



REPORT

The Canelands Extension Basic Assessment, eThekweni Municipality, KwaZulu-Natal

Draft Basic Assessment Report (DM/0031/2012)

Client: Tongaat Hulett Developments

Our
Reference: E02.DUR.000538

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BASIC ASSESSMENT REPORT

Submitted in terms of the Environmental Impact Assessment Regulations, 2010 promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

This template may be used for the following applications:

- **Environmental Authorization** subject to basic assessment for an activity that is listed in Listing Notices 1 or 3, 2010 (Government Notices No. R 544 or No. R 546 dated 18 June 2010); or
- **Waste Management Licence** for an activity that is listed in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) for which a basic assessment process as stipulated in the EIA Regulations must be conducted as part of the application (refer to the schedule of waste management activities in Category A of Government Notice No. 718 dated 03 July 2009).

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1. This **basic assessment report** meets the requirements of the EIA Regulations, 2010 and is meant to streamline applications. This report is the format prescribed by the KZN Department of Economic Development, Tourism & Environmental Affairs. Please make sure that this is the latest version.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with text.
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5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it will result in the rejection of the application as provided for in the regulations.
6. No faxed or e-mailed reports will be accepted.
7. The report must be compiled by an independent environmental assessment practitioner ("EAP").
8. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
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10. The EAP must submit this basic assessment report for comment to all relevant State departments that administer a law relating to a matter affecting the environment. This provision is in accordance with Section 24 O (2) of the National Environmental Management Act 1998 (Act 107 of 1998) and such comments must be submitted within 40 days of such a request.
11. **Please note that this report must be handed in or posted to the District Office of the KZN Department of Economic Development, Tourism & Environmental Affairs to which the**

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application has been allocated (please refer to the details provided in the letter of acknowledgement for this application).

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GLOSSARY

Activity (Development) – an action either planned or existing that may result in environmental impacts through pollution or resource use. For the purpose of this report, the terms ‘activity’ and ‘development’ are freely interchanged.

Alternative – a possible course of action, in place of another, of achieving the same desired goal of the proposed project. Alternatives can refer to any of the following but are not limited to: site alternatives, site layout alternatives, design or technology alternatives, process alternatives or a no-go alternative.

Applicant – the project proponent or developer responsible for submitting an environmental application to the relevant environmental authority for environmental authorisation.

Bench Wetland - an area of mostly level or nearly level high ground (relative to the broad surroundings), including hilltops/crests (areas at the top of a mountain or hill flanked by down-slopes in all directions), saddles (relatively high-lying areas flanked by down-slopes on two sides in one direction and up-slopes on two sides in an approximately perpendicular direction), and shelves/terraces/ledges (relatively high-lying, localised flat areas along a slope, representing a break in slope with an up-slope one side and a down-slope on the other side in the same direction).

Biodiversity – the diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.

Construction – means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

Cumulative Impacts – 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 to produce a greater impact or different impacts.

Direct impacts – impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.

Ecological Reserve – the water that is necessary to protect the water ecosystems of the water resource. It must be safeguarded and not used for other purposes. The Ecological Reserve specifies both the quantity and quality of water that must be left in the national water resource. The Ecological Reserve is determined for all major water resources in the different water management areas to ensure sustainable development.

Ecosystem – a dynamic system of plant, animal (including humans) and micro-organism communities and their non-living physical environment interacting as a functional unit. The basic structural unit of the biosphere, ecosystems are characterised by interdependent interaction between the component species and their physical surroundings. Each ecosystem occupies a space in which macro-scale conditions and interactions are relatively homogenous.

Environment – In terms of the National Environmental Management Act (NEMA) (Act No 107 of 1998) (as amended), “Environment” means the surroundings within which humans exist and that are made up of:

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- a) the land, water and atmosphere of the earth;
- b) micro-organisms, plants and animal life;
- c) any part or combination of (a) or (b) and the interrelationships among and between them; and
- d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Assessment (EA) – the generic term for all forms of environmental assessment for projects, plans, programmes or policies and includes methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.

Environmental Authorisation – an authorisation issued by the competent authority in respect of a listed activity, or an activity which takes place within a sensitive environment.

Environmental Assessment Practitioner – the individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations.

Environmental Impact – a change to the environment (biophysical, social and/ or economic), whether adverse or beneficial, wholly or partially, resulting from an organisation's activities, products or services.

Environmental Impact Assessment (EIA) – the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.

Environmental Issue – a concern raised by a stakeholder, interested or affected parties about an existing or perceived environmental impact of an activity.

Environmental Management – ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental Management Programme – A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. This EMP focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

Expansion – means the modification, extension, alteration or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the capacity of the facility or the footprint of the activity is increased.

Fatal Flaw – issue or conflict (real or perceived) that could result in developments being rejected or stopped.

General Waste – household water, construction rubble, garden waste and certain dry industrial and commercial waste which does not pose an immediate threat to man or the environment.

Hazardous Waste – waste that may cause ill health or increase mortality in humans, flora and fauna.

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Indirect impacts – indirect or induced changes that may occur as a result of the activity. These types of impacts include all of 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.

Integrated Environmental Management – a philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity – at local, national and international level – that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools for a particular proposal or activity. These may include environmental assessment tools (such as strategic environmental assessment and risk assessment), environmental management tools (such as monitoring, auditing and reporting) and decision-making tools (such as multi-criteria decision support systems or advisory councils).

Interested and Affected Party – for the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, means an interested and affected party contemplated in Section 24(4)(a)(v), and which includes – (a) any person, group of persons or organisation interested in or affected by such operation or activity; and (b) any organ of state that may have jurisdiction over any aspect of the operation or activity.

Mitigate – the implementation of practical measures designed to avoid, reduce or remedy adverse impacts or enhance beneficial impacts of an action.

No-Go Option – in this instance the proposed activity would not take place, and the resulting environmental effects from taking no action are compared with the effects of permitting the proposed activity to go forward.

Rehabilitation – a measure aimed at reinstating an ecosystem to its original function and state (or as close as possible to its original function and state) following activities that have disrupted those functions.

Sensitive environment – any environment identified as being sensitive to the impacts of the development.

Significance – significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. magnitude, intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic).

Stakeholder engagement – the process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.

Sustainable Development – development which meets the needs of current generations without hindering future generations from meeting their own needs.

Watercourse – means:

- a) a river or spring;
- b) a natural channel or depression in which water flows regularly or intermittently;

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- c) a wetland, lake or dam into which, or from which, water flows; and
- d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

Wetland – means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

ABBREVIATIONS AND ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
BGIS	Biodiversity Geographic Information Systems
BID	Background Information Document
CB	Indian Ocean Coastal Belt
CB3	KwaZulu-Natal Coastal Belt
CBA	Critical Biodiversity Area
CMA	Catchment Management Agency
C-PLAN	Conservation Plan
CR	Critically Endangered
DAFF	Department of Agriculture, Forestry and Fisheries
dBAR	Draft Basic Assessment Report
DEA	Department of Environmental Affairs
DTPC	Dube TradePort Corporation
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
EDTEA	Department of Economic Development, Tourism and Environmental Affairs
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EIS	Ecological Importance and Sensitivity
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
EM	eThekweni Municipality
ETS	Ecosystem Threat Status
GA	General Authorisation
GIS	Geographic Information System
HGM	Hydrogeomorphic unit
I&AP	Interested and Affected Parties
IDP	Integrated Development Plan
KZN	KwaZulu-Natal
MAP	Mean Annual Precipitation
MHIRA	Major Hazardous Installation Risk Assessment
NBSAP	National Biodiversity Strategy and Action Plans
NEM:AQA	National Environmental Management Air Quality Act
NEM:BA	National Environmental Management Biodiversity Act
NEM:WA	National Environmental Management Waste Act
NEMA	National Environmental Management Act
NFA	National Forests Act
NFEPA	National Freshwater Ecosystem Priority Area
NFEPA	National Freshwater Ecosystem Priority Areas
NGO	Non-Governmental Organisation
NHRA	National Heritage Resources Act
NP	Not Protected

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NWA	National Water Act
OHSA	Occupational Health and Safety Act
PES	Present Ecological State
PES	Present Ecological State
PET	Potential Evapotranspiration
PP	Poorly Protected
PPP	Public Participation Process
PU	Planning Unit
REC	Recommended Ecological Category
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANBI	South African National Biodiversity Institute
SWL	Static Water Level
SWMP	Stormwater Management Plan
THD	Tongaat Hulett Developments
VEGRAI	Riparian Vegetation Response Assessment Index
WMA	Water Management Agency
WT	Wetland Type
WUL	Water Use Licence

EXECUTIVE SUMMARY

Introduction

Canelands Extension, also referred to as **Canelands East** is located to the south-west of the **Dube TradePort and King Shaka International Airport precinct**. The development is situated in the north eastern quadrant of Canelands industrial area, adjacent to the north coast railway line. The development covers an area of 7.23 gross hectares (7.23 ha). Access to the development is taken off Vincent Dickenson Road via road D499, a divisional road. The proposed development site is bounded by industrial sites and to the south, the Umdloti River. **Tongaat Hulett Developments (THD)** wishes to develop the site for industrial purposes. The site lies adjacent to the existing **Canelands Industrial estate**. Potential land uses may include general / light industrial, logistics, warehousing and distribution. These land uses will complement those of the existing Canelands Industrial Estate, and will ensure that this land parcel reads as an extension to the existing development.

It is proposed, due to the proximity of the floodplain and numerous other constraints located on-site, that a single platform covering an area of approximately 1.56 hectares (1.56 ha) is created. Both a servicing and traffic report has been completed, which details how this development will be accommodated by the existing bulk infrastructure within the region.

The application for environmental authorisation (EA) for the Canelands Extension was submitted on 26 June 2012 and accepted on 03 July 2012. The Basic Assessment (BA) had then commenced but was placed on hold due to the development of the Climate Resilience Plan / Framework process (CRF). This plan is an undertaking by a partnership between THD, EM and Dube TradePort Corporation (DTPC). The Climate Resilience Plan is a pilot for the EM's Northern Spatial Development Plan. The Climate Resilience Plan aims to provide insight into appropriate urban planning and development design that adequately considers the role of ecological systems and the built environment in reducing risk and explores how these can be practically applied in an influential spatial planning manner, reducing risk and enhancing resilience of the Municipality. In this new approach there is a clear adherence to the mitigation hierarchy in arriving to solutions. For this reason, all aquatic and wetland assessments have been revised with the application of this approach and in turn, this BA Report has been accordingly revised.

The Climate Resilience Plan will form part of the broader Rockefeller Foundations 100 Resilient Cities (100RC) Programme of which EM has been inaugurated as the first cohort of 32 successful cities. The 100RC Programme aims to assist cities around the world to build urban resilience in the face of a future where slow onset issues and acute shocks or stresses are likely to be more prevalent. It is intended that the Climate Resilience Plan, upon completion, will be used as a decision making tool which will inform planning of developments in a manner that will build urban resilience.

In addition, it is noted that a broad conceptual EMPr for the receiving areas identified in the Climate Resilience Plan is required. However, we wish to clarify that this concept EMPr is not required to accompany this BA, because the wetland specialist is not recommending offsite rehabilitation due to minimal impact on wetlands. The wetland functional equivalents assessment found that **the gain of 0.17 ha equivalents for HGM Unit 1 and the loss of 0.03 ha equivalents for HGM Unit 2 equates to an overall gain of 0.14 ha equivalents for the entire site. Therefore the assessment indicates and overall net gain in wetland functional units.** The framework recognises that the overall loss of wetland habitat in the region is below sustainability thresholds, and as such, mitigation measures should be based on achieving a 'net gain' rather than 'no net loss'. Wetland habitat in the reasonably attainable rehabilitated state will equate to approximately 0.36 functional equivalents. Based on the development impact on 0.24 ha, the wetland habitat is considered to decrease in functioning by approximately 0.12 functional equivalents to 0.24 functional equivalents. This loss would be addressed through the functional and ecosystem conservation offset targets of 0.09 functional equivalents and 0.09 habitat hectare equivalents, respectively. Therefore, due to the minute 0.09 functional equivalent required, no offsite rehabilitation is required in any of the identified receiving areas.

Study Alternatives

The Canelands Extension project has considered alternatives in terms of the transformation of the portion of land which has been considered in terms of two layout or extent alternatives and the alternative of *status quo* or the No-Go alternative is also assessed.

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Regarding these alternatives, **layout alternative one (L1)** is the preferred alternative and proposes the development of 1.56 ha of the total site area of 7.2 ha. The remaining 5.95 ha is preserved as open space. In this alternative, the environmental constraints posed by the aquatic systems are avoided. **Layout alternative two (L2)** proposes the development of 2.24 ha of the total 7.2 ha of the site. This proposal is to maximize development on the site (including into the wetland and floodplain on the opposite side of the road). The **No-Go alternative** will maintain the *status quo* and no development will occur. The site will remain as is negating any positive or negative impacts to the site and surrounding areas.

Public Participation

Refer to Appendix E1 for a summary of the Public Participation Process (PPP) undertaken. As this application was lodged in June 2012, given the time lapse, the PPP was undertaken in August 2012 and then repeated in July 2015 as requested by the EDTEA. Therefore, Background Information Documents (BIDs) were circulated in August 2012 and then in July 2015 again. Site Notices were erected in August 2012 and July 2015. All registered Interested and Affected Parties (I&APs) were contacted *via* email and informed of the resumption of the project in July 2015.

Findings of the Basic Assessment

Layout Alternative 2 emerges as the less preferred alternative after conducting the impact assessment. **The footprint of this alternative is significantly higher than alternative 1 and is not recommended for authorisation.** The following table highlights the preferred alternative for each of the planning, construction and operational phase. It excludes the decommissioning phase which is not applicable to this development.

Planning Phase		
Average for Layout Alternative 1 without mitigation	-2.5	Negative low
Average for Layout Alternative 1 with mitigation	4.2	Positive low
Average for Layout Alternative 2 without mitigation	-3.8	Negative low
Average for Layout Alternative 2 with mitigation	1.8	Positive low
Construction Phase		
Average for Layout Alternative 1 without mitigation	-7.8	Negative Moderate
Average for Layout Alternative 1 with mitigation	-3.6	Negative low
Average for Layout Alternative 2 without mitigation	-8.9	Negative Moderate
Average for Layout Alternative 2 with mitigation	-4.6	Negative low
Operational Phase		
Average for Layout Alternative 1 without mitigation	-7.8	Negative Moderate
Average for Layout Alternative 1 with mitigation	-3.6	Negative low
Average for Layout Alternative 2 without mitigation	-8.9	Negative Moderate
Average for Layout Alternative 2 with mitigation	-4.6	Negative low

All planning directives of the local, provincial and national governments advocate for the opportunities which arise from this development. In the EAP's opinion, the benefits negate or outweigh the negative impacts of the project. It is therefore recommended that a positive environmental authorisation be issued with a validity period of five (5) years.

In conclusion, the development is recommended for environmental authorisation as the negative impacts are negligent in comparison to the social and economic benefits to be realised. Alternative 1 is recommended.

The specialist assessments provided the following conclusions on the proposed development:

Ecology:

The proposed development will not have a significant impact on the ecological state of the vegetation that is directly affected. Furthermore, opportunities exist to rehabilitate non-developed areas of the site to allow establishment of natural vegetation. Not only will this improve the integrity and functionality of

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terrestrial and aquatic ecosystems on-site, but will also enhance ecological connectivity within the broader landscape setting.

Traffic:

Based on the analysis conducted the following conclusion can be drawn with regards to the traffic impact of the proposed Canelands Extension:

- All intersections are currently working at an excellent LOS, however the Vincent Dickenson and D499 intersection needs to be upgraded which could be a result of the design life of the intersection being reached.
- The analysis of the additional development traffic and the five year predicted traffic show the intersections operate at a good LOS, with minimal delays and queue lengths at intersections.
- The impacts to the surrounding road network are negligible, due to the small size of the development.
- Due to the rural nature of the community, pedestrian movement and public transport usage in the area are high.
- The road safety around the development area is poor, providing no pedestrian sidewalks, road signage, road marking and laybys for public transport.

Heritage:

No heritage sites occur on the footprint. The study area was surveyed by foot yet no archaeological sites or artefacts were observed. The area is also not part of any known cultural landscape. No heritage and/or archaeological sites were located on the survey. The study area also does not form part of any known cultural landscape.

It is therefore suggested that the proposed development may proceed as no heritage sites are in any immediate danger of being destroyed or altered.

Aquatic (Surface Water and Wetlands):

The assessments undertaken to determine the baseline conditions of the Mdloti River, revealed that there were various impacts affecting the systems. Most of these impacts were only minor and had not affected the integrity of the site to a large degree. The site upstream of Canelands Extension was in a good condition in terms of both the biological water quality and habitat integrity. The construction and other activities upstream near the water treatment works do, however, pose a threat to the overall condition of the site. The site downstream of Canelands East was also in a good condition and showed signs that water quality and habitat integrity had improved compared to the upstream site.

Majority (70%) of the plants identified during the site visit are invasive alien species which supports the fact that the vegetation is generally highly disturbed. Although opportunities for wetland rehabilitation are limited within the development site, the removal of alien vegetation within HGM Unit 1 and re-vegetation with appropriate indigenous riparian vegetation marginally improves the integrity of this system. It is assumed that no rehabilitation measures can be implemented within the remaining portions of HGM Unit 2, therefore, the integrity of the system is expected to decrease in the post-development landscape. **However, the gain of 0.17 ha equivalents for HGM Unit 1 and the loss of 0.03 ha equivalents for HGM Unit 2 equates to an overall gain of 0.14 ha equivalents for the entire site. Therefore the assessment indicates an overall net gain in wetland functional units.**

The proposed development layout encroaches into portions of the identified 2.9 ha of wetland habitat. Despite these systems having been significantly modified by historical agricultural activities, mitigation measures are deemed as necessary, in accordance with the Strategic Wetland Management Framework for the eThekweni Northern Region. The framework recognises that the overall loss of wetland habitat in the region is below sustainability thresholds, and as such, mitigation measures should be based on achieving a 'net gain' rather than 'no net loss'.

The ecosystem services were evaluated in terms of supply and demand. The supply score was based on the potential and effectiveness of a specific wetland at providing an ecosystem service (Macfarlane and Edwards, 2015). **In the 'reasonably attainable' rehabilitated state the potential would remain the same as the current state but the effectiveness is anticipated to increase based on the implementation of effective rehabilitation measures.** It is anticipated that in the post-development landscape setting, each of the wetland systems within the development site would remain within the same EIS categories, as a result of the rehabilitation associated with the proposed development. The

hydro-functional importance is strongly linked to the fact that the systems will receive runoff from the industrial development areas and improved water retention and distribution patterns as a result of the rehabilitation. Wetland habitat in the reasonably attainable rehabilitated state will equate to approximately 0.36 functional equivalents. Based on the development impact on 0.24 ha, the wetland habitat is considered to decrease in functioning by approximately 0.12 functional equivalents to 0.24 functional equivalents. This loss would be addressed through the functional and ecosystem conservation offset targets of 0.09 functional equivalents and 0.09 habitat hectare equivalents, respectively.

The Framework for Improved Wetland Management (EcoPulse, Version 0.3, December 2015), a deliverable of the Climate Resilience Plan, states that economic growth and development has resulted in widespread exploitation of natural resources and a general erosion of natural capital across much of the eThekweni Municipality. This has been clearly demonstrated in the northern area of eThekweni which houses the study area, where historical agricultural practices have resulted in almost total destruction of natural habitats. As part of a partnership, THD as a key local role-player has therefore committed themselves to interact constructively in order to ensure that development of the region takes place in a manner that provides a model for government-private sector partnership that can deliver sustainable development. This is reflected through the meaningful collaboration achieved to date and common agreement to implement policies and practices that are underpinned by a new vision for the project area. This has been applied to the Canelands Extension proposed development. The new approach to assessing the impacts to the wetlands considers a sustainability threshold, and what the environment can sustain. The framework states that in assessing impacts and calculating wetland offset requirements, there are three components that need to be specifically assessed when evaluating offset requirements: Water Resources and Ecosystem Services, Ecosystem Conservation, and Species of Conservation Concern. In each case, the significance of potential impacts needs to be assessed as part of the environmental authorisation process, and offset requirements need to be calculated for any significant impacts on wetland ecosystems. In the case of the Canelands Extension, the impacts to water resources and ecosystem services is at a low enough level to mitigate thereby having limited impact on ecosystem conservation and no species of conservation concern have been identified in the study area.

A strategic framework for improved wetland management has recently been developed for eThekweni Municipality's Northern Spatial Development Plan Area (Macfarlane, 2015, cited in Deliverable 4 of the Climate Resilience Framework, Strategic Wetland Offset Assessment, Version 0.3, December 2015), and has received in-principle buy-in from the key landowners involved, namely the DTPC, THD and the EM. This framework clearly articulates the initial proposed policy objectives and implementation framework for wetland management in the study area. This includes specific goals for wetland offsets that cater for a full spectrum of functions and values provided by wetlands. Such an initiative is testament to the continued commitment of THD to socio-economic development which is under-pinned by sustainability and conservation.

