR and enquire whether you may benefit from the abovementioned programme. Should this be the case you will have to appoint the CSIR as the EAP to undertake a Basic Assessment Process as outlined above on your behalf. It is further recommended that that all potential crop production expansion areas be identified and assessed for in the Basic Assessment Process should the applicant wish to continue with the cultivation.

   Contact: Mr. Greg Schreiner Email: gschreiner@csir.co.za
   CSIR Tel: (021) 888 2419

5) **Please note that the activity applied for may not commence prior to an Environmental Authorisation being issued by this Department.**
6) Should the developer wish to undertake any other activities on site, a written enquiry must be submitted to this Department for clarity on any activities that are listed in terms of GNR 983, GNR 984 and GNR 985 of 04 December 2014 (as amended); and, written comment from this Department must be obtained **prior** to undertaking any of these activities.

Should you have any queries or wish to discuss the points above, please do not hesitate to contact our offices.

Yours sincerely

for: **Acting Head of Department:**

F-2. Minutes of the pre-application meeting held with CSIR and EDTEA on 13 November 2017

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AGENDA

PRE-APPLICATION MEETING WITH DEDTEA (KZN) ON BA FOR THE PROPOSED CULTIVATION OF 14 HA OF SUGARCANE ON BROUGHTON FARM, ALBERT FALLS, KWAZULU-NATAL

Venue (TBC): KwaZulu-Natal Department of Economic Development, Tourism & Environmental Affairs, 270 Jabu Ndlovu Street, PIETERMARITZBURG

Proposed dates (TBC): 27th October, 30th October, 3rd November, 6th November

Attendees (TBC): Kelly Stroebel (CSIR), Reka Kallicharan (DEDTEA), Mavis Padayachee (DEDTEA)

Topic	Time
1. Welcome and Introductions	11:00 – 11:05
2. Overview of the Basic Assessment for the proposed cultivation of 14 ha of sugarcane on Broughton farm, Albert Falls, Kwazulu-Natal	11:05 – 11:20
3. Overview of the Basic Assessment and Public Participation process to be undertaken	11:20 – 11:30
4. Questions and discussion	11:30 – 11:45
5. Way forward and Closure	11:45 – 12:00

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MINUTES

PRE-APPLICATION MEETING WITH DEDTEA (KZN) ON BA FOR THE PROPOSED CULTIVATION OF 14 HA OF SUGARCANE ON BROUGHTON FARM, ALBERT FALLS, KWAZULU-NATAL

Venue: KwaZulu-Natal Department of Economic Development, Tourism & Environmental Affairs, 270 Jabu Ndlovu Street, PIETERMARITZBURG

Date: Monday 13 November 2017

Attendees: Kelly Stroebel (CSIR), Reka Kallicharan (DEDTEA), Nontokozo Mvelase (DEDTEA)

See above for Agenda

Agenda Point 2 key notes:

- An urban area is identified as a residential area as per the town planning scheme.
- The property in question is zoned agricultural.
- Be aware that the C-Plan will eb triggered should it fall within 5km of a protected area. This needs to be verified with Ezemvelo.
- GN R 327 Activity 14 may be triggered if there are buildings exceeding 10 square metres in size. It is confirmed that NO buildings will be constructed as part of this project.
- In regard to GNR 327 Activity 12, it must be noted that the EMF is not formally adopted by the local municipality and the CBA is not adopted in the systematic biodiversity plan. Thus this activity must be removed from the application.
- A buffer must be put in place for the uMngeni River.
- The agricultural potential for the project must be described i.e.:
    - Slopes
    - Soil type
    - Need and desirability for the activity
    - Alternatives i.e. tourism and no-go benefits

- Impacts on slopes and erosion must be considered.
- Any permits relating to CARA must be considered.
- Authorities to be included in the project are Department of Agriculture and Rural Development for MACRO planning.
- Contact details for authorities from the Municipality are: Phumlani Gwala and Pravir Harriparsad.
- There is no BAR template for KZN applications.
- Adhere to Appendix 1 of the EIA regulations.
- Include note on the fact that the project will be irrigated via rainwater harvesting.