MHI RA:

The SASOL gas pipeline was designed according to the adequate specifications at the time of development. The pipeline is operated and maintained according to recognised and prescribed procedures. SASOL employees are trained and there is reasonable supervision, control and auditing.

The developer must liaise with SASOL and determine or accept mitigation measures to limit the risk to the general public. Developers and their tenants still however need to implement an Emergency Plan. The purpose of this Emergency plan is outlined in the EMPr.

Summary

In light of the above, it can be concluded that the proposed Canelands Extension does not pose a significant risk to the receiving and surrounding environment and no fatal flaws have been identified. It is therefore recommended that this development be given environmental authorisation which stipulates that the mitigation measures identified by the specialists and EAP are strictly adhered to.

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DEPARTMENTAL REFERENCE NUMBER(S)

File reference number (EIA):	
File reference number (Waste Management Licence):	

SECTION A: DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

1. NAME AND CONTACT DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Name and contact details of the EAP who prepared this report:

Business name of EAP:	Royal HaskoningDHV		
Physical address:	6 Payne Street, Pinetown, 3610		
Postal address:	P. O. Box 55, Pinetown		
Postal code:	3600	Cell:	082 571 1425
Telephone:	031 719 5500	Fax:	031 719 5505
E-mail:	Novashni.Moodley@rhdhv.com		

2. NAMES AND EXPERTISE OF REPRESENTATIVES OF THE EAP

Names and details of the expertise of each representative of the EAP involved in the preparation of this report:

Name of representative of the EAP	Education qualifications	Professional affiliations	Experience at environmental assessments (yrs)
Novashni Sharleen Moodley	MSc Environmental Science	SACNASP (Pr.Sci.Nat) IAIAsa	7
Malcolm Roods	HeD, BA (Hons) Environmental Management	EAPSA	13
Bronwen Griffiths	MSc Conservation Biology	SACNASP (Pr.Sci.Nat) IAIAsa	17

3. NAMES AND EXPERTISE OF SPECIALISTS

Names and details of the expertise of each specialist that has contributed to this report:

Name of specialist	Education qualifications	Field expertise	Section/s contributed to in this basic assessment report	Title of specialist report/s as attached in Appendix D
Bosch Semele	BSc Civil Engineering	Civil Engineering	Section B (2): Project Description.	Engineering Services Report Appendix D1
GroundTruth	BSc Ecology	Ecology	Section C (4): Groundcover	Assessment of Vegetation on Portion 2026 of Cotton Lands No. 1575, Canelands
GroundTruth	BSc Ecology	Ecology	Section C (4): Groundcover and	Wetland Assessment & Rehabilitation

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Name of specialist	Education qualifications	Field expertise	Section/s contributed to in this basic assessment report	Title of specialist report/s as attached in Appendix D
			sensitive habitats	Plan: Canelands Portion 2026 and Wetland Functional Equivalents (December 2015) and Aquatic Baseline Assessment (December 2015)
DRENNAN, MAUD & PARTNERS	BSc Civil Engineering and BSc Geology	Civil Engineering and Engineering Geologists	Section C (1), (2) and (3): Geotechnical Information	Report on the Geotechnical Investigation for the Suitability for Development of an area Designated as Canelands East, Verulam
eThembeni Cultural Heritage	MA Archaeology	Archaeology	Section C (6): Heritage Information	Phase 1 Heritage Impact Assessment Report: Portion 2026 of Canelands No 1575, eThekweni Metropolitan Municipality, KwaZulu-Natal
Aurecon	BSc Civil Engineering	Civil Engineering, traffic and transport	Section B (7): Site Access	Canelands Industrial Traffic Impact Assessment for the Rezoning of Canelands Portion 2026
Occutech	Chemical Engineering	Major Hazardous Installation Risk Assessments	Section C	Major Hazard Installation – Risk Assessment - Canelands East, Umdloti Estate, D757, Morelands Road

SECTION B: ACTIVITY INFORMATION

1. PROJECT TITLE

Describe the project title as provided on the application form for environmental authorization:

Basic Assessment for the Proposed Canelands Extension, eThekweni Municipality, KwaZulu-Natal.

2. PROJECT DESCRIPTION

Provide a detailed description of the project:

2.1. Introduction

2.1.1. Project Description

Canelands Extension, also referred to as **Canelands East** is located to the south-west of the **Dube TradePort and King Shaka International Airport precinct**.

The development is situated in the north eastern quadrant of Canelands industrial area, adjacent to the north coast railway line. The development covers an area of 7.23 gross hectares (7.23 ha). Access to the development is taken off Vincent Dickenson Road *via* road D499, a divisional road. The proposed development site is bounded by industrial sites and to the south, the Umdloti River.

The location of the development is indicated in Figure 1 below.



Figure 1: Locality Map of Study Area

Tongaat Hulett Developments (THD) wishes to develop the site for industrial purposes.

The site lies adjacent to the existing **Canelands Industrial estate**. Potential land uses may include general / light industrial, logistics, warehousing and distribution. These land uses will complement those of the existing Canelands Industrial Estate, and will ensure that this land parcel reads as an extension to the existing development.

It is proposed, due to the proximity of the floodplain and numerous other constraints located on-site,

that a single platform covering an area of approximately 1.56 hectares (1.56 ha) is created. Both a servicing and traffic report has been completed, which details how this development will be accommodated by the existing bulk infrastructure within the region.

Figure 2 shows an aerial view of the existing state of the proposed site.



Figure 2: Aerial View of the Study Area

2.1.2.Engineering services

This section is drawn from the Bosch Stemele Engineering Services Report, 2014.

Refer to Appendix D1 for the full report and drawings.

Earthworks

Suitable material from a reputable commercial site will be sourced and brought to the site to add to *in-situ* material in order to develop the required platform for the developable area. *In-situ* material has been determined as suitable for backfill of grade 7 quality (refer to geotechnical assessment), therefore, only supplementary material is required from off-site commercial sources.

Water Requirements

According to the Engineering Services Report (Bosch Stemele, 2014), the completely utilised site will require a water supply of 3.75 kℓ per day.

Supply to the site will be full municipal pressure with an individual meter, supplied by the Canelands Reservoir via a 200 mm diameter gravity supply main which traverses the south of the site. There is sufficient treated water to service the site upon completion (use by end-users).

Sewer

Wastewater is planned to drain to the low point on the site.

Currently, no gravity sewers on the site are low enough to receive wastewater / sewerage *via* gravity. Therefore, wastewater generated by the development would need to be pumped into a suitable gravity reticulation main. A relatively small pumpstation will be constructed.

An alternative to this design is to connect to the proposed new Inyaninga outfall main. This latter alternative is however, subject to timing of construction.

Sewerage is treated at the Verulam Sewage Treatment Works (STW) which has been upgraded. This STW has sufficient capacity to treat the expected 30 kℓ per day of effluent.

Roads

The site is traversed by District Road D499, which is under the jurisdiction of the KwaZulu-Natal Department of Transport (KZN DoT). The D499 spans from the Provincial Road P100 also known as the Vincent Dickenson, to the north east, and terminates at the adjacent industrial factory at the western boundary.

The road is blacktopped and is anticipated to have sufficient capacity for the minor traffic expected to be generated by a development of this size. However, the surface may require minor upgrades.

The Traffic Impact Assessment (TIA, Aurecon, 2014) states that the pedestrian mobility along the D499 may be a safety concern and therefore proposes a 1.5 m sidewalk along the length of the access road. Furthermore, a layby is suggested for public transport.

Stormwater

Pollution control

As the development proposed is for industrial purposes, there is the possibility that surface pollutants could be washed into the stormwater system. To control the possibility of polluted stormwater, a stormwater attenuation system is required to be installed dependent on the approval by the eThekweni Municipality (EM).

This system will retain the run-off generated by the first 3 mm of rainfall in a separate receptacle, following which the clean stormwater will by-pass the attenuation system and be released into the natural drainage course. This system will be tested for effectiveness. If determined non-effective, stormwater will be diverted to the wastewater / sewage system.

The full Stormwater Management Plan is provided in Appendix D8.

Flow considerations

Generally it is required that the development does not discharge stormwater run-off into adjacent properties at levels higher than the current peak discharges. However, in this instance, the discharge of stormwater is into a major river (only in the case where the pollution control system discussed above proves effective). The flow rates of the Umdloti River exceed the magnitude of the stormwater discharge and therefore the discharge from the development will have a negligible effect on the total flow of the river at any given flood level. It is thus noted that the flow volume attenuation is therefore not warranted as it is not expected to make a notable difference.

Nonetheless, energy dissipaters will be utilised for the pipes to reduce scour at the exit points when the river is at low flow levels.

Road stormwater will be collected kerbside *via* inlets and piped to the nearest discharge point.

Electricity

There is an existing major electrical substation located adjacent to the first phase of the Canelands Industrial site. EM has provided confirmation that it is able to provide the capacity required for the Canelands Extension.

Should additional power be required, then this will need to be confirmed with EM and alternate arrangements investigated. A dedicated electrical cable is required from the substation to the site.

2.2. The Climate Resilience Plan Process

The application for environmental authorisation (EA) for the Canelands Extension was submitted on 26

June 2012 and accepted on 03 July 2012. The Basic Assessment (BA) had then commenced but was placed on hold due to the development of the Climate Resilience Plan / Framework process. This plan is an undertaking by a partnership between THD, EM and Dube TradePort Corporation (DTPC).

The Climate Resilience Plan is a pilot for the EM's Northern Spatial Development Plan. The Climate Resilience Plan aims to provide insight into appropriate urban planning and development design that adequately considers the role of ecological systems and the built environment in reducing risk and explores how these can be practically applied in an influential spatial planning manner, reducing risk and enhancing resilience of the Municipality. In this new approach there is a clear adherence to the mitigation hierarchy in arriving to solutions. For this reason, all aquatic and wetland assessments have been revised with the application of this approach and in turn, this BA Report has been accordingly revised.

The Climate Resilience Plan will form part of the broader Rockefeller Foundations 100 Resilient Cities (100RC) Programme of which EM has been inaugurated as the first cohort of 32 successful cities. The 100RC Programme aims to assist cities around the world to build urban resilience in the face of a future where slow onset issues and acute shocks or stresses are likely to be more prevalent. It is intended that the Climate Resilience Plan, upon completion, will be used as a decision making tool which will inform planning of developments in a manner that will build urban resilience.

In addition, it is noted that a broad conceptual EMPr for the receiving areas identified in the Climate Resilience Plan is required. It is envisaged that this should include broad principles, rehabilitation interventions, objectives, conceptual biodiversity plans, and rough estimated costing's. However, we wish to clarify that this concept EMPr is not required to accompany this BA, because the wetland specialist is not recommending offsite rehabilitation due to minimal impact on wetlands. The wetland functional equivalents assessment found that **the gain of 0.17 ha equivalents for HGM Unit 1 and the loss of 0.03 ha equivalents for HGM Unit 2 equates to an overall gain of 0.14 ha equivalents for the entire site. Therefore the assessment indicates and overall net gain in wetland functional units.** The framework recognises that the overall loss of wetland habitat in the region is below sustainability thresholds, and as such, mitigation measures should be based on achieving a 'net gain' rather than 'no net loss'. Wetland habitat in the reasonably attainable rehabilitated state will equate to approximately 0.36 functional equivalents. Based on the development impact on 0.24 ha, the wetland habitat is considered to decrease in functioning by approximately 0.12 functional equivalents to 0.24 functional equivalents. This loss would be addressed through the functional and ecosystem conservation offset targets of 0.09 functional equivalents and 0.09 habitat hectare equivalents, respectively. Therefore, due to the minute 0.09 functional equivalent required, no offsite rehabilitation is required in any of the identified receiving areas.

3. ACTIVITY DESCRIPTION

Describe each listed activity in Listing Notice 1 (GNR 544, 18 June 2010), Listing Notice 3 (GNR 546, 18 June 2010) or Category A of GN 718, 3 July 2009 (Waste Management Activities) which is being applied for as per the project description:

This section has been expanded to provide a comparative table to the **2014 EIA Regulations** and assess the level of similarity.

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Table 1: Listed Activities Applicable to the Canelands Extension Project

2010 EIA Regulations			2014 EIA Regulations			Comparison	EIA consideration undertaken deemed to consider 2014 regulations
No. and date of relevant notice:	Activity No(s) (i.t.o. relevant notice):	Description of each listed activity (and applicability to project):	No. and date of relevant notice:	Activity No(s) (i.t.o. relevant notice):	Description of each listed activity		
GNR¹ 544 June 2010 – LN² 1 (Basic Assessment)	9	<p>The construction of facilities or infrastructure exceeding 1000 m in length for the bulk transportation of water, sewage or storm water –</p> <p>(i) with an internal diameter of 0,36 m or more; or</p> <p>(ii) with a peak throughput of 120 l per second or more,</p> <p>Excluding where:</p> <p>a. Such facilities or infrastructure are for bulk transportation of water, sewage or stormwater or stormwater drainage inside a road reserve; or</p> <p>b. Where such will occur within urban areas but further than 32 m from a watercourse, measured from the edge of the watercourse.</p> <p>This activity does trigger for</p>	GNR 983 – Dec 2014 – LN 1 (Basic Assessment)	9	<p>The development of infrastructure exceeding 1 000 m in length for the bulk transportation of water or storm water;</p> <p>(i) with an internal diameter of 0,36 m or more; or</p> <p>(ii) with a peak throughput of 120 l/s or more;</p> <p>excluding where;</p> <p>a) such infrastructure is for bulk transportation of water or stormwater or storm water drainage inside a road reserve; or</p> <p>b) where such development will occur within an urban area.</p>	<p>Considered to be directly similar.</p> <p>A general amendment of the 2010 EIA Regulations which emerged in the 2014 EIA Regulations was the replacement of the term “construction” with “development” as can be seen in this particular example.</p> <p>However, in terms of the 2014 Regulations, this activity would not be applicable due to exclusion (b) – that is, development within an urban</p>	Yes

¹ GNR = Government Notice Regulation

² LN = Listing Notice

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2010 EIA Regulations			2014 EIA Regulations			Comparison	EIA consideration undertaken deemed to consider 2014 regulations
No. and date of relevant notice:	Activity No(s) (i.t.o. relevant notice):	Description of each listed activity (and applicability to project):	No. and date of relevant notice:	Activity No(s) (i.t.o. relevant notice):	Description of each listed activity		
		<p>the stormwater reticulation. Basic infrastructure does form part of the project before being sold to the end-user and is therefore applied for.</p> <p>Furthermore, it is within 32 m from the Umdloti River.</p> <p>The following is applicable in terms of the pipe sizes:</p> <ul style="list-style-type: none"> ▪ Water: peak flow is less than 120 ℓ/s and the connection size will not be greater than 150 mm (less than 1 000 m in length) ▪ Sewer : peak flow less than 120 ℓ/s and pipe size 160 mm diameter for gravity and 90 mm / 110 mm for rising main (in total less than 1 000 m in length) ▪ Stormwater 450 mm less than 1 000 m (just across the road) 				area.	

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2010 EIA Regulations			2014 EIA Regulations			Comparison	EIA consideration undertaken deemed to consider 2014 regulations
No. and date of relevant notice:	Activity No(s) (i.t.o. relevant notice):	Description of each listed activity (and applicability to project):	No. and date of relevant notice:	Activity No(s) (i.t.o. relevant notice):	Description of each listed activity		
	10	<p>The construction of facilities or infrastructure for the transmission and distribution of electricity –</p> <p>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV; or</p> <p>(ii) inside urban areas or industrial complexes with a capacity of 275 kV or more.</p> <p>This activity does trigger for the electricity infrastructure. Basic infrastructure does form part of the project before being sold to the end-user and is therefore applied for.</p> <p>This activity is applied for as 380 kVA is required for the development of Canelands Extension.</p>		11	<p>The development of facilities or infrastructure for the transmission and distribution of electricity;</p> <p>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV; or</p> <p>(ii) inside urban areas or industrial complexes with a capacity of 275 kV or more.</p>	Considered to be directly similar.	Yes
	23	The transformation of undeveloped, vacant or derelict land to		28	Residential, mixed, retail, commercial, industrial or institutional developments	Not considered to be directly similar. The study area was	No

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2010 EIA Regulations			2014 EIA Regulations			Comparison	EIA consideration undertaken deemed to consider 2014 regulations
No. and date of relevant notice:	Activity No(s) (i.t.o. relevant notice):	Description of each listed activity (and applicability to project):	No. and date of relevant notice:	Activity No(s) (i.t.o. relevant notice):	Description of each listed activity		
		<p>(i) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 ha or more, but less than 20 ha, or</p> <p>(ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 ha but less than 20 ha.</p> <p>This activity is applicable as the site in its entirety is 7 ha, regardless of the fact that 1.56 ha is actually planned for industrial sales / use, the entire site will be applied for actual transformation.</p>			<p>where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development:</p> <p>(i) will occur inside an urban area, where the total land to be developed is bigger than 5 ha; or</p> <p>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 ha;</p> <p>excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.</p>	<p>not utilised for agriculture or afforestation post 01 April 1998. If it was utilised for afforestation or agriculture prior to 01 April 1998 then the activity is still not similar as the total area to be developed is less than 5 ha, whereas 7 ha will be transformed in terms of landuse. This activity may thus be considered to no longer be applicable.</p>	
	24	The transformation of land bigger than 1 000 m ² in size, to residential, retail, commercial, industrial or institutional use, where, at the time of coming	GNR 985 Dec 2014 – LN 2 (Scoping and EIA)	15	The clearance of an area of 20 ha or more of indigenous vegetation, excluding where such clearance of indigenous	This is not directly comparable or similar and shifts the focus from transformation of	No

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2010 EIA Regulations			2014 EIA Regulations			Comparison	EIA consideration undertaken deemed to consider 2014 regulations
No. and date of relevant notice:	Activity No(s) (i.t.o. relevant notice):	Description of each listed activity (and applicability to project):	No. and date of relevant notice:	Activity No(s) (i.t.o. relevant notice):	Description of each listed activity		
		<p>into effect of this Schedule or thereafter such land was <u>zoned open space, conservation or had an equivalent zoning.</u></p> <p>The activity is applicable as while the study area does form part of the Northern Urban Development Corridor (NUDC), the site itself is currently zoned as “Amenity Reserve”.</p>			<p>vegetation is required for;</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>land, to that of clearance of vegetation. For this project in particular it does not apply, and thus is no longer applicable.</p>	

4. FEASIBLE AND REASONABLE ALTERNATIVES

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this report. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The Canelands Extension project has considered alternatives in terms of section 4(c) and 4(f) above; that is the transformation of the portion of land has been considered in terms of two layout or extent alternatives and the alternative of status quo or the No-Go alternative is also assessed.

Regarding these alternatives, **layout alternative one (L1)** is the preferred alternative and proposes the development of 1.56 ha of the total site area of 7.2 ha. The remaining 5.95 ha is preserved as open space. This alternative is shown in Figure 3. In this alternative, the environmental constraints posed by the aquatic systems are avoided.

Layout alternative two (L2) proposes the development of 2.24 ha of the total 7.2 ha of the site. This proposal is to maximize development on the site (including into the wetland and floodplain on the opposite side of the road) as depicted in Figure 4.

The **No-Go alternative** will maintain the status quo and no development will occur. The site will remain as is negating any positive or negative impacts to the site and surrounding areas. Figure 5 depicts the No-Go alternative.

(Figures overleaf)

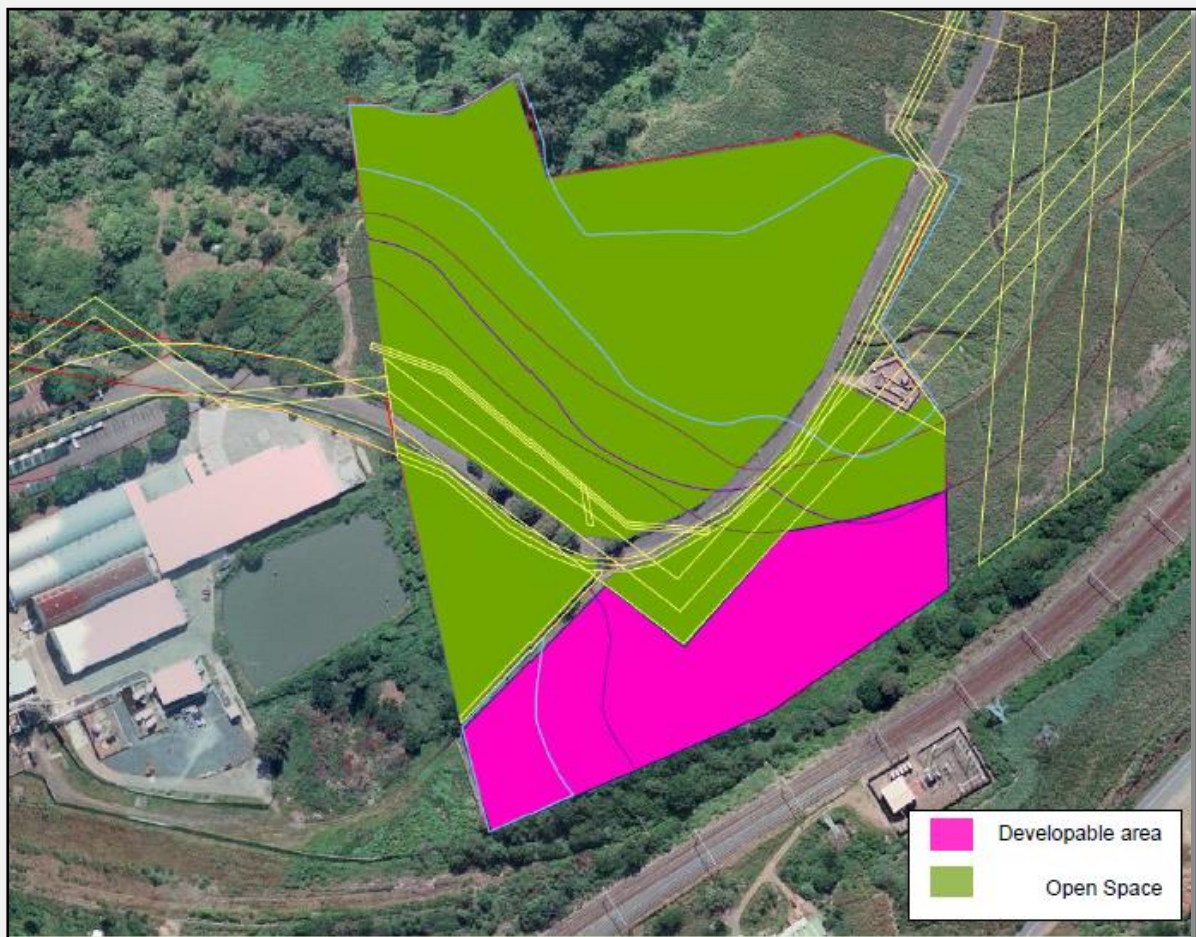


Figure 3: Alternative one (L1) – preferred alternative

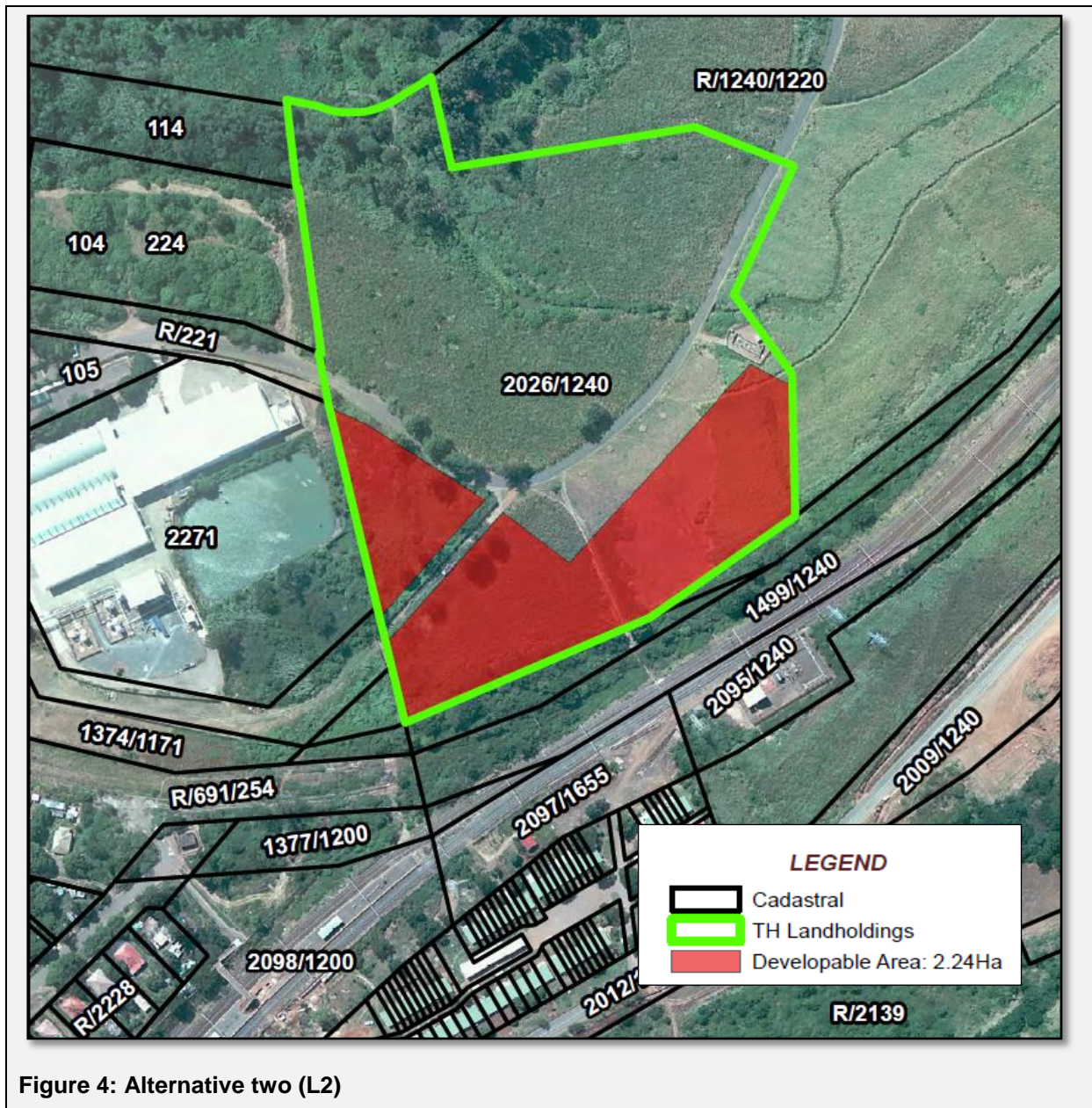
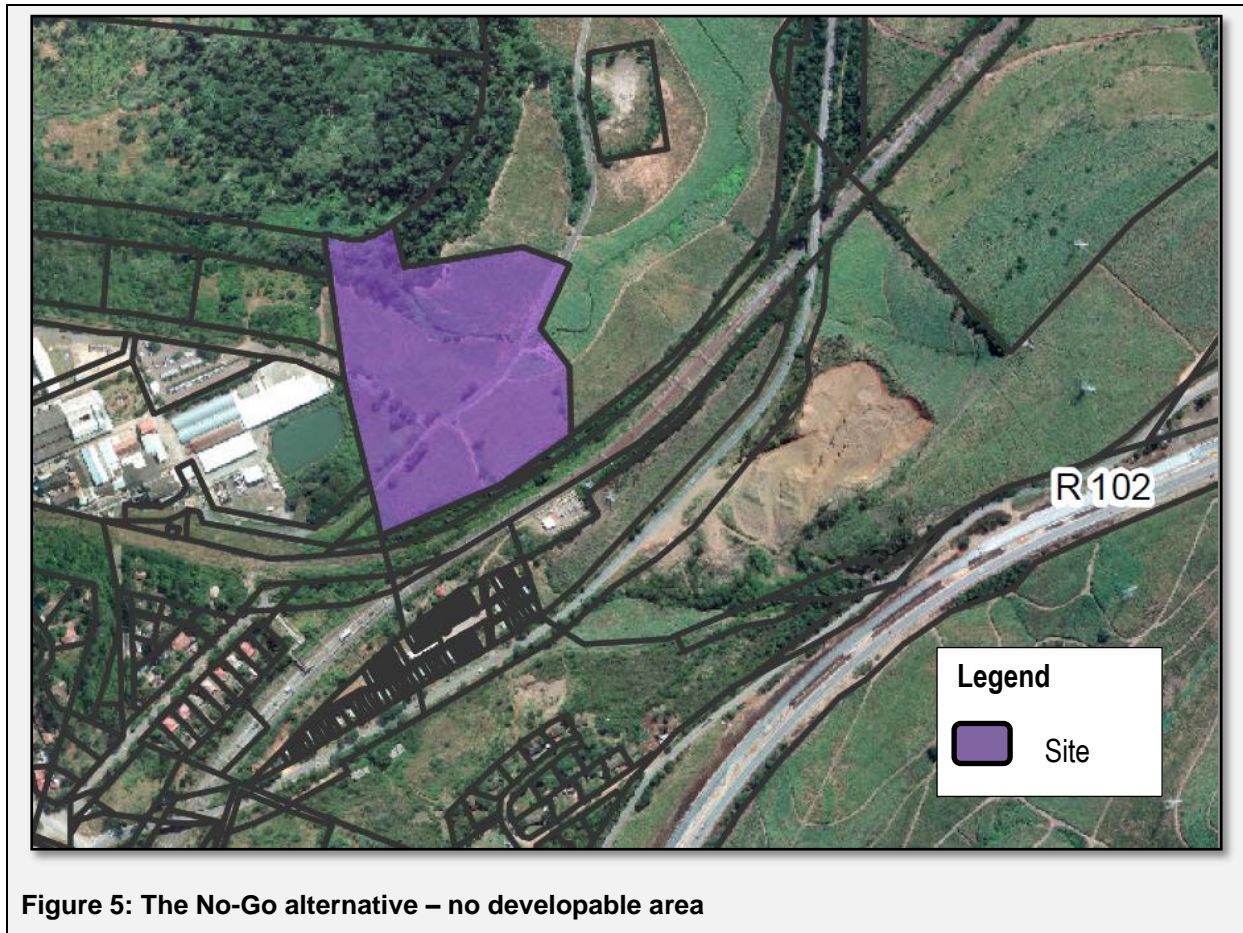


Figure 4: Alternative two (L2)



Sections B 5 – 15 below should be completed for each alternative.

5. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. List alternative sites were applicable.

Alternative: Only Site

Alternative S (preferred or only site alternative) – Centre-point

Alternative S2 – N/A

Alternative S3 – N/A

Latitude (S):

Longitude (E):

29°	37'	21.80"	31°	3'	35.56"
°	'	"	°	'	"
°	'	"	°	'	"

In the case of linear activities: electricity, sewer and stormwater reticulation

Alternative:

Electricity Layout

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Latitude (S):

Longitude (E):

29°	37'	32.76"	31°	03'	09.58"
29°	37'	19.48"	31°	03'	16.63"
29°	37'	23.51"	31°	03'	36.69"

Stormwater Layout

- Starting point of the activity
- Middle point of the activity
- End point of the activity

29°	37'	24.31"	31°	03'	33.26"
29°	37'	28.29"	31°	03'	33.01"
29°	37'	27.40"	31°	03'	33.33"

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Sewer Layout

- Starting point of the activity
- Middle point of the activity
- End point of the activity

29°	37'	20.87"	31°	03'	22.94"
29°	37'	20.90"	31°	03'	31.68"
29°	37'	21.12"	31°	03'	41.05"

For route alternatives that are longer than 500 m, please provide an addendum with co-ordinates taken every 500 m along the route for each alternative alignment.

6. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity / technology as well as alternative activities / technologies (footprints):

Alternative:

Alternative LA1³ (preferred activity alternative)

Alternative LA2 (if any)

Alternative A3 (if any)

Size of the activity:

17 500 m ²
22 500 m ²
m ²

or, for linear activities:

Not applicable

Alternative:

Alternative A1 (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

Length of the activity:

m
m
m

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:

Alternative L1 (preferred activity alternative)

Alternative L2 (if any)

Alternative L3 (if any)

Size of the site / servitude:

72 300 m ²
72 300 m ²
m ²

7. SITE ACCESS

Does ready access to the site exist?

YES X	NO
N/A	

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

Access to the development is taken off Vincent Dickenson Road via road D499, a divisional road.

The Traffic Impact Assessment (TIA) (Aurecon, 2014) provides the following information.

For the complete report refer to Appendix D6.

The Surrounding Transport Network of the Site

The Canelands industrial area is situated in the northern region of the EM and on the northern edge of Verulam. Portion 2026 is situated in the north eastern quadrant of Canelands industrial area, adjacent to the north coast railway line.

The major road in this area is the R102, a Provincial Main Road (MR2) and a major north-south regional route linking Durban with the northern sector of the EM and beyond.

Vincent Dickenson Road lies west of and parallel to, the R102 and it is also a Provincial Main Road (P100) located close to the east of the site and aligned in a north-south direction. The north coast railway line lies to the west of Vincent Dickenson Road and to the east of the proposed development.

As mentioned above, access to the development is taken off Vincent Dickenson Road via road D499,

³ "Alternative A.." refer to activity, process, technology or other alternatives.

a divisional road. This road is short, looping to the south to provide access to the back of Canelands Industrial and having an off-shoot to the west to an area known as Palmer's Estate which houses, *inter alia*, the Umgeni Water Hazelmere Treatment Plant. Both of these areas are bounded by the Umdloti River in the south-west.

To the south, New Glasgow Road is the main local access road serving the existing Canelands industrial area. New Glasgow Road is a Provincial Main Road (P530-1) that intersects with Vincent Dickenson Road.

The location of the site in relation to the surrounding road network is shown in Figure 6 overleaf.

An analysis of the intersections reveals that all movements along the intersections are generally operating at a substantial good Level of Service (LOS).

Existing Pedestrian Activity

The pedestrian activity in the vicinity of the site is fairly high during peak commuter periods but low outside of these periods. This pedestrian activity is associated with workers walking to and from the employment opportunities in Canelands.

The site only has one frontage, D499, along its northern boundary having no sidewalks. The grass verges are, however, approximately 1.5 m wide and pedestrians were observed walking along these verges on both sides of this road. Pedestrians in the area were observed walking along dirt foot paths when travelling from the south, New Glasgow Road; it can be assumed this route shortens both distance and time for pedestrians.

Condition of Roads

Vincent Dickenson Road, being a Provincial Main Road, is generally in good condition through the study area.

Refer to Plate 1, Plate 2 and Plate 3 overleaf.

P499 is in variable condition with good areas and poor areas along its length and considerable pot-holing and edge break visible in places. The pavement appears to be light, being a thin chip and spray layer over gravel base which will not be adequate for heavy industrial traffic.

The intersection of these two roads is unsatisfactory as road markings are worn out and the Stop sign is old and faded. In addition, a plethora of signs appear to have been illegally erected within the intersection and these are intrusive to the extent that they mask the Stop sign.

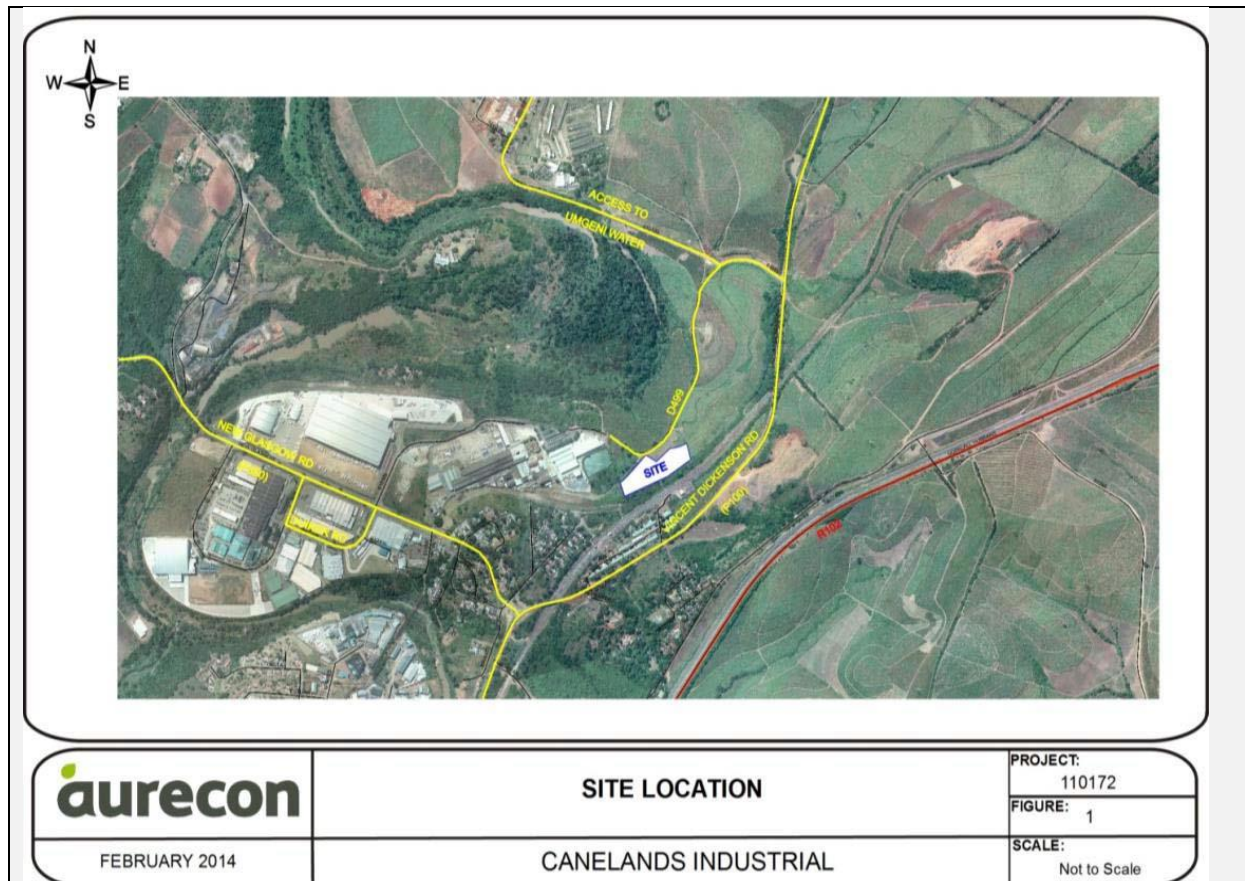


Figure 6: Access to the study site (Aurecon, 2014)



Plate 1: P100 South bound



Plate 2: P100 North bound



Plate 3: Bad condition of P499 (Pot-holing)

Road Safety

Road safety conditions for both motorists and pedestrians are generally good in the vicinity of the site. D499 is flat with a sharp curve past the site, visibility and sight distance around the site is good in all directions. The D499 does not have street lighting and this may cause a visibility problem along the road at night. The main road leading to the site, D499, in some areas experiences bad pavement conditions, potholes, which could be of danger to motorists.

The Implications and Required Upgrades for the Canelands Extension

Due to the size of the development, a small number of trips will be generated by the addition of the industrial area at the proposed Canelands Portion 2026. The total trips generated in the AM/PM peak are 84 trips, with 63 trips inbound and 21 trips outbound in the AM, and the reverse in the PM.

All traffic generated by the proposed rezoning of the Canelands Portion 2026 Industrial area is expected to come off the Provincial Main Road, Vincent Dickenson Road (P100). The distribution of the new traffic generated by the proposed rezoning is assumed to be in the same proportions as the existing AM and PM peak hour traffic passing through the intersections being analysed.

Based on the above distribution pattern, the AM and PM traffic generated by the rezoning has been distributed on the surrounding road network, around the assumed access point to the Industrial area.

The proposed rezoning site has just one access serving as entrance and exit to the area, the intersection of P100 and D499. Upon-site inspection it was seen that the access is currently under distress, see Plate 4 and Plate 5, and will need to be upgraded with the Industrial rezoning.



Plate 4: Edge failure



Plate 5: Delamination

The access into the site will be taken from D499 on the apex of a right angle bend adjacent to the Chem Spec boundary. The proposed access way to the development provides adequate sight distance along the north and west approaches. The proposed access will and will serve as an access and egress to the industrial area.

The proposed option is shown in Figure 7 below.



Figure 7: Proposed Access to Industrial Development

The proposed Industrial development is expected to generate some pedestrian volumes. Due to the social standing of the area, the current pedestrian volume is quite high therefore it is recommended that D499 be provided with a sidewalk along at least one side to accommodate all pedestrian movement.

The new development will generate the use of public transport but the proposed site is lacking in facilities for these vehicles to offload passengers, resulting in vehicles staging at the intersection for this purpose.

It is recommended that a layby facility be included on Vincent Dickenson Road just downstream of the D499 intersection for both directions of travel. This will ensure safety of all road users.

The additional traffic generated by the development will not influence the safety of the roads. The current safety conditions in the area are poor and therefore the TIA offers recommendations for improvement of this, which are carried forward to the EMPr.

The TIA concluded that based on the above analysis the following conclusion can be drawn with regards to the traffic impact of the proposed Canelands Extension:

- All intersections are currently working at an excellent LOS, however the Vincent Dickenson and D499 intersection needs to be upgraded which could be a result of the design life of the intersection being reached.
- The Vincent Dickenson Road / New Glasgow Road intersection operates at a good LOS despite the relatively high traffic volumes experienced during the peak hours. This is due to the recent upgrades completed at this intersection.
- The Sidra (traffic modelling programme) analysis of the additional development traffic and the five year predicted traffic show the intersections operate at a good LOS, with minimal delays and queue lengths at intersections.
- The impacts to the surrounding road network are negligible, due to the small size of the

development.

- Due to the rural nature of the surrounding community, pedestrian movement and public transport usage in the area are high; however, the road safety around the development area is poor, providing no pedestrian sidewalks, road signage, road marking and laybys for public transport.
- The pavement of D499 is very light and it will have to be upgraded over its entire length to carry additional industrial traffic.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

8. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this report.

The site or route plans must indicate the following:

- 1.1. the scale of the plan which must be at least a scale of 1:500;
- 1.2. the property boundaries and numbers / erf / farm numbers of all adjoining properties of the site;
- 1.3. the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- 1.4. the exact position of each element of the application as well as any other structures on the site;
- 1.5. the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
- 1.6. walls and fencing including details of the height and construction material;
- 1.7. servitudes indicating the purpose of the servitude;
- 1.8. sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
 - rivers, streams, drainage lines or wetlands;
 - the 1:100 year flood line (where available or where it is required by ~~DWA~~ **DWS**);
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation including protected plant species (even if it is degraded or infested with alien species);
- 1.9. for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500 mm contours must be indicated on the plan; and
- 1.10. the positions from where photographs of the site were taken.

9. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

10. FACILITY ILLUSTRATION

A detailed illustration of the facility must be provided at a scale of 1:200 and attached to this report as Appendix C. The illustrations must be to scale and must represent a realistic image of the planned activity/ies.

11. ACTIVITY MOTIVATION

11.1 Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 140 000 000.00
What is the expected yearly income that will be generated by or as a result of the activity?	Unknown
Will the activity contribute to service infrastructure?	YES X NO
Is the activity a public amenity?	YES NO X
How many new employment opportunities will be created in the development phase of the activity?	1 404
What is the expected value of the employment opportunities during the development phase?	Unknown
What percentage of this will accrue to previously disadvantaged individuals?	90%
How many permanent new employment opportunities will be created during the operational phase of the activity?	90
What is the expected current value of the employment opportunities during the first 10 years?	Unknown
What percentage of this will accrue to previously disadvantaged individuals?	90%

11.2 Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

The proposal is to extend the Canelands Industrial Park in order to cater for the need of industrial space, therefore THD wishes to develop the site for industrial purposes. The site lies adjacent to the existing Canelands Industrial estate.

Potential land uses may include general / light industrial, logistics, warehousing and distribution. These land uses will complement those of the existing Canelands Industrial Estate, and will ensure that this land parcel reads as an extension to the existing development.

The development of Canelands Extension would allow for an additional industrial platform to be created, which would in turn stimulate additional jobs and economic activity. From a policy perspective, the need for job creation, as well as locating jobs in close proximity to those who need them is stressed in both the National development Plan (NDP), as well as the Provincial Growth and Development Plan (PGDP). The development of Canelands Extension would create jobs in close proximity to the surrounding rural periphery, where jobs are greatly needed.

The development of Canelands Extension is also in line with the planning frameworks of the EM, including the Northern urban development Corridor (NUDC) plan, for which the Climate Resilience Plan / Framework is being developed in order to ensure urban resilience and sustainability of the area.

In addition to this, Canelands Extension is in close proximity to the airport and therefore forms part of the "Airport City", or "Durban Aerotropolis" which is currently being driven jointly between provincial and local government. There is a demand for well-located industrial land within close proximity to the airport / Dube TradePort. Additional Industrial activity will further stimulate trade, and in turn increase the demand for air cargo logistics. This will translate into additional use of the service offered at the Dube TradePort, which will further stimulate jobs and growth and investment within the region.

Indicate any benefits that the activity will have for society in general:

In 2014, as discussed in the Introduction (Section 2.2 above) THD, EM and DTPC entered into a partnership to develop a Climate Resilience Plan /Framework for the northern area of eThekweni.

The project arose out of an acknowledgement that a key imperative at national, provincial and local government level, is the alleviation of poverty through various measures including effective land use management leading to optimal land use, infrastructural provision and promotion of investment leading to inclusive economic development. In conjunction with this, increasing urbanisation also places increasing pressure on the natural environment through large-scale land transformation.

Thus, the need for balanced; sustainable development was acknowledged by all parties, based upon a minimum ecological footprint and a process towards obtaining both agreement on this ecological footprint, as well as around an approach to development in the region, was entered into.

The expected output of this process is a resilience framework, which would serve to guide development within the region into the future. While the preparation of this framework was underway, THD and DTPC agreed to put a number of their Environmental Impact Assessments (EIAs) on hold, one of which was Canelands Extension (this project, by THD).

The process formally commenced in October 2014, and is now reaching a conclusion. As noted above, at the heart of the framework is the ecological footprint based upon predominantly, the wetland habitat in the region. The work that has been done by consultants Biomimicry, Eco-Pulse Environmental Consulting Services and GroundTruth has led to the finalisation of a wetland management policy framework that provides for wetland gains and losses and ultimately, for a certain quantum of consolidated offset receiving areas which provides mitigation for where wetlands will be impacted upon by the proposed development.

The Canelands Extension project was placed on hold as this framework was developed and has been derived to ensure the outcomes of the framework are met and ensuring impacts to identified ecological footprints are abated.

The development will promote economic development in the area and contribute to poverty eradication by creating places of employment and also increasing property values.

Indicate any benefits that the activity will have for the local communities where the activity will be located:

12. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
The Constitution (No. 108 of 1996)	Ensuring basic human needs are met through the provision of basic road infrastructure within rural areas	National and Provincial	18 December 1996
National Environmental Management Act (NEMA Act No. 107 of 1998) and associated EIA Regulations	Listed activities triggered in the EIA Regulations promulgated under NEMA, hence the need for an environmental authorisation	Department of Environmental Affairs	8 December 2014
National Water Act (NWA Act No. 36 of 1998)	A Water Use Licence is required for water uses (a), (c) (f) (g) and (i) of Section 21 of the NWA. These water uses are: (a) Abstraction of water for construction purposes; (c) Impeding or diverting the flow of water in watercourse; (f) Discharging waste or water	Department of Water and Sanitation	26 August 1998

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Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
	<p>containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit</p> <p>(g) Disposing of waste in a manner which may detrimentally impact on a water resource</p> <p>(i) Altering the bed or banks of a watercourse.</p>		
National Heritage Resources Act No. 25 of 1999	The proposed project includes linear development of more than 100 m and hence requires a phase 1 HIA and AMAFA comment.	AMAFA	14 April 1999
National Environmental Management: Biodiversity Act Threatened or protected species (GNR 388); Lists of species that are threatened or protected (GNR 389); Alien and invasive species regulations (GNR 506); Publication of exempted alien species (GNR 509); Publication of National list of invasive species (GNR 507); and Publication of prohibited alien species (GNR 508).	The study area is not classified as a protected area as per the NEM: BA, but is nonetheless screened in terms of the NEM: BA.	DEA	7 June 2004 19 July 2013
National Environment Management: Air Quality Act, 2004. No. 39 of 2004	The project must ensure that the use of any asphalt plants is not allowed else it may trigger the need for an atmospheric emissions licence as per the NEM: AQA and as governed and issues by the district authority.	District Mandate	24 February 2005
Mineral and Petroleum Resources Development Act - No. 28 of 2002	The project must align with the provisions of the Act and ensure that material for the road is sourced from a licenced source (borrow-pit). A mining permit is not applied for and not expected to be required due to the scale of the project.	National and Provincial	10 October 2002
Occupational Health and Safety Act No. 85 of 1993	Occupational Health and Safety may be at risk during construction phase.	National and Provincial	23 June 1993
Conservation of Agriculture Resource Act No. 43 of 1983	Agricultural land is unlikely to be impacted upon during the development of this extension of an industrial area. The agricultural potential of this portion of land is limited due to its size and fragmentation.	National and Provincial	21 April 1983
National Environmental Management: Waste Act	Waste will be generated during the construction phase, however, in	National and Provincial	10 March 2009

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Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
No. 59 of 2008 and GNR 921	accordance with the waste regulations, waste will not be stored but responsibly disposed of at a registered landfill, and therefore, a waste management licence is not warranted.		
Ethekwini Municipality IDP and individual sector plans	Provides key and prioritised sectors and development objectives for the metropolitan.	Ethekwini Municipality	2014/2015
Ethekwini Climate Resilience Framework	In 2014 Tongaat Hulett, Dube TradePort and eThekweni Municipality entered into a partnership to develop a climate resilience framework for the northern area of eThekweni. The project arose out of an acknowledgement that a key imperative at national, provincial and local government level, is the alleviation of poverty through various measures including effective land use management leading to optimal land use, infrastructural provision and promotion of investment leading to inclusive economic development. In conjunction with this, increasing urbanisation also places increasing pressure on the natural environment through large-scale land transformation.	Ethekwini Municipality, Tongaat Hulett Developments and Dube TradePort.	Not yet formerly adopted
Northern urban development Corridor (NUDC)	Provides key and prioritised sectors and development objectives for the metropolitan.	Ethekwini Municipality	2015
Provincial Growth and Development Plan (PGDP)	Provides key and prioritised sectors and development objectives for the province.	KwaZulu-Natal	2012 – 2016
National development Plan (NDP)	Provides key and prioritised sectors and development objectives at a national scale.	South African Government	2016

13. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

13.1 Solid waste management

Will the activity produce solid construction waste during the construction / initiation phase?

YES X	NO
Unknown	

If yes, what estimated quantity will be produced per month?

How will the construction solid waste be disposed of? (describe)

The construction waste will be disposed of at the new landfill which will replace the Bisasar Road landfill.
Disposal certificates will be obtained and filed on-site, and also made available to the EDTEA when requested.

Where will the construction solid waste be disposed of? (provide details of landfill site)

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As above.

Will the activity produce solid waste during its operational phase?

YES X **NO**

If yes, what estimated quantity will be produced per month?

Unknown at this stage.

How will the solid waste be disposed of? (provide details of landfill site)

The waste generated at operation will be disposed of at the new landfill which will replace the Bisasar Road landfill or as required per waste stream of the end-user (i.e. the end user will accept responsibility to dispose of at a registered landfill for hazardous waste if need be).

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

As above.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine the further requirements of the application.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

YES **NO X**

Note that the end-user may generate hazardous waste; however, the end-user will be responsible for obtaining the relevant authorisations, licences and permits.

If yes, contact the KZN Department of Economic Development, Tourism & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Is the activity that is being applied for a solid waste handling or treatment facility?

YES **NO X**

If yes, contact the KZN Department of Economic Development, Tourism & Environmental Affairs to obtain clarity regarding the process requirements for your application.

13.2 Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

YES **NO X**

If yes, what estimated quantity will be produced per month?

m³

Will the activity produce any effluent that will be treated and/or disposed of on-site?

Yes **NO X**

If yes, contact the KZN Department of Economic Development, Tourism & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Will the activity produce effluent that will be treated and/or disposed of at another facility?

YES **NO X**

Note that the end-user may generate / discharge liquid effluent; however, the end-user will be responsible for obtaining the relevant authorisations, licences and permits.

If yes, provide the particulars of the facility:

Facility name:

Contact person:

Postal address:

Postal code:

Telephone:

E-mail:

Cell:

Fax:

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

13.3 Emissions into the atmosphere

Will the activity release emissions into the atmosphere?

Note that the end-user may release emissions; however, the end-user will be responsible for obtaining the relevant authorisations, licences and permits.

If yes, is it controlled by any legislation of any sphere of government?

YES	NOX
YES	NO

If yes, contact the KZN Department of Economic Development, Tourism & Environmental Affairs to obtain clarity regarding the process requirements for your application.

If no, describe the emissions in terms of type and concentration:

The only applicable emissions are those associated with construction debris, such as dust. This may be exacerbated by climatic conditions and will be controlled by dust suppression methods such as water suppression (spraying via water trucks).

Limited dust liberation and emissions during construction phase due to the offloading of construction material such as sand and cement and movement of construction vehicles is expected.

During the operational phase, the industries which operate within the Canelands Extension will release emissions into the atmosphere, at this stage, the constituents and levels are unknown. These end-user industries will be responsible for obtaining the required permits, authorisation and licences.

13.4 Generation of noise

Will the activity generate noise?

If yes, is it controlled by any legislation of any sphere of government?

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

YES	NOX
YES	NO

The activities applied for and proposed will not generate noise, however, the construction of the proposed infrastructure and platform for industrial development by the end-user will generate noise. This must be controlled as per local regulations and acceptable dBA levels as prescribed in occupational health and safety regulations.

14. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	water-board	groundwater	river, stream, dam or lake	other	the activity will not use water
X					
If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:					N/A
Does the activity require a water use permit from the Department of Water and Sanitation?					YES X NO

If YES, please submit the necessary application to the Department of Water and Sanitation and attach proof thereof to this report.

A water use licence is required for Section 21 (g) for the development of the pumpstation. The pre-application meeting was held with the Department of Water and Sanitation on 26 November 2015; refer to Appendix G1 for the record thereof.

15. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

Not applicable to the nature of the project. However, THD is well-placed to unlock value and show leadership by adopting and implementing sustainable principles and guidelines for all its current and future industrial buildings and developments. The purchaser will be encouraged to incorporate these high-level sustainability guidelines into the development planning and implementation by the purchaser(s) / developer(s).

The key sustainability interventions addressed in these guidelines include:

- Space heating and cooling (including air-conditioning);
- Lighting;
- Water heating;
- Gas Cooking;
- Laundry;
- On-site (renewable) energy generation;
- Office equipment; and
- Electrical connection, distribution, and control systems.

These guidelines are also differentiated on the basis of interventions which can be implemented at different stages of the overall development process, namely:

- the development planning stage (by THD)
- the building design and construction stage (by project design teams)
- the occupation and operational stage (by home or building owners and tenants, or end-users)

Finally, it is suggested that the fundamental starting point for more sustainable industrial buildings is the consideration and incorporation of basic environmentally conscious design principles into the planning and design. Good basic design will inevitably result in less intensive or costly mechanical and electrical systems to maintain the desired LOS for occupants (and owners) of buildings within THD developments'.

These detailed guidelines have been incorporated, where applicable, into the EMPr (Appendix F)

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

As above.

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SECTION C: SITE / AREA / PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A):

1

- Subsections 1 – 6 below must be completed for each alternative.

1. GRADIENT OF THE SITE

The southern part of the project area south of the road crossing through the project area is sloping gently with a concave slope conformation in a north to north-westerly direction. The northern part comprises a fairly level north-western portion with a wider north westerly trending valley line located to the north east. The entire valley line has been marked as wetland.

Indicate the general gradient of the site.

Alternative L1:

Flat X	1:50 – 1:20 X	1:20 – 1:15 X	1:15 – 1:10 X	1:10—1:7,5	1:7,5—1:5	Steeper than 1:5
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Alternative L2 (if any):

Flat X	1:50 – 1:20 X	1:20 – 1:15 X	1:15 – 1:10 X	1:10— 1:7,5	1:7,5—1:5	Steeper than 1:5
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Alternative L3 (if any):

Flat	1:50—1:20	1:20—1:15	1:15—1:10	1:10— 1:7,5	1:7,5—1:5	Steeper than 1:5
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2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site **(Please cross the appropriate box)**.

Alternative L1 (preferred site):

Ridgeline X	Plateau X	Side slope of hill / mountain X	Closed valley	Open valley X	Plain X	Undulating plain / low hills X	Dune	Sea- front
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Alternative L2 (if any):

Ridgeline X	Plateau X	Side slope of hill / mountain X	Closed valley	Open valley X	Plain X	Undulating plain / low hills X	Dune	Sea- front
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Alternative L3 (if any):

Ridgeline	Plateau	Side slope of hill / mountain	Closed valley	Open valley	Plain	Undulating plain / low hills	Dune	Sea- front
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3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Has a specialist been consulted for the completion of this section?

YES X

NO

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If YES, please complete the following:

Name of the specialist:	M.J. Hadlow of DRENNAN MAUD & PARTNERS		
Qualification(s) of the specialist:	BSc Geology, Pr.Sci.Nat		
Postal address:	P.O. BOX 30464 Mayville		
Postal code:	4058		
Telephone:	031 201 8992	Cell:	
E-mail:	dmp@iafrica.com	Fax:	031 201 7920
Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?		YES	NO X
If YES, specify and explain:		While the site falls within the KwaZulu-Natal Coastal Belt which is an Endangered vegetation type, site investigations and desktop evaluations reveal that the site is so heavily transformed that it does not contain any units of vegetation associated with this vegetation type.	
Are there any special or sensitive habitats or other natural features present on any of the alternative sites?		YES X	NO
If YES, specify and explain:		The riparian habitat of the Umdloti River, as well as other aquatic systems (wetlands).	
Are any further specialist studies recommended by the specialist?		YES	NO X
If YES, specify:			
If YES, is such a report(s) attached in <u>Appendix D</u> ? Refer to Appendix D5 for the full report and laboratory results		YES	NO

Signature of specialist:



Date:

30.11.2012

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

A specialist has been commissioned for this section as per details provided above and assessment provided below.

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Is the site(s) located on any of the following (cross the appropriate boxes)?

	Alternative L1:		Alternative L2 (if any):		Alternative L3 (if any):	
Shallow water table (less than 1.5m deep)	YES X	NO	YES X	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	NO X	YES	NO X	YES	NO
Seasonally wet soils (often close to water bodies)	YES X	NO	YES X	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO X	YES	NO X	YES	NO
Dispersive soils (soils that dissolve in water)	YES X	NO	YES X	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	NO X	YES	NO X	YES	NO
Any other unstable soil or geological feature	YES	NO X	YES	NO X	YES	NO
An area sensitive to erosion	YES X	NO	YES X	NO	YES	NO

Geology and Soils of the Site

The report on the geotechnical investigation (DRENNAN MAUD & PARTNERS, 2012) provides the following results from inspection pits (IP), auger excavations and Dynamic Cone Penetration (DCP) testing. Refer to Appendix D5 for the full report and laboratory results.

The majority of the project area is underlain by the diamictic bedrock of the Ordovician Dwyka Formation and the soils derived therefrom. Along the upper slope of the valley as well as at the northern end of the project area, quaternary alluvial terrace sediments comprising loose sands, gravel and boulder capping the Dwyka Formation occur at depth.

Fill materials were encountered along the western portion of the site. It is assumed, a north west - south east trending depression or shallow drainage line leading towards the Dow AgroSciences SA (Pty) Ltd (adjacent business) pond has been filled in order to level the area. In general the depth to completely to highly weathered, very soft rock, sedimentary bedrock exceeds 3 m depth with the exception of the south western most area where weathered bedrock was exposed at a depth of 2.40 m below existing ground level.

Loose alluvial terrace sediments associated with the nearby meandering Umdloti River cap the underlying Dwyka Formation both along the embankment of the valley line as well as at the north western boundary.

Laboratory tests show results of Colluvium and Residual Tillite. Colluvium has a low (7.4%) clay content and provides excellent to good sub-grade material. Colluvium classifies as a Grade Seven (G7) material and is considered suitable for re-use as subgrade and in selected layer works for road and pavement works. The Residual Tillite material encountered classifies as clayey sand with a clay content of 14.2% which is considered an excellent to good subgrade material. This material also classifies as a G7 material and is considered suitable for re-use as subgrade and in selected layer works for road and pavement works.

In addition, further residual material was encountered. This Residual Tillite classifies as gravelly, sandy, silty clay with a clay content of 34.6%. This material is considered a fair to poor subgrade material and is not considered suitable in road and pavement layer works. Refer to Figure 8 for the map of the site geological characteristics.

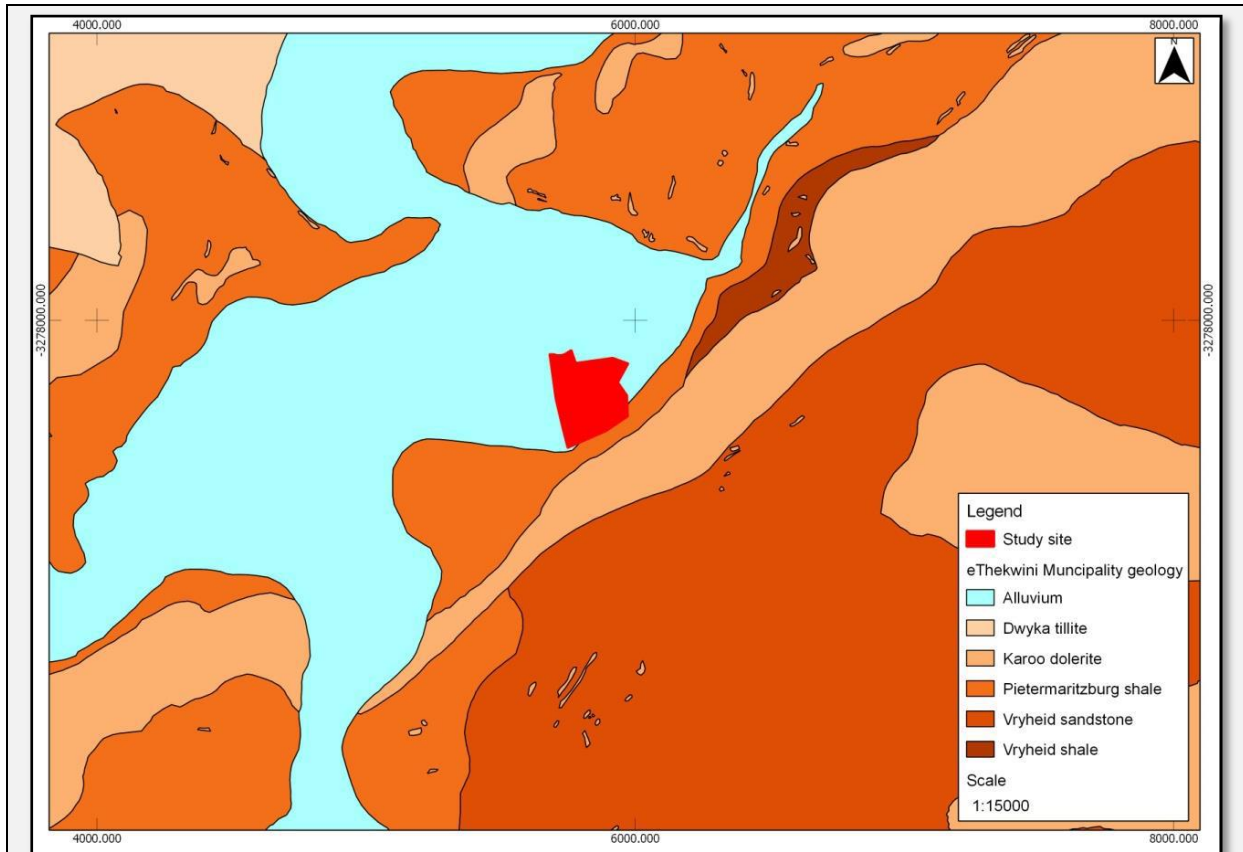


Figure 8: Geology of the Study Site (GroundTruth, 2014)

In terms of the results of this assessment, the geotechnical investigation concludes that the investigated 2.54 ha portion of the 7.3 ha site as stable in its existing condition, and capable of the proposed development. The report provides recommendations which are carried forward to the Environmental Management Programme (EMPr). These recommendations amount to no more than sound building practices, appropriate for the geotechnical conditions existing on the site.

Basic Assessment Report

4. GROUND COVER

Has a specialist been consulted for the completion of this section?

YES X **NO**

If YES, please complete the following:

Name of the specialist:	Gary de Winnaar of GroundTruth		
Qualification(s) of the specialist:	BSc Ecology, Pr.Sci.Nat		
Postal address:	P O Box 2005, Hilton		
Postal code:	3245		
Telephone:	033 342 6399	Cell:	
E-mail:	gary@groundtruth.co.za	Fax:	086 599 2300

Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites? **YES** **NO X**

If YES, specify and explain: While the site falls within the KwaZulu-Natal Coastal Belt which is an Endangered vegetation type, site investigations and desktop evaluations reveal that the site is so heavily transformed that it does not contain any units of vegetation associated with this vegetation type.

Are there any special or sensitive habitats or other natural features present on any of the alternative sites? **YES X** **NO**

If YES, specify and explain: The riparian habitat of the Umdloti River, as well as other aquatic systems (wetlands).

Are any further specialist studies recommended by the specialist? **YES** **NO X**

If YES, specify:

If YES, is such a report(s) attached in Appendix D? **YES** **NO**

Signature of specialist:



Date:

04.2014

Climate

The study area falls within the U30B quaternary catchment (Midgley *et al.*, 1994), and drains directly into the Umdloti River and a tributary system. The mean annual precipitation (MAP) for the U30B catchment is 983.2 mm and Potential Evapo-transpiration (PET) is 247.3 mm (Schulze, 2007), which suggests that the wetlands within the catchment would have low sensitivity to hydrological impacts within the catchment (Macfarlane *et al.*, 2007).

Description of study area vegetation

The site and broader study area occurs within the KwaZulu-Natal Coastal Belt (see Appendix 5), an Endangered vegetation type (Mucina *et al.*, 2006). The KwaZulu-Natal Coastal Belt occupies a long, and in places broad, coastal strip along the KwaZulu-Natal coast extending roughly from Mtunzini in the north to Port Edward in the south (Mucina *et al.*, 2006). In natural situations, this vegetation type is defined by various types of subtropical coastal forest interspersed with *Themeda triandra* grassland.

Over the years, the natural vegetation of this unit has been highly transformed and fragmented, primarily from extensive sugarcane cultivation, timber plantations and urban sprawl. Due to the extensive transformation, the natural vegetation has been replaced by a mosaic of secondary grasslands (dominated by *Aristida* sp.), seral thickets and bushveld most of which is severely threatened by alien plant invasion. Currently only a very small area (i.e. less than 1% of original area) is protected in *Ngoye*, *Mbumbazi* and Vernon Crookes Nature Reserves.

Lower order vegetation units (e.g. grassland, forest, wetland, etc.) are also nested in the part of the

KwaZulu-Natal Coastal Belt. However, due to the degraded nature of the vegetation, little can be referred back to these units in their original state.

Classification and mapping of vegetation/ecological units

The site contains several units as per the prevailing vegetation communities and land use. Definitions and descriptions of each unit are as follows:

- Thicket – Generally disturbed land comprising a high proportion of both woody and herbaceous alien species, with a limited presence of pioneer, indigenous woody species or more common indigenous herbaceous species. Thicket within the site is generally confined to the southern boundary along the railway servitude (Figure 9) and is identified by dense stands of trees or tall shrubs, dominated by a few species.
- Riparian habitat – Riparian habitat occurs along watercourses draining valley bottoms. In natural situations, the vegetation is mostly evergreen and characterised by trees and other plant species that tolerate soils with high water content or that are completely saturated. The NWA defines riparian habitat as the “physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas” (NWA, 1998). The vegetation associated with the riparian areas, extending across the site to the north western corner (Figure 9), is defined as riverine scrub.
- Wetland habitat – This includes the *typha*-dominated wetland and wetland habitat associated with the watercourse and sugarcane (Figure 9).
- Sugarcane – Land comprising cultivated sugarcane (Figure 9).
- Roads / infrastructure – Areas that have been developed for roads and various infrastructure (Figure 9).

Table 2 summarises the areas of each vegetation/ecological unit as determined by the desktop mapping and field-based verification procedures. The site is dominated by sugarcane (67%). In terms of the remaining vegetation, riverine scrub is dominant (15%), followed by *typha* wetland (8%) and thicket (5%). The wetland habitat intercepts a significant portion (43%) of the vegetation units mapped for the site (Figure 9).

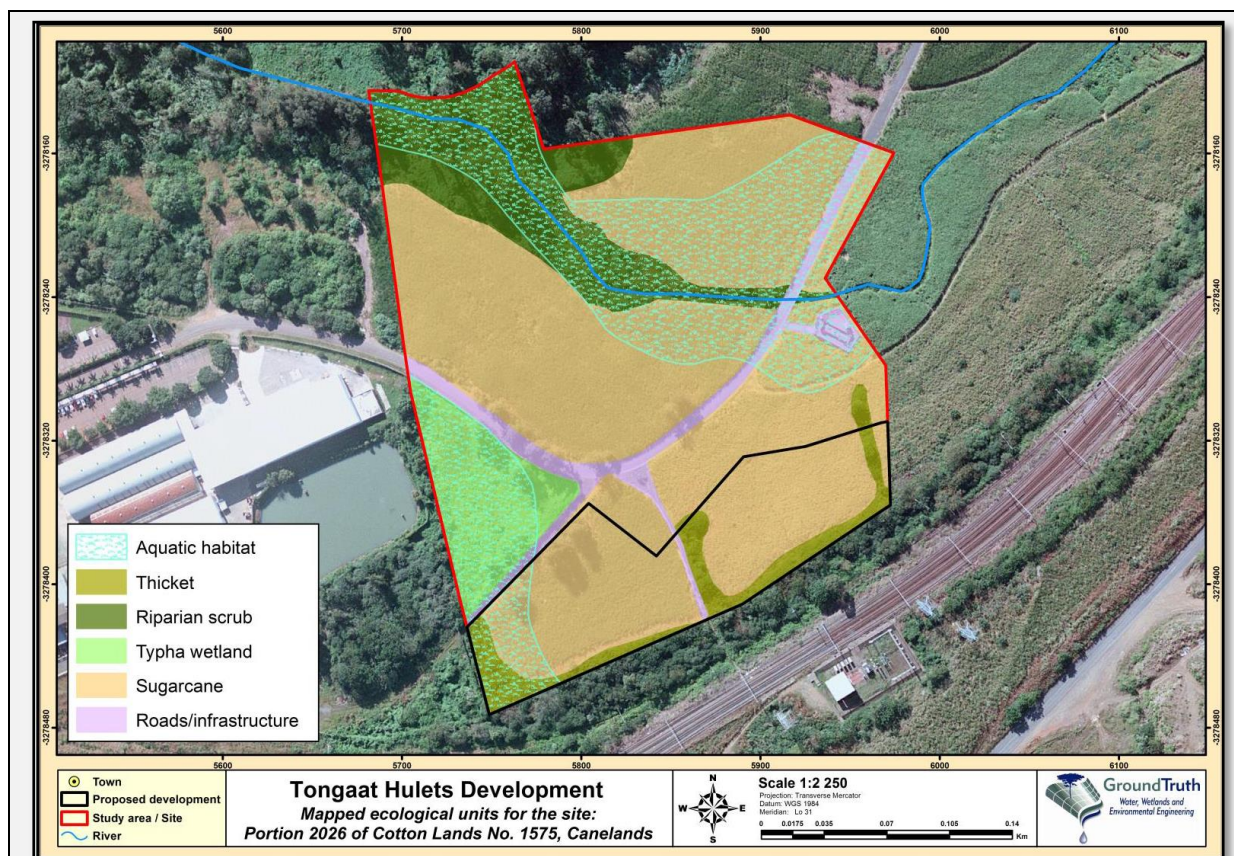


Figure 9: Mapped ecological units within portion 2026 of Cotton Lands no. 1575, Canelands

Table 2: Ecological units and their respective areas within the study area as derived from the available vegetation types

Ecological Unit	Study area	
	Area (ha)	Percent of total area (%)
Thicket	1.1	5
Riverine scrub	0.4	15
Typha wetland	4.8	8
Sugarcane	0.3	67
Roads/infrastructure	0.6	6
Total	7.3 ha	

Present state of vegetation

The vegetation cover of the site is dominated by cultivated sugarcane (Genus: *Saccharum*), a tall perennial grass, introduced to South Africa for sugar production. The remaining open spaces that are not developed or cultivated are disturbed and are largely dominated by invasive alien plant species. The few indigenous plant species that remain form insignificant and isolated components within the site.

Furthermore, no elements resembling the natural reference vegetation for the area, i.e. KwaZulu-Natal Coastal Belt, are associated with the site. As a result, the vegetation on the site is considered highly transformed.

A general description of vegetation associated with the mapped ecological units is as follows:

- Thicket – The thicket vegetation along the southern boundary is overwhelmingly dominated by

invasive alien trees, notably *Melia azedarach* (Syringa) and *Schinus terebinthifolius* (Brazilian Pepper).

- Riverine scrub – The riverine scrub contains a mosaic of different plant growth forms (e.g. trees, shrubs, herbs and grasses) made up mostly of invasive alien species. The few indigenous elements that remain include *Anomatheca laxa* (Small Red Iris), *Phragmites australis* (Common Reed), *Senecio polyanthemoides*, *Trichilia emetica* (Natal Mahogany) and *Strelitzia nicolai* (Wild Banana).
- *Typha* wetland – The wetland located near the south western corner of the site is dominated by *Typha capensis* (Bulrush), but flanked by a variety of invasive alien shrubs, herbs and climbers.

Conservation important species

No Red Listed or other conservation important plant species were observed within the site.

Invasive / alien plant species

Majority (70%) of the plants identified during the site visit are invasive alien species which supports the fact that the vegetation is generally highly disturbed. Problematic species include:

- Trees: *Casuarina equisetifolia* (Casuarina), *Eucalyptus grandis* (Saligna Gum), *Grevillea banksii* (Scarlet Silky Oak), *Leucaena leucocephala* (Leucaena), *Melia azedarach* (Syringa), *Schinus terebinthifolius* (Brazilian Pepper Tree), *Solanum mauritianum* (Bugweed) and *Syzygium cuminii* (Jambolan Plum);
- Shrubs: *Chromolaena odorata* (Triffid Weed), *Lantana camara* (Lantana), *Ricinus communis* (Castor-oil Plant), *Senna didymobotrya* (Peanut-butter Cassia), *Sesbania punicea* (Brazilian Glory Pea) and *Tithonia diversifolia* (Mexican Sunflower);
- Herbs: *Ageratum houstonianum* (Blue Weed) and *Canna indica* (Canna);
- Climbers: *Cardiospermum grandiflorum* (Balloon Vine), *Ipomea purpurea* (Common Morning Glory) and *Passiflora subpeltata* (Wild Granidilla); and
- Grass: *Arundo donax* (Giant Reed).

Important habitats and ecosystems

Flora

No vegetation that occurs within the site requires protection and/or specific management. However, it is important that the aquatic ecosystems associated with the site (i.e. riparian and wetland habitats) are protected under the auspices of the NWA. The functionality of these systems should be maintained, and where possible improved, to ensure the continued supply of ecological and hydrological services in the landscape (e.g. improving water quality, streamflow regulation, groundwater recharge, erosion control, and maintenance of wetland-dependant biodiversity).

The vegetation report concluded that with exception to loss of wetland habitat, the proposed development will not have a significant impact on the ecological state of the vegetation that is directly affected. Furthermore, opportunities exist to rehabilitate non-developed areas of the site to allow establishment of natural vegetation. Not only will this improve the integrity and functionality of terrestrial and aquatic ecosystems on-site, but will also enhance ecological connectivity within the broader landscape setting. The specialist who conducted the study validates the seasonality and age of the study, stating that the transformation of the site indicated it is unlikely that a re-assessment in the rainy season will yield different results.

Refer to Appendix D2 for the complete report and declaration.

Aquatic Assessment

Wetland Assessment

The Climate Resilient Plan / Framework process discussed in section 2.2 of the Introduction above, commenced approximately two years ago. Through the process, how wetlands are dealt with became a key issue requiring resolution. As a result, Doug McFarlane of EcoPulse, and Craig Cowden of GroundTruth developed a new form of assessment for wetland loss within the study area.

The result of this is a move away from the “no net loss” approach for wetlands, towards a “net gain”

approach. Essentially, developers are required to rehabilitate on-site, and then offset any wetland loss within three receiving areas, which are focused around the Ohlanga, oThongathi and Mdloti rivers. Full details of this approach can be found in Appendix D11.

In this new approach there is a clear adherence to the mitigation hierarchy in arriving to this solution, namely, wetlands are avoided where possible, rehabilitation / minimisation of the impacts on-site is recommended where possible, and where not possible, offsets in excess of existing requirements is recommended. For this reason, all aquatic and wetland assessments have been revised with the application of this approach and in turn, this BA Report has been accordingly revised. The wetland assessments have therefore been revised in December 2015 and are summarised hereunder. The full reports can be found in Appendix D3.

In accordance with the strategic wetland management framework compiled by Eco-Pulse (Macfarlane, 2015) as part of the Climate Resilience Plan, for the eThekweni Northern Region, mitigation requirements were derived as follows:

- Losses and/or gains in wetland habitat were based on changes in the supply of ecosystem services rather than ecological integrity and/or condition; since the wetlands are deemed to be 'working wetlands' within an urban setting, wetland functionality pertaining to water quality enhancement was seen as more important than wetland health and habitat integrity enhancement;
- Losses of wetland habitat were based on a hypothetical 'reasonably attainable' rehabilitated state rather than the current state, thereby factoring in the loss of opportunity to rehabilitate the affected wetlands; and
- Mitigation measures were based on achieving a 'net gain' rather than 'no net loss', to redress the loss of wetland habitat in the region, which is considered to be below sustainability thresholds.

Wetland Vegetation

Under natural conditions the surrounding landscape and study site would have been characterised by particular vegetation types. The historical dominant vegetation type present was the KwaZulu-Natal Coastal Belt (CB3) (Mucina and Rutherford, 2006), which falls under the Indian Ocean Coastal Belt Group 2 (CB) bioregion (Net *et al.*, 2011). The KwaZulu-Natal Coastal Belt (CB3) has been classified as having an 'endangered' conservation status, due to the lack of protection it receives.

Of the remaining 50% only a small percentage is statutorily protected in reserves including Ngoye, Mbumbazi and Vernon Crookes Nature Reserves. This vegetation type expands from Mtunzini along the north coasts of KwaZulu-Natal to Port Edward in the south, and commonly occurs at altitudes of 20–450 m above sea level. The greatest threat to this vegetation type has been agriculture, urbanization and the construction of roads (Mucina and Rutherford, 2006).

Wetland Classification

To allow for the differentiation between wetland systems and the prioritisation of systems either for conservation or management purposes, GroundTruth (Wetland Delineation and Rehabilitation Plan, 2014) classified the wetlands in accordance with the South African National Biodiversity Institute's (SANBI's) wetland classification system. However, for the purpose of assessing the Hydrogeomorphic Unit (HGM) units, Kotze *et al.* (2007) was used to classify the wetland systems into HGM units rather than Level 4 of the SANBI system.

The HGM unit types defined by Kotze *et al.* (2007) differ from the SANBI (2009) types, with the river classification being excluded and flat wetlands being grouped with the depression wetlands. According to GroundTruth (2012), two of the six HGM unit types are present within the study site namely channelled (HGM Unit 1) and un-channelled valley-bottom (HGM Unit 2) systems, refer to Table 3.

Table 3: Description of HGM Units System

(Level 1)	Bioregion (Level 2)	Landscape Unit (Level 3)	HGM Unit (Level 4)	Description of HGM Units (Kotze et al, 2007)
Inland systems	Indian Ocean Coastal	Valley Floor landscape units	Channelled	Valley-bottom areas with a well-defined stream channel but lacking characteristic floodplain features. May

Basic Assessment Report

	Belt Bioregion		be gently sloped and characterised by the net accumulation of alluvial deposits or may have steeper slopes and be characterised by the net loss of sediment. Water inputs from the main channel (when channel banks overflow) and from adjacent slopes.
		Un-channelled	Valley-bottom areas with no clearly defined stream channel usually gently sloped and characterised by alluvial sediment deposition, generally leading to a net accumulation of sediment. Water inputs mainly from channel entering the wetland and also from adjacent slopes.

Figure 10 below depicts the HGM units on-site.

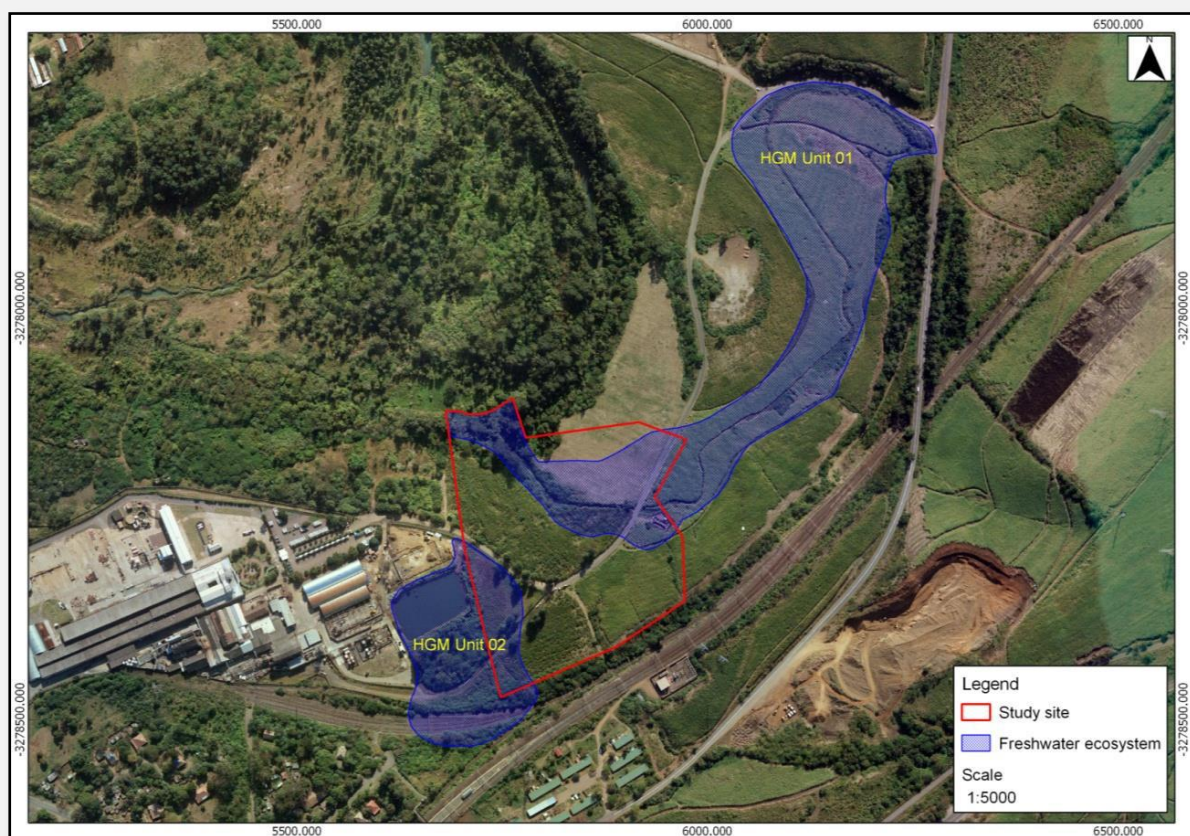


Figure 10: HGM Units on-site

For these wetland types the ecosystem threat status is considered to be 'critically endangered'. This is mostly related to minimal protection this vegetation unit receives and the level of transformation that has occurred. It should be noted that Ezemvelo KZN Wildlife (2009) makes reference to the fact that transformed systems, such as the systems within the study site, should be carefully considered, as rehabilitation of transformed wetland systems allows for the provisioning of wetland habitat that previously was non-existent.

The National Freshwater Ecosystem Priority Areas (NFEPA) is a tool developed to assist in the conservation and sustainable use of South Africa's freshwater ecosystems, including rivers, wetlands

and estuaries. According to the available NFEPA wetlands coverage, none of the HGM units' on-site were classified as NFEPA wetlands, most likely due to their altered nature. However, the site drains into a NFEPA river, the Umdloti River. The river condition of this system is considered to be 'B' (refer to detailed report in Appendix D3a for explanation on NFEPA scoring system), and therefore should be maintained at this level. The near-natural condition of this stretch of the river system is most likely the reason for this classification.

The Wetland Delineation and Rehabilitation Plan done by GroundTruth (2012) undertakes a WET-Health Assessment (refer to Appendix D3a for full methodology). Rehabilitation planning efforts were limited to those wetland areas within the property, as rehabilitation on adjacent properties would be subject to further discussions with the relevant landowners. Based on the assessment of the wetland area and the objectives of the rehabilitation, medium to long-term management guidelines have been provided to assist in maintaining the desired levels of ecosystem integrity and functioning. These guidelines include alien invasive control.

The results of the study indicate that the wetland habitat within the study area covers approximately 2.87 ha of the site, including the wetland habitat within the Chem Spec / Dow AgroSciences site. The systems are considered to be fed by surface and sub-surface water inputs, depending on the nature of the wetland within the landscape (GroundTruth, 2012). The study undertaken by GroundTruth (2012) further revealed that the site has undergone extensive modifications through agricultural practices, the railway line, ChemSpec / Dow AgroSciences and Duiker road.

It appears that historically HGM Unit 1 (Figure 11) was influenced by an alluvial ridge or levee adjacent to the Black Mhlashini River, but was modified to facilitate sugarcane cultivation, with the excavation of a drainage channel. The artificial drainage and sandy nature of the soils within the wetland has led to the desiccation of the system and limited areas were identified with seasonal wetness characteristics. Generally, seasonal and permanent wetness characteristics within the wetland were limited to within or directly adjacent to the drainage channel.

The wetland habitat within ChemSpec (HGM Unit 2) appears to be contained within the property boundary, with only an isolated area identified as having marginal signs of wetness north-east of Duiker Road (Figure 11). The original or benchmark status of the wetland habitat in this area is difficult to determine as the system is potentially influenced by a storage pond within ChemSpec and seepage from below the railway line south of the study site. Despite its origins, the wetland is characterised by the presence of obligate wetland species associated with the seasonal/permanent wetness zones including *inter alia*, *Typha capensis*, *Cyperus latifolius*, *Cyperus sexangularis*, and *Paspalum distichum*.

In addition to the identified wetland habitat within the study area, three drainage lines were identified in the southern portion of the site (Figure 11). The drainage lines serve to capture and direct surface flows from culverts under the railway line into the valley-bottom wetland upstream of the Duiker Road crossing. The surface flows in these areas would need to be taken into consideration during the development and storm water management planning and design.

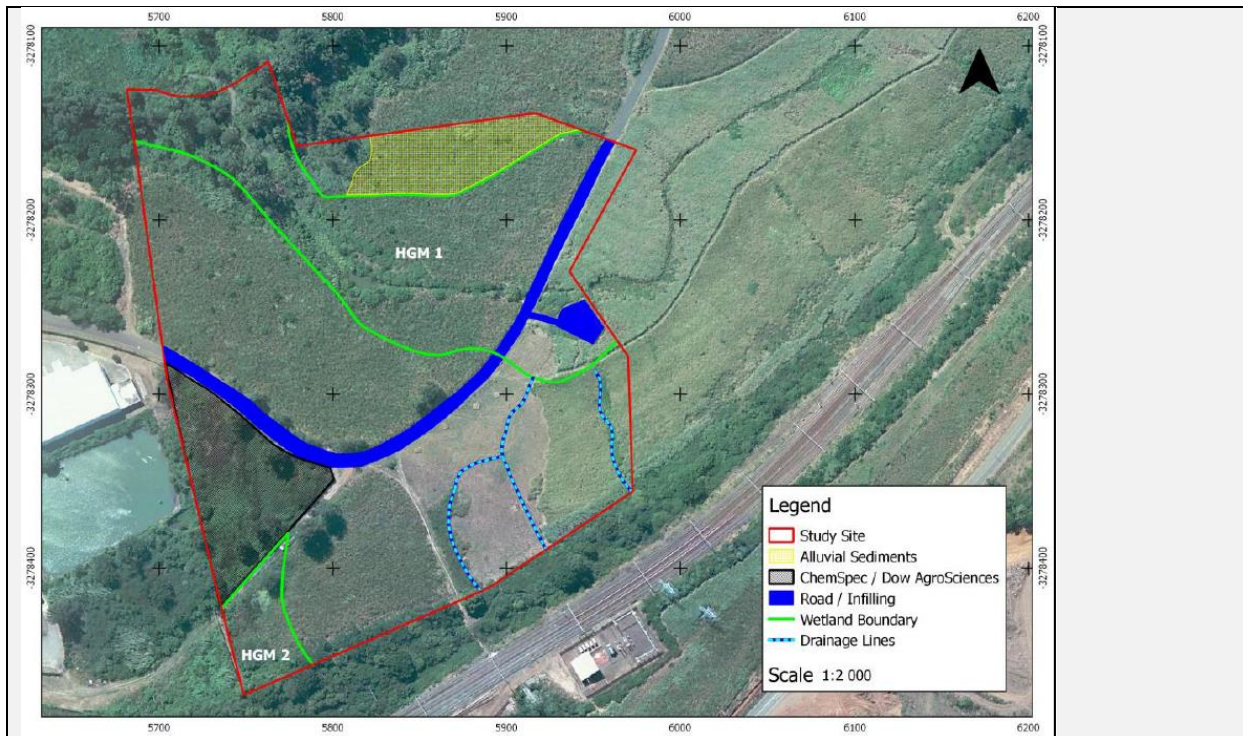


Figure 11: Overview of the Wetland HGM units within the study site

A single wetland within 500 m of the study site was identified but not assessed due to there being no hydrological link to the development site (Figure 12). The system has been transformed by extensive sugarcane cultivation.

The 'State of the Rivers' (SoR) survey by EM (2007) showed that a number of the rivers, 17 of the 59 systems sampled, in the EM are in poor condition i.e. habitat diversity and availability have declined; mostly only tolerant species are present; species present are often diseased; and population dynamics have been disrupted (Kleynhans and Louw, 2008). The predominant impacts on the rivers include solid waste or litter, discharge from Waste Water Treatment Works, sewage infrastructure and road infrastructure.

The Canelands Extension development site is located within the catchment of the Black Mhlashini River (Figure 12) which drains into the Mdloti River. The SoR identifies the Mdloti River as generally in a good condition for the stretch below Hazelmere Dam and above the town of Verulam, with high nutrient loads and industrialisation being major impacts on the system, and calls for the improved management of the system and its catchment to address the impacts on the river. It would be anticipated that the Black Mhlashini River would have a similar suite of impacts to that of the Mdloti River.

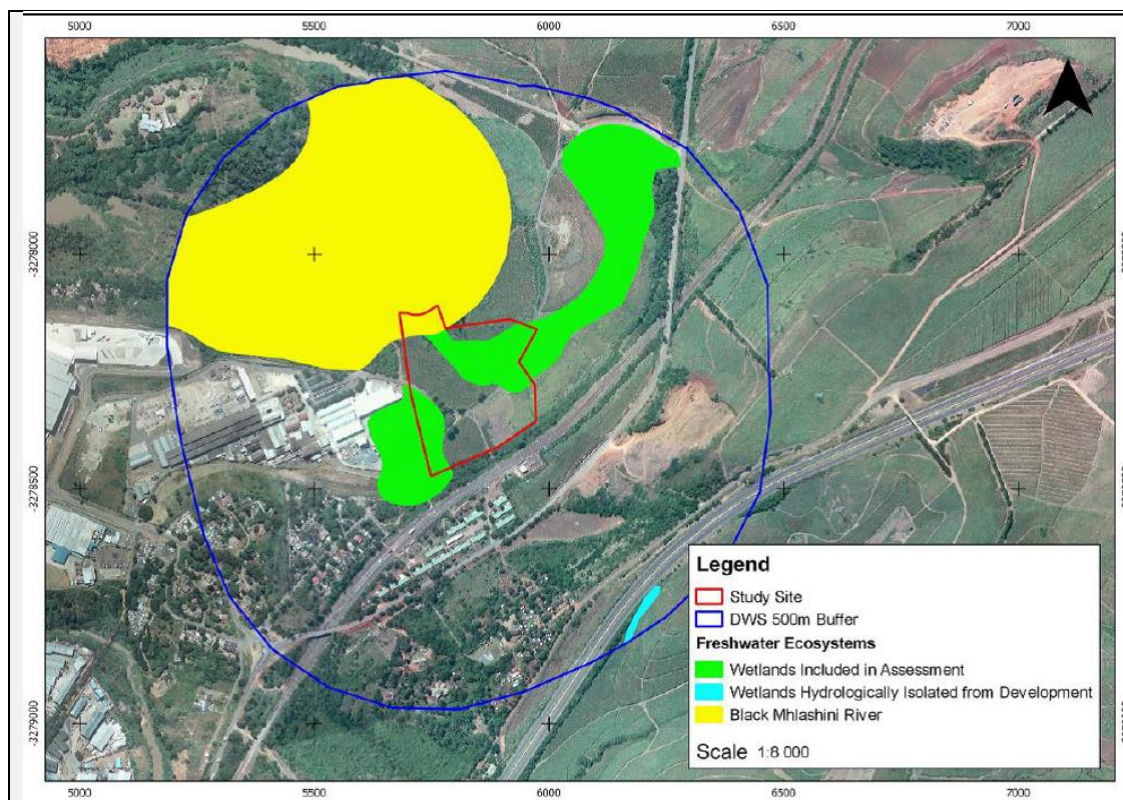


Figure 12: Overview of freshwater systems within the site proximity

Wetland Delineation

The delineation of the wetland within the Canelands Extension site was undertaken by GroundTruth in 2012 in accordance with the then Department of Water Affairs (DWA) guideline document (DWAF, 2005). The wetland habitat identified on-site covered an area of 2.9 ha and the systems were fed by surface and sub-surface water inputs. The site was split up into numerous sections. The northern section identified the presence of a valley-bottom wetland draining into the Black Mhlashini River and was historically influenced by an alluvial ridge adjacent to the Black Mhlashini River, but the drainage was modified for the purpose of sugarcane cultivation. The artificial drainage and sandy nature of the soils within portions of the wetlands has led to the desiccation of the system. Seasonal and permanent zones were limited to close to or within the channel, which could be attributed to the artificial drainage dominating the site.

Additional wetland habitat was identified in the south-western corner of the site and extends into ChemSpec / Dow AgroSciences. The portion within the built up areas will be lost or classified as highly transformed. Three drainage lines were identified in the southern section of the site, which capture and direct majority of the stormwater flows from the culverts in the area. Since the stormwater from the developed areas will flow into the identified systems, the runoff should be carefully managed.

A detailed WET-Health Assessment has been conducted for the wetland and can be found in the report, Appendix D3a. Based on the Present Ecological State (PES) scores for HGM Unit 2, **the approximately 3.03 ha of wetland habitat is currently considered to be equivalent to 0.96 ha of intact wetland habitat** (refer to tabular representation of scores in the full report in Appendix D3).

For the post-development scenario the wetland habitat will be considered to be equivalent to 0.93 ha. The reduction in hectare equivalents for the post-development scenario is due to the loss of 0.22 ha of the HGM unit as a result of the development. There is therefore a loss of approximately 0.03 hectare equivalents.

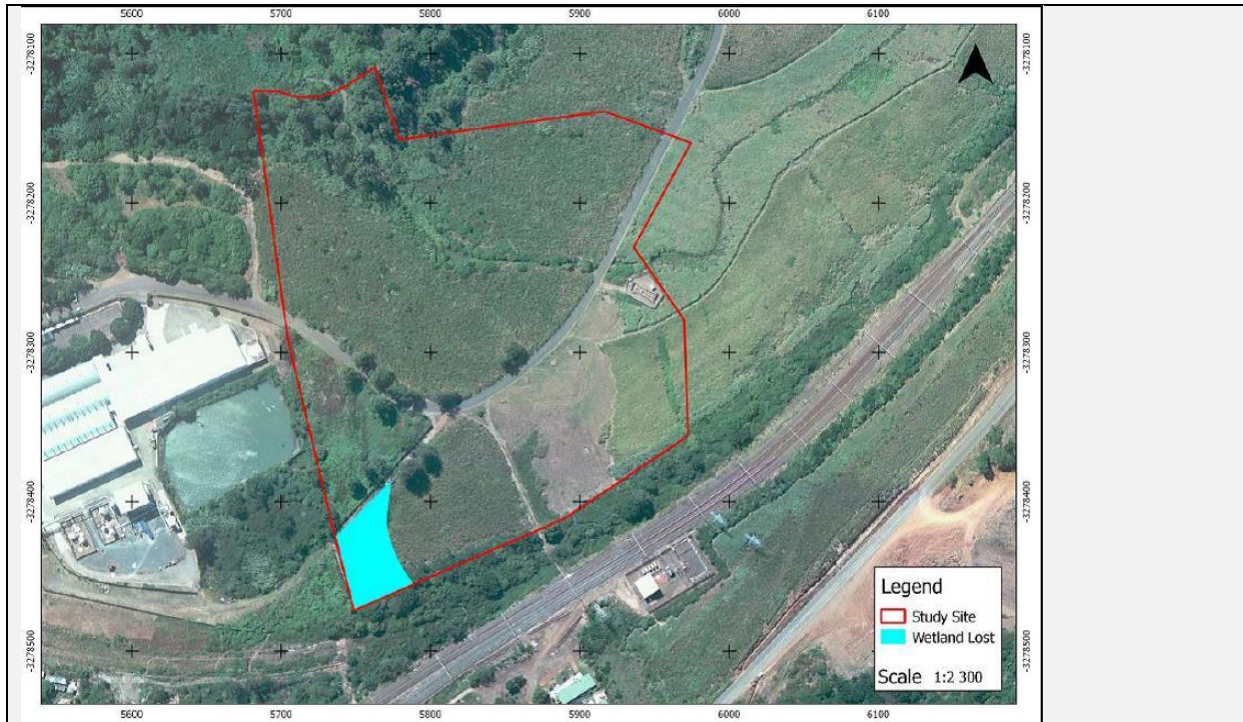


Figure 13: Overview of wetlands lost on-site

On-site Wetland Rehabilitation

Rehabilitation initiatives have been proposed for HGM Unit 1 in an attempt to improve the levels of functioning and integrity of the wetland habitat on-site (Figure 14). Due to the proximity of Duiker Road to the lower portion of HGM Unit 1, no engineered interventions have been prescribed. Furthermore, it should be noted that recommendations have not been supplied for HGM Unit 2 as the proposed development layout will encroach on the portion of the wetland habitat within the property boundary that requires rehabilitation. Some of the main wetland problems occurring within the wetland are alien invasive plants, stream bank erosion, sugarcane cultivation and the Duiker Road crossing.

The aim of the rehabilitation is to mitigate the impacts of the potential development on-site, and potentially enhance the functioning and integrity of the freshwater ecosystems within the development site; with the primary objective for securing and improving the overall functioning and integrity of the system. In order to achieve these aims and objectives the rehabilitation strategy includes earthworks, intensive revegetation and alien plant control. Although additional impacts have been identified within the wetland habitat, no engineered interventions have been proposed due to the small anticipated returns compared to the costs. Revegetation and continued alien plant control will assist in substantially improving the vegetation component of the wetland, however these initiatives will only prove to be efficient if continued management and maintenance of the alien vegetation is ensured. The proposed rehabilitation activities have been illustrated in the figure below.

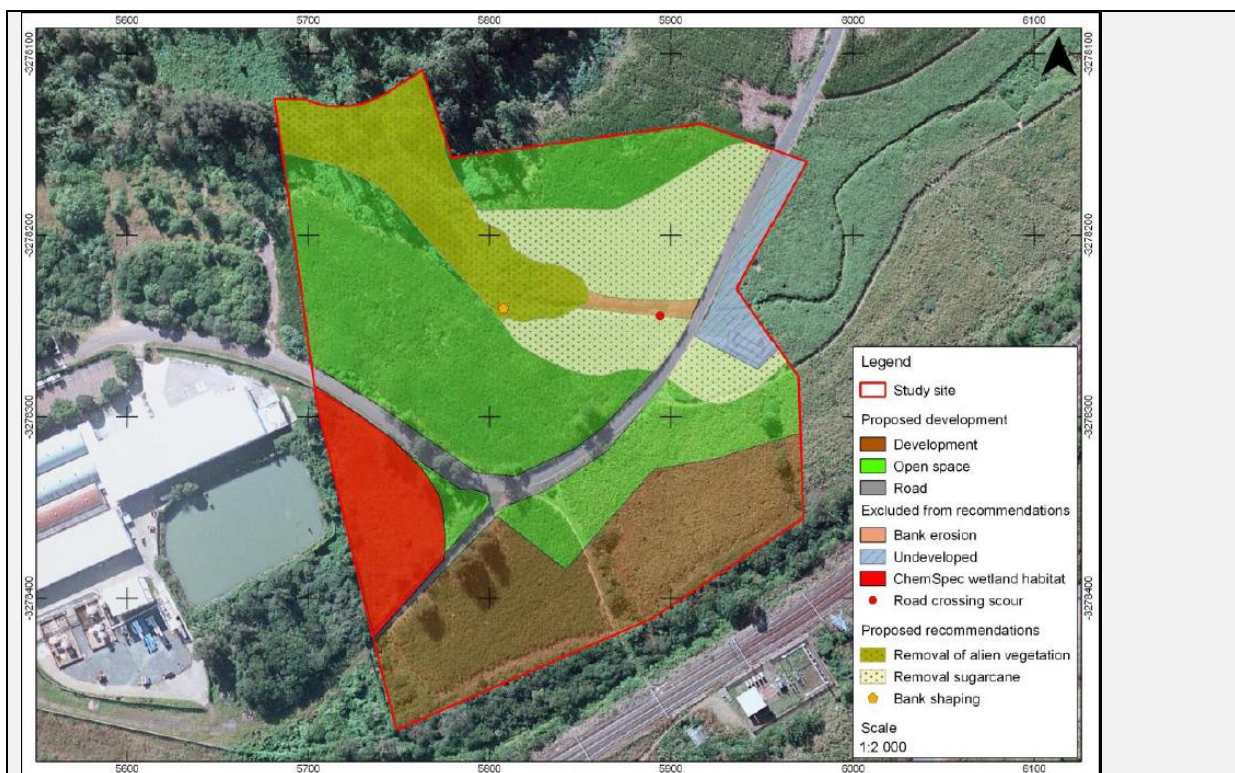


Figure 14: Proposed development layout and rehabilitation activities

Although opportunities for wetland rehabilitation are limited within the development site, the removal of alien vegetation within HGM Unit 1 and re-vegetation with appropriate indigenous riparian vegetation marginally improves the integrity of this system. It is assumed that no rehabilitation measures can be implemented within the remaining portions of HGM Unit 2, therefore, the integrity of the system is expected to decrease in the post-development landscape. However, **the gain of 0.17 hectare equivalents for HGM Unit 1 and the loss of 0.03 hectare equivalents for HGM Unit 2 equates to an overall gain of 0.14 hectare equivalents for the entire site.**

Wetland Functionality

A modified WET-EcoServices approach (Macfarlane and Edwards, 2015 – as per the Climate Resilience Plan) was used to calculate 'functional equivalents' of key ecosystem services to quantify the level of functioning of the wetland systems, and to highlight their relative importance in providing ecosystem benefits and services at a landscape level. The approach aims to account for both current and future opportunities lost based on a 'reasonably attainable' rehabilitated state of the wetlands, and to incentivise the rehabilitation, management and protection of high value wetland areas for offsetting the residual impacts (Macfarlane, 2015). The functional equivalents methodology divides the ecosystem services into three (3) categories:

- Regulating and supporting services;
- Provisioning services; and
- Cultural services.

The ecosystem services were evaluated in terms of supply and demand. The supply score was based on the potential and effectiveness of a specific wetland at providing an ecosystem service (Macfarlane and Edwards, 2015). **In the 'reasonably attainable' rehabilitated state the potential would remain the same as the current state but the effectiveness is anticipated to increase based on the implementation of effective rehabilitation measures.** The demand is based on the value of a service provided by a wetland to society (Macfarlane and Edwards, 2015).

According to the (then) DWA (2013) Manual for Rapid Ecological Reserve Determination of Inland Wetlands (Version 2.0), the wetland systems within the Canelands Extension study site was calculated to be within the C category for the current scenario. In this instance, the Ecological Importance and Sensitivity (EIS) category for each HGM unit is derived from the hydro-functional importance score, i.e.

the highest of three scores is used to determine the overall ecological importance and sensitivity category of the wetland. The hydro-functional importance is strongly linked to the fact that the systems' opportunity to perform water quality enhancement is high, due to adjacent land use practices.

It is anticipated that in the post-development landscape setting, each of the wetland systems within the development site would remain within the same EIS categories, as a result of the rehabilitation associated with the proposed development. The hydro-functional importance is strongly linked to the fact that the systems will receive runoff from the industrial development areas and improved water retention and distribution patterns as a result of the rehabilitation.

As described, the losses associated with the development have been derived using changes in functional equivalents based on a scenario where wetlands on-site are in a 'reasonably attainable' rehabilitated state. The envisaged rehabilitation of the wetland areas retained within the post-development landscape to enhance the functioning of these systems and improve the overall integrity of the systems is described in the full report in Appendix D3. Based on the supplied development layout, approximately 0.24 ha of wetland area will be lost as a result of the proposed development. Assessments of the functioning of these directly impacted wetlands were undertaken using the approach defined by Macfarlane and Edwards (2015).

The graphic representation of the wetland on-site, clearly illustrates that the wetland habitat in the reasonably attainable rehabilitated state will equate to approximately 0.36 functional equivalents. Based on the development impact on 0.24 ha, the wetland habitat is considered to decrease in functioning by approximately 0.12 functional equivalents to 0.24 functional equivalents. This loss would be addressed through the functional and ecosystem conservation offset targets of 0.09 functional equivalents and 0.09 habitat hectare equivalents, respectively.

In this particular instance, the losses based on the functional equivalents approach may be considered non-significant, and while these values could be included in offset receiving area calculations (refer to Edwards *et al.* 2015), it may be deemed a largely academic undertaking. In this instance it may be more beneficial for the protection and management of the on-site freshwater ecosystems to incorporate sustainable urban drainage systems (Barr Engineering Company, 2001) into the stormwater management planning such as infiltration trenches and oil/grit separators, thereby promoting stormwater management measures that serve to contribute towards water quality enhancement within the landscape.

Surface Water

The Aquatic Assessment (GroundTruth) conducted in December 2015 provided a South African Scoring System (SASS5) Assessment. The results thereof can be found in Appendix D3b of this BAR. It is not discussed in detail herein but in the Water Use licence Application. For the purposes of this BAR, the physico-chemical results are provided.

The physico-chemical water quality was compared to the Department of Water and Sanitation (DWS) water quality guidelines for aquatic ecosystems – target water quality ranges (TWQR) (DWAf, 1996). The comparisons of the downstream results with the upstream results indicate very little variation due to changes associated with the Canelands Extension site, as shown in Table 4. Furthermore the determinants analysed were within acceptable levels according to the DWS TWQR, with the exception of dissolved oxygen at the downstream site. Dissolved oxygen however, naturally fluctuates throughout the day and longer term monitoring would therefore be required to determine a baseline level for dissolved oxygen at the site.

Table 4: Upstream and downstream physico-chemical results of the Canelands site surface water

Determinant	Units	Upstream	Downstream
Conductivity	mS/m	42.1	40.8
Dissolved Oxygen	mg O ₂ /L (% saturation)	6.51 (81%)	3.90 (46%)
pH	pH units	7.06	6.98
Temperature	°C	26.3	23.8
Clarity	cm	72	88

Biological Results

Biological results are tabulated per site below and colour coded to represent the ecological category of each assessment.



View of the sample site			View downstream of the sample site		
					
Date	Index of Habitat Integrity		Diatoms		Status
	Instream	Riparian	SPI	%PTV	
9/12/2015	89	88	13.6	61	Good

Figure 15: Mdloti River upstream**Present Health Status**

The Mdloti upstream of Canelands Extension was assessed below the impacts from the Hazelmere water treatment plant. Due to habitat limitations SASS5 macro invertebrate assessments were not included at this site. The biological health was determined using diatoms.

The diatom results indicate that the biological water quality was in a good condition at the time of the assessment. The percentage Pollution Tolerant Values (%PTV) indicated that there is organic pollution impacting the system.

The Instream and riparian habitat (IHI) assessments showed the integrity of both the instream and riparian habitats to be good. The main impacts at the site were related to construction/sand mining activities immediately upstream of the site and alien vegetation.



View upstream of sample site			View downstream of sample site				
							
Date	Index of Habitat Integrity		Macro-invertebrates		Diatoms		Status
	Instream	Riparian	SASS Score	ASPT	SPI	%PTV	
9/12/2015	93	89	106	5	16.2	52	Good

Figure 16: Mdloti River downstream

The site was located downstream of Canelands Extension but upstream of the sand mining concession. The SASS5 assessment indicated the biological water quality was in a fair condition; however, habitat was limited at the site which in turn negatively impacted the SASS5 score. Diatoms which are not habitat dependent possibly provide a better indication of the condition of the site. The diatoms showed the site to be in a good condition with the score improving compared to the upstream site: this would suggest a lack of additional impacts emanating from the Canelands Extension property. The instream habitat integrity was near to natural with only minor impacts at the site. The riparian habitat was in a good condition, with alien plants being the main impact.

Natural veld good condition ^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation ^E X	Veld dominated by alien species ^E	Gardens
Sport field	Cultivated land X	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "E" is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

GroundTruth as a specialist has been consulted for such expertise.

5. LAND USE CHARACTER OF SURROUNDING AREA

Cross the land uses and/or prominent features that currently occur within a 500 m radius of the site and give a description of how this influences the application or may be impacted upon by the application:

Land use character			Description
Natural area	YES X	NO	Some of the surrounding land can be classified as natural as it is undeveloped. No impact is envisaged for such areas.
Low density residential	YES	NO	
Medium density residential	YES X	NO	The Verulam and Canelands residential area is around the site, impacts to these residential areas will be both positive and negative in nature. Refer to Section E: Impact Assessment for detailed impact assessment in this regard.
High density residential	YES	NO	
Informal residential	YES X	NO	The Verulam and Canelands informal residential area is around the site, impacts to these residential areas will be both positive and negative in nature. Refer to Section E: Impact Assessment for detailed impact assessment in this regard.
Retail commercial & warehousing	YES X	NO	The site is surrounded by logistics and industrial type developments and is hence an extension of this type of developments. No impact is expected to these developments, only cumulative impacts are considered in Section E.
Light industrial	YES X	NO	The site is surrounded by logistics and industrial type developments and is hence an extension of this type of developments. No impact is expected to these developments, only cumulative impacts are considered in Section E.
Medium industrial	YES X	NO	The site is surrounded by logistics and industrial type developments and is hence an extension of this type of developments. No impact is expected to these developments, only cumulative impacts are considered in Section E.
Heavy industrial	YES X	NO	The site is surrounded by logistics and industrial type developments and is hence an extension of this type of developments. No impact is expected to these developments, only cumulative impacts are considered in Section E.
Power station	YES	NO	
Office / consulting room	YES X	NO	The site is surrounded by logistics and industrial type developments and is hence an extension of this type of developments. No impact is expected to these developments, only cumulative impacts are considered in Section E.
Military or police base / station / compound	YES	NO	
Spoil heap or slimes dam	YES	NO	
Quarry, sand or borrow pit	YES	NO	
Dam or reservoir	YES	NO	
Hospital/medical centre	YES	NO	

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School/ crèche	YES	NO	
Tertiary education facility	YES	NO	
Church	YES	NO	
Old age home	YES	NO	
Sewage treatment plant	YES	NO	
Train station or shunting yard	YES	NO	
Railway line	YES X	NO	The southern boundary of the site is marked by the property of the railways accommodating the main railway line connecting Tongaat with Verulam.. No impact is expected on this.
Major road (4 lanes or more)	YES	NO	
Airport	YES	NO	
Harbour	YES	NO	
Sport facilities	YES	NO	
Golf course	YES	NO	
Polo fields	YES	NO	
Filling station	YES	NO	
Landfill or waste treatment site	YES	NO	
Plantation	YES X	NO	Sugarcane is on-site. There is no impact expected.
Agriculture	YES	NO	
River, stream or wetland	YES X	NO	The Umdloti River is on-site, as well as wetlands. Impacts to these systems are addressed in Section E: Impact Assessment, of this report.
Nature conservation area	YES	NO	
Mountain, hill or ridge	YES	NO	
Museum	YES	NO	
Historical building	YES	NO	
Protected Area	YES	NO	
Graveyard	YES	NO	
Archaeological site	YES	NO	
Other land uses (describe)	YES	NO	

6. CULTURAL/ HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or within 20 m of the site?

YES

NO X

If YES, contact a specialist recommended by AMAFA to conduct a heritage impact assessment. The heritage impact assessment must be attached as an appendix to this report.

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Briefly explain the recommendations of the specialist:

A specialist was commissioned. No aspects of cultural heritage were identified and hence no recommendations offered. Nonetheless, the following is provided in the detailed report which can be found in Appendix D4 and included in the EMPr attached as Appendix F to this report.

In the event that such indicator(s) of heritage resources are identified, the following actions should be taken immediately:

- All construction within a radius of at least 20 m of the indicator should cease. This distance should be increased at the discretion of supervisory staff if heavy machinery or explosives could cause further disturbance to the suspected heritage resource.
- This area must be marked using clearly visible means, such as barrier tape, and all personnel should be informed that it is a no-go area.
- A guard should be appointed to enforce this no-go area if there is any possibility that it could be violated, whether intentionally or inadvertently, by construction staff or members of the public.
- No measures should be taken to cover up the suspected heritage resource with soil, or to collect any remains such as bone or stone.
- If a heritage practitioner has been appointed to monitor the project, s/he should be contacted and a site inspection arranged as soon as possible.
- If no heritage practitioner has been appointed to monitor the project, the head of archaeology at Amafa's Pietermaritzburg office should be contacted; telephone 033 3946 543).
- The South African Police Services (SAPS) should be notified by an Amafa staff member or an independent heritage practitioner if human remains are identified. No SAPS official may disturb or exhume such remains, whether of recent origin or not.
- All parties concerned should respect the potentially sensitive and confidential nature of the heritage resources, particularly human remains, and refrain from making public statements until a mutually agreed time.

Any extension of the project beyond its current footprint involving vegetation and/or earth clearance should be subject to prior assessment by a qualified heritage practitioner, taking into account all information gathered during this initial heritage impact assessment.

Will any building or structure older than 60 years be affected in any way?

YES

NO X

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

YES

NO X

If YES, please submit the necessary application to AMAFA and attach proof thereof to this report.

Major Hazardous Installation Risk Assessment (MHI RA)

A SASOL Gas Pipeline transports SASOL gas which is a mixture of methane (88.6% by volume) at pressure (59 Bar) through the project site. The gas pipeline was originally laid in 1969 for transport of oil. In 1995 the pipeline was converted to a gas pipeline. The gas is supplied by SASOL from Secunda. Refer to Appendix C for the map delineating the pipeline.

SASOL has a number of preventative actions and/or measures to reduce potential incidents which are discussed herein. A release could result in:

- toxic gas release. This could cause asphyxiation due to reduction of Oxygen in atmosphere;
- gas fire – jet fire
- explosion - vapour cloud explosion (VCE)

South Africa unlike many other countries does not have legislation which states what risk levels are acceptable (tolerable). The current MHI Regulations do not specifically include pipelines, but the General Regulations list chemicals and volumes which determine that they are a compulsory MHI. Methane is listed and a volume of 15 tons is prescribed. The volume in the pipeline on this site is less

than this amount under normal operating conditions. Therefore this pipeline is not an automatic MHI. This risk assessment evaluated the worst case scenario and alternative case scenarios. These could identify the risk should a leak occur, and where this risk could occur. This site is at present agricultural land and no buildings or persons live on this land.

The MHI Regulations framed under the Occupational Health and Safety Act 1993 (Act No. 85 of 1993) requires management to identify if their processes or activities can constitute or cause a major hazardous incident. If it can, then a risk assessment must be performed to determine the possible consequences so that appropriate preventive measures can be implemented.

The hazard

Methane gas can present a serious health risk, environmental and/or fire if unprotected exposure occurs. The primary hazard is the release of a toxic gas cloud into the outside atmosphere. Methane acts a simple asphyxiant when inhaled. Its presence in air displaces the air, which lowers the partial pressure of Oxygen and cause hypoxia in those who breathe it in.

Analysis

The worst case analysis for the Methane release was performed. Methane releases can present one of the following:

- a toxic risk, or
- fire risk

The requirements for MHI RA's are that, a worst case scenario must be determined. All controls and systems used and designed to prevent or mitigate against such a release can be considered if these fall into the active control category. All passive controls can be noted but cannot be used to mitigate the risk. The toxic endpoint for the release of all methane gas was determined. This identified that the worst case consequence varies according to the different models and how the loss occurs.

Three types of worst case scenarios are identifiable:

- toxic;
- flammable and/or (vapour cloud); and
- explosive risk.

The toxic risk was identified as the primary risk.

Consequence analysis

To assess the potential risk, the existing pipeline with its existing mitigation measures was assessed. The potential worst case and other releases were determined. The worst case consequence for a variety of users was considered and their suitability.

Major Incidents

No previous spillages or releases of Methane from this pipe have occurred in this area. A significant release of Methane gas would result in a toxic vapour cloud being generated and released. This could be flammable and could ignite. This cloud, depending on wind direction, could affect all those employees on-site if unprotected, and under worse case conditions would spread for a distance of at least 190 m. This was without mitigation measures.

Consequence

To perform the risk assessment data relating to pipelines, failure rates, terrain, meteorological data, proposed developments and the surrounding activities including those potentially at risk were considered.

Risk determination

Identification of risk (threat)

For process industries, the initial incident usually involves a loss of containment of some sort - a leak (pipe, flange) or tank leak. For pipelines a release of gas (loss of containment) can also occur. A variable number of potential failure modes can arise. The failure modes of the hazard are categorized,

and all contributing components are identified.

Research has identified that most pipeline releases do not ignite. Without ignition the toxic risk is reduced and for more releases it primarily effects the immediate surroundings – kills plants/vegetation and could affect someone in that area.

Most of the consequences arise when and if the gas ignites. It was identified that the ignition risk from a gas leak is 4.5%. Ignition depends on the existence of random ignition sources. A hole in the pipeline had the low risk of ignition 2% whilst a rupture (worst case) had a higher ignition potential (13%). Ignition by lightning was identified to be a cause of more than 50% of the gas releases recorded.

Risk summary

Exposure to Methane can present a significant health hazard. This assessment identified that the release of Methane, from the SASOL gas pipeline would present a health risk for all persons within a 190 m radius from the release point under worst case conditions without mitigation measures. Due to the terrain and climatic conditions, the area of effect could be larger than that calculated. The Risk Assessment identified the following:

- The greatest risk would be a gas release which ignites. This would be a worst case release. This release would be rare and in general is low in probability. The developer has encased the pipeline. This has reduced the risk to very low and contained at the pipeline.
- The release of Methane from a leak could affect an area of 190 m around the source. The implementation of the enclosure has reduced this area to the area of the pipeline.
- SASOL are responsible for any maintenance.

This mitigation measure is considered to be the best method of preventing pipelines presenting a significant risk. The mitigation measures implemented identify that the site should be declared an MHI and that once the decision as to the type of development has occurred its suitability needs to be determined.

Further potential impacts or risks are assessed in Section E of this BAR.

Conclusion

The SASOL gas pipeline was designed according to specifications at the time and this would have been adequate at that time. The pipeline is operated and maintained according to recognised and prescribed procedures. SASOL employees are trained and there is reasonable supervision, control and auditing. The end-user must liaise with SASOL and determine or accept mitigation measures to limit the risk to the general public.

The SASOL MHI

An MHI RA was conducted by SASOL when the gas pipeline was initially laid. This MHI RA classifies the pipeline as an MHI. Sasol Gas has been supplying methane rich gas to KwaZulu-Natal (KZN) for many years. The methane rich gas is transported from Secunda to Durban South via a combination of Transnet and Sasol Gas pipelines. The Transnet line is an old liquid fuels pipeline that became redundant and available for fuel gas transmission to KZN. The areas supplied are Newcastle, Richards Bay and eThekweni districts. Transnet Pipelines owns the main 18 inch pipeline and Sasol Gas the laterals pipelines to the various customers.

Sasol Gas has declared the gas lines as an MHI and in accordance with the MHI Regulations has to perform a revalidation assessment of the various pipelines to assure the safety integrity of the pipelines. Transnet owns, operates and maintains the main transmission line and is responsible for the safety of the public influenced by the line.

Hazards identified

The risk associated with the pipeline, in terms of the safety of people, damage to the environment, and loss of income, depends on the expected failure frequency and the related consequences, which are directly related to the type of fluids transported and the sensitivity of population areas near the pipeline. In this context, pipeline failures are defined as loss of containment.

The potential pipeline failures, causes and their consequences should be taken into account in the design and the operating philosophy. The most common pipeline threats which may lead to the loss of technical integrity are given below:

- Internal corrosion and hydrogen induced cracking (HIC);
- Internal erosion;
- External corrosion and bi-carbonate stress corrosion cracking;
- Mechanical impact, external interference;
- Fatigue;
- Hydrodynamic forces;
- Geo-technical forces;
- Growth of material defects;
- Over pressurisation; and
- Thermal expansion forces.

The failure modes that should be assessed include leaks of various sizes (punctures) and line breaks (ruptures). A key parameter in setting the boundary between a leak of a stable size and a rupture is the critical defect length.

Consequences of a release of fuel gas from the pipeline would either be a fire ball if a large gas cloud is formed and ignited immediately, a flash fire if the cloud drifts downwind in the open air and finds a delayed source of ignition, an explosion if a drifting gas cloud enters confined or semi-confined structures and finds a source of ignition, or a jet fire if delayed ignition occurs, typically 30+ seconds after the release has started. For natural gas releases, the jet fire effects are dwarfed by the initial effects of a fireball, so to avoid double counting, the fireball effects were considered on its own.

SECTION D: PUBLIC PARTICIPATION

Refer to Appendix E1 for a summary of the Public Participation Process (PPP) undertaken.

As this application was lodged in June 2012, given the time lapse, the PPP was undertaken in August 2012 and then repeated in July 2015 as requested by the EDTEA. Therefore, Background Information Documents (BIDs) were circulated in August 2012 and then in July 2015 again.

Site Notices were erected in August 2012 and July 2015. All registered Interested and Affected Parties (I&APs) were contacted *via* email and informed of the resumption of the project in July 2015.

1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

- (a) fixing a notice board (of a size at least 60 cm by 42 cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- (b) giving written notice to—
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the local and district municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity (as identified in the application form for the environmental authorization of this project); and
 - (vii) any other party as required by the competent authority;
- (c) placing an advertisement in—
 - (i) one local newspaper; or
 - (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
- (e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
 - (i) illiteracy;
 - (ii) disability; or
 - (iii) any other disadvantage.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

- (a) indicate the details of the application which is subjected to public participation; and
- (b) state—
 - (i) that an application for environmental authorization has been submitted to the KZN Department of Economic Development, Tourism & Environmental Affairs in terms of the EIA Regulations, 2010;(ii)
 - (iii) a brief project description that includes the nature and location of the activity to which the application relates;
 - (iv) where further information on the application can be obtained; and
 - (iv) the manner in which and the person to whom representations in respect of the application may be made.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

4. DETERMINATION OF APPROPRIATE PROCESS

The EAP must ensure that the public participation process is according to that prescribed in regulation 54 of the EIA Regulations, 2010, but may deviate from the requirements of sub regulation 54(2) in the manner agreed by the KZN Department of Economic Development, Tourism & Environmental Affairs as appropriate for this application. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate.

Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before this application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations (regulation 57 in the EIA Regulations, 2010) and be attached as Appendix E to this report.

6. PARTICIPATION BY DISTRICT, LOCAL AND TRADITIONAL AUTHORITIES

District, local and traditional authorities (where applicable) are all key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of this application and provided with an opportunity to comment.

Has any comment been received from the district municipality?

YES X

NO

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

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The project falls within the eThekweni Metropolitan. Comment has been received in response to the Background Information Document (BID) as follows:

1. *Ethekwini Electricity Department*
No objections. Ethekwini Municipality must be contacted with regards to underground electrical services.
Electrical services will be at the cost of the Applicant.
2. *Environmental Planning and Climate Protection Department*
No detailed comment at this stage, until the draft Basic Assessment Report (dBAR) is available. However, a detailed wetland and riparian habitat assessment is supported.
3. *Land Use Management Branch*
No objections subject to full compliance with the provision of the North Scheme.
4. *Framework Planning Branch*
The proposed development is planned for an area identified for future industrial development in terms of the Spatial Development Framework (SDF, 2015-2016); therefore there are no objections to the proposed development.
5. *Economic Development Unit*
No objections.
6. *Parks, Leisure and Cemeteries*
No comment.
7. *Environmental Health Department*
Development in Canelands must be carefully planned and actioned to prevent knock-on / domino effect impacts in combination with Dow Agrosience (which is a Major Hazardous Installation [MHI]).
Further comment will be provided on the dBAR.
8. *Ethekwini Transport Authority*
No comment.
9. *Geotechnical Engineering Branch*
No objections in principle. A geotechnical investigation will be required to guide the development due to the potentially highly variable riverine sediments underlying the site.
10. *Coastal Stormwater and Catchment Management*
No comment.
11. *Ethekwini Water and Sanitation*
This department has a 200 mm and 375 mm trunk sewer traversing the property. Further, please note:
 - (a) Building plans clearly showing the site drainage plan must be submitted to this department for approval;
 - (b) The bunding and drainage on the premises must conform to national building regulations and to the relevant SABS regulations;
 - (c) A spill management plan needs to be developed for the construction and operational phases;
 - (d) Refuse bin storage areas are to comply with Health Bylaws and national building regulations;
 - (e) Potential impacts to the receiving water must be outlined and precautionary measures

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	should be taken to prevent any effects to the water quality.
12.	<i>Durban Solid Waste</i> Methods for waste management and recycling must be provided.
13.	<i>Disaster Management</i> No comment.
14.	<i>Fire Safety</i> No objections provided the building plans are submitted for approval and no building is to be within the recommended safety distance to the methane gas pipeline and any other MHI in the vicinity as determined by an approved risk assessment.

Has any comment been received from the local municipality?

YES

NO

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

As above. The eThekwinini is a Metropolitan.

Has any comment been received from a traditional authority?

YES

NO X

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7. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

YES X

NO

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

1. KwaZulu-Natal Department of Transport (KZN DoT)

No objections in principle to the proposed layout. The following conditions must be adhered to the proposed development:

- (a) In terms of section 13 of the Kwazulu-Natal Provincial Roads Act No. 4 of 2001, no buildings or any structures whatsoever, other than a fence, hedge or a wall which does not rise higher than 2.1 m above or below the surface of the land on which it stands, shall be erected on the land within a distance of 15 m measured from the road reserve boundary of District Road 499.
- (b) The road reserve boundary shall be determined in consultation with this Departments Road Information Services, (Tel: 033-355 8600).
- (c) The applicant's attention is drawn to the relevant stormwater clause contained in section 12 of the Kwazulu-Natal Provincial Roads Act No. 4 of 2001 and section 5 of the Roads Regulations, wherein it is advised that the disposal of stormwater emanating from the road reserve through the layout, or any stormwater emanating from the layout through the road reserve, shall be undertaken in consultation with and to the satisfaction of this Departments Cost Centre Manager, Metro (Telephone: 031-4698900) during the development of the property concerned.
- (d) Subject to the Municipal approval of the application, authority is hereby granted in terms of section 10 of the Provincial Roads Act No. 4 of 2001, for the use of the existing access point from District Road 499. However, due to the proposed Industrial Estate being used for Industrial purposes, this Department would require a Traffic Assessment to determine the standard of access.
- (e) Upon finalization of the proposed layout for the development, prior to any development commencing, a detailed to scale site development plan adhering to the abovementioned conditions is to be submitted to this office for assessment and comments.
- (f) Accordingly, upon receipt of a detailed to-scale site development plan and TIA, this Department will comment further.
- (g) All costs incurred, as a result of these requirements shall be borne entirely by the developer.
- (h) This correspondence does not grant authorization or exemption from compliance with any other relevant and applicable legislation.

2. SASOL

A wayleave application and site visit was advised following the identification of a SASOL pipeline which traverses the property. SASOL stated that SASOL gas may be affected by trenching.

An MHI Risk Assessment (MHIRA) previously undertaken for SASOL MHI pipelines in eThekwinini was provided for use in this BAR.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

Note: Amendments / changes as per the 2014 regulations and the attached schedules were considered and input into the document at hand for completeness.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

None. Comment may be received to the dBAR

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached as Appendix E to this report):

A Comments and Response is attached as Appendix E6. At this stage this is limited to comments received from the Metropolitan, KZN DoT and SASOL (local authority and stakeholders) and responses to these.

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Methodology

Impact Mitigation and the hierarchy

Mitigation requires proactive planning which is enabled by following the mitigation hierarchy in Figure 17, below. Examples of mitigation can include changes to the scale, design, location, siting, process, sequencing, phasing, and management and/or monitoring of the proposed development activities, as well as the restoration or rehabilitation of disturbed sites. Where environmental impacts can be severe, the guiding principle should be “anticipate and prevent” in nature rather than “assess and repair”. A stepped approach should therefore be followed in trying to minimise development impacts which include:

1. Firstly, attempting to avoid/prevent impacts through project design and location;
2. Secondly, employing mitigation aimed at minimising the magnitude/significance of impacts where these are unavoidable; and
3. Lastly, compensating for any remaining/residual impacts through on-site rehabilitation or through the application of offsets where deemed relevant.

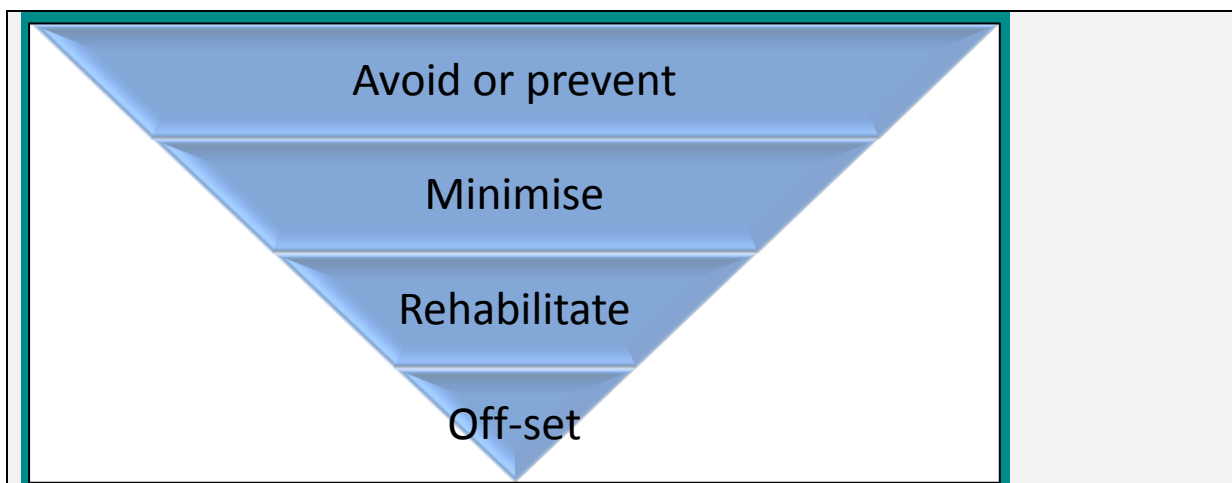


Figure 17: The mitigation hierarchy (DEA, 2013)

Avoid or prevent refers to considering options in project location, siting, scale, layout, technology and phasing to avoid impacts on biodiversity, associated ecosystem services, and people. This is the best option, but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts mining should not take place. In such cases it is unlikely to be possible or appropriate to rely on the latter steps in the mitigation. In this scenario alternatives can be assessed to avoid and prevent impacts, either *via* location, design or layout alternatives and has been applied in this project by assessing layout alternatives.

Minimising refers to considering alternatives in the project location, siting, scale, layout, technology and phasing that would minimise impacts on biodiversity and ecosystem services. In cases where there are environmental and social constraints every effort should be made to minimise impacts.

Rehabilitation in the mitigation hierarchy refers to rehabilitation of areas where impacts are unavoidable and measures are provided to return impacted areas to near natural state or an agreed land use after mine closure. However, rehabilitation may fall short of replicating the diversity and complexity of the original and natural system.

Off-setting refers to measures over and above rehabilitation to compensate for the residual negative effects on biodiversity, after every effort has been made to minimise and then rehabilitate impacts. Biodiversity offsets can provide a mechanism to compensate for significant residual impacts on biodiversity.

Mitigation measures specific to the impacts identified and discussed below are provided and are intended to augment standard/generic mitigation measures included in the construction Environmental Management Programme (EMPr).

Impact Assessment Methodology

The potential environmental impacts associated with the project are evaluated according nature, extent, duration, intensity, probability and significance of the impacts, whereby:

Impact Ratings

The following parameters are used to describe the impact / issues in this assessment:

1. Nature

This is a brief written statement of the environmental aspect being impacted upon by a particular action or activity.

2. Extent (E)

Extent refers to the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact.

- Site (1) – Within the construction-site.
- Local (2) – Within a radius of 2 km of the construction-site.

- Regional (3) – the scale applies to impacts on a provincial level and parts of neighbouring provinces.
- National (4) – the scale applies to impacts that will affect the whole South Africa.

3. Duration (D)

Duration indicates what the lifetime of the impact will be.

- Short-term (1) – less than 5 years.
- Medium-term (2) – between 5 and 15 years.
- Long-term (3) – between 15 and 30 years.
- Permanent (4) – over 30 years and resulting in a permanent and lasting change that will always be there.

4. Intensity (I)

Intensity describes whether an impact is destructive or benign.

- Very High (4) – Natural, cultural and social functions and processes are altered to extent that they permanently cease.
- High (3) – Natural, cultural and social functions and processes are altered to extent that they temporarily cease.
- Moderate (2) – Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way.
- Low (1) – Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected.

5. Probability (P)

Probability describes the likelihood of an impact actually occurring.

- Improbable (1) – Likelihood of the impact materialising is very low.
- Possible (2) – The impact may occur.
- Highly Probable (3) – Most likely that the impact will occur.
- Definite (4) – Impact will certainly occur.

6. Cumulative (C)

In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

7. Significance (S)

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Refer below and to Table 5 for an explanation of the risk assessment methodology.

Table 5: Significance Rating of Classified Impacts

Score	Elaboration
- 13–16 points	NEGATIVE VERY HIGH Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a “very high impact” is likely to be a fatal flaw.
- 10–12 points	NEGATIVE HIGH These are impacts which individually or combined pose a significantly high negative risk to the environment. These impacts pose a high risk to the quality of the receiving environment. The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
- 7–9 points	NEGATIVE MODERATE These are impacts which individually or combined pose a moderate negative risk to the quality of health of the receiving environment. These systems would not generally require immediate action but the deficiencies should be rectified to avoid future problems and associated cost to rectify

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		once in HIGH risk. Aesthetically and/or physically non-compliance can be expected over a medium term. In this case the impact is medium term, moderate in extent, mildly intense in its effect and probable. Mitigation is possible with additional design and construction inputs.
- 4-6 points	NEGATIVE LOW	These are impacts which individually or combined pose a deleterious or adverse impact and low negative risk to the quality of the receiving environment, and may lead to potential health, safety and environmental concerns. Aesthetically and/or physical non-compliance can be expected for short periods. In this case the impact is short term, local in extent, not intense in its effect and may not be likely to occur. A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.
0	NEUTRAL	Impact is neither beneficial nor adverse. These are impacts which cannot be classified as either positive or negative or classified and null and void in the case of a negative impact being adequately mitigated to a state where it no longer renders a risk.
+ 4-6 points	POSITIVE LOW	These are impacts which individually or combined pose a low positive impact to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is short term, local in extent, not intense in its effect and may not be likely to occur. A low impact has no permanent impact of significance.
+ 7-9 points	POSITIVE MODERATE	These are impacts which individually or combined pose a moderate positive effect to the quality of health of the receiving environment. In this case the impact is medium term, moderate in extent, mildly intense in its effect and probable.
+ 10-12 points	POSITIVE HIGH	These are impacts which individually or combined pose a significantly high positive impact on the environment. These impacts pose a high benefit to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is longer term, greater in extent, intense in its effect and highly likely to occur. The effects of the impact may affect the broader environment.
+ 13-16 points	POSITIVE VERY HIGH	These are permanent and important beneficial impacts which may arise. Individually or combined, these pose a significantly high positive impact on the environment. These impacts pose a very high benefit to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is long term, greater in extent, intense in its effect and highly likely or definite to occur. The effects of the impact may affect the broader environment.

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact as depicted in Table 5.

The suitability and feasibility of all proposed mitigation measures will be included in the assessment of significant impacts. This will be achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented. Mitigation measures identified as necessary will be included in an EMPr. The EMPr forms part of this EIA Report, please refer to Appendix F.

Rating of Potential Impacts

The potential impacts identified are explained per phase of the project and mitigation measures are provided. The impacts are explained per pre-construction (planning), construction and operational phases.

Note that due to the nature of the development type, there is no decommissioning phase for this project. Note that rehabilitation post maintenance activities in the future are included in the EMPr, but are not defined as being 'decommissioning'.

1.1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the planning and design phase:

Not applicable – No site alternatives assessed

b. Process, technology, layout or other alternatives

List the impacts associated with any process, technology, layout or other alternatives that are likely to occur during the planning and design phase (please list impacts associated with each alternative separately):

Layout Alternatives

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
Phase: Planning and Design – Layout Alternatives									
Sub-phase: Direct Impacts									
1	Inadequate or incompetent Planning and Design for infrastructure	1	Without	-2	-2	-2	-2	-8	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-3	-3	-3	-11	Negative high
			With	-1	-3	-3	-2	-9	Negative Moderate
	Mitigation: (a) Ensure best practicable solutions of design which is best suited to the study area and receiving environment which will then result in the provision of infrastructure for the use of people in the surrounding communities. (b) Consideration must still be given to design which will minimise the need for maintenance and costs associated with that. (c) Ensure correct, peer and supervisor reviewed designs are developed. Furthermore, it is paramount that the findings of this BAR and the associated specialist studies are incorporated into the design to avoid sensitive areas.								
	Consideration for national, provincial and local plans in the planning for the development	1	Without	1	1	3	3	8	Positive moderate
			With	2	4	3	4	13	Positive very high
		2	Without	1	1	3	3	8	Positive moderate
			With	2	4	3	4	13	Positive very high
	Mitigation: All relevant plans for the area must be considered and adequate consultation with the relevant planning officials in the area.								
2	Development in sensitive habitats could lead to the diminishing of the socio-economic benefits.	1	Without	-1	-1	-3	-2	-7	Negative Moderate
			With	3	3	2	3	11	Positive high
		2	Without	-1	-1	-3	-2	-7	Negative Moderate
			With	3	3	2	3	11	Positive high
	Enhancement: All measures and considerations for the design must consider the triple bottom line and ensure optimisation of social, economic, environmental and practical benefits. This development is in line with the regional (provincial) and national development plans and therefore caters to the type of development required and encouraged in the area.								
	Appropriate planning of exclusion of sensitive vegetation and steep areas.	1	Without	-2	-3	-2	-2	-9	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-3	-3	-3	-11	Negative high
			With	-1	-2	-3	-4	-10	Negative high
	Mitigation: (a) Ensure best practicable solutions of design which is best suited to the study area and receiving environment which will then result in the provision of infrastructure for the use of people in the surrounding communities. (b) Consideration must still be given to design which will minimise the need for maintenance and costs associated with that. (c) Ensure correct, peer and supervisor reviewed designs are developed. Furthermore, it is paramount that the findings of this BAR and the associated specialist studies are incorporated into the design to avoid sensitive areas.								
3	Appropriate planning of exclusion of sensitive vegetation and steep areas.	1	Without	-2	-3	-2	-2	-9	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-3	-3	-3	-11	Negative high
			With	-1	-2	-3	-4	-10	Negative high
	Mitigation: (a) Ensure best practicable solutions of design which is best suited to the study area and receiving environment which will then result in the provision of infrastructure for the use of people in the surrounding communities. (b) Consideration must still be given to design which will minimise the need for maintenance and costs associated with that. (c) Ensure correct, peer and supervisor reviewed designs are developed. Furthermore, it is paramount that the findings of this BAR and the associated specialist studies are incorporated into the design to avoid sensitive areas.								
	Appropriate planning of exclusion of sensitive vegetation and steep areas.	1	Without	-2	-3	-2	-2	-9	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-3	-3	-3	-11	Negative high
			With	-1	-2	-3	-4	-10	Negative high
	Mitigation: (a) Ensure best practicable solutions of design which is best suited to the study area and receiving environment which will then result in the provision of infrastructure for the use of people in the surrounding communities. (b) Consideration must still be given to design which will minimise the need for maintenance and costs associated with that. (c) Ensure correct, peer and supervisor reviewed designs are developed. Furthermore, it is paramount that the findings of this BAR and the associated specialist studies are incorporated into the design to avoid sensitive areas.								

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
5	This impact is more likely to materialise for Alternative 2 as it eliminates the open space allocation and rather develops into the sensitive habitats.								
	Possible lack of consideration of what the environment can accommodate.	1	Without	-1	-1	-3	-2	-7	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-2	-3	-3	-10	Negative high
			With	-1	-2	-2	-2	-7	Negative Moderate
Mitigation: All measures and considerations for the design must consider the triple bottom line and ensure optimisation of social, economic, environmental and practical benefits.									
Sub-phase: Indirect Impacts									
6	None	1	Without	0	0	0	0	0	Neutral
			With	0	0	0	0	0	Neutral
		2	Without	0	0	0	0	0	Neutral
			With	0	0	0	0	0	Neutral
	Mitigation: None								
Sub-phase: Cumulative Impacts									
7	The Canelands Extension may lead to increased / mushroomed development	1	Without	2	2	2	2	8	Positive moderate
			With	3	4	3	3	13	Positive very high
		2	Without	2	2	2	2	8	Positive moderate
			With	3	4	3	3	13	Positive very high
	Enhancement: The development will promote accessibility which can only have a positive impact in terms of socio-economic opportunities as well as safety. Furthermore, as this area is identified for industrial and logistic type developments, such catalyst developments serve the broader regional development plan.								
Average for Layout Alternative 1 without mitigation								-2.5	Negative low
Average for Layout Alternative 1 with mitigation								4.2	Positive low
Average for Layout Alternative 2 without mitigation								-3.8	Negative low
Average for Layout Alternative 2 with mitigation								1.8	Positive low

No-Go Alternative (compulsory)

No.	Impact	Significance = E+D+I+P	Interpretation
Phase: Planning and Design – No-Go			
Sub-phase: Direct Impacts			
1	All the impacts outlined above will not apply to the No-Go alternative as the status quo will apply and the environment will remain as it is currently. However, it is important to note that the benefits associated with the development will also not materialise, and it must be noted that the majority of the impacts identified for the development were mitigated to a negative low or positive impact once the measures for mitigation were applied, indicating that maintaining the status quo is to lose the opportunity of a beneficial development with negligible environmental impacts.	0	Neutral

1.2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE**a. Site alternatives**

List the potential impacts associated with site alternatives that are likely to occur during the construction phase:

Not applicable – No site alternatives assessed

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the construction phase (please list impacts associated with each alternative separately):

Layout Alternatives

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No .	Impact	Alternat ive	Mitigat ion	Exte nt	Durati on	Intens ity	Probabi lity	Significan ce = E+D+I+P	Interpretatio n
Phase: Construction - Layout Alternatives									
Sub-phase: Direct Impacts									
1	Removal of vegetation – Majority (>70%) of the site's vegetation has been removed or is transformed, primarily through sugarcane agriculture and construction of roads.	1	Without	-1	-4	-3	-3	-11	Negative high
			With	-1	-2	-1	-1	-5	Negative low
		2	Without	-2	-4	-3	-3	-12	Negative high
			With	-1	-2	-2	-3	-8	Negative Moderate
	Mitigation: (a) Ensure minimal or no disturbance outside of the development footprint area, particularly during construction. (b) Mature, indigenous trees occurring within the development footprint should be incorporated, as far as possible, into the landscaping plan. (c) Indigenous trees should be clearly marked to avoid accidental removal / damage. (d)Topsoil from development area should be stockpiled in appropriately designated areas for re-use during landscaping and revegetation / rehabilitation. (e) Active planting of indigenous vegetation should consider the following: 1. Revegetation should commence as soon as possible to create vegetative cover on bare / exposed soils. 2. Landscaping of the development area should include strategic planting of indigenous plants that are representative of the area. 3. Open spaces should be revegetated using an indigenous grass-seed mix, with preference for important grasses of the KwaZulu-Natal Coastal Belt. 4. Appropriate indigenous herbs may be inter-planted into the grassland to speed up the process of natural recruitment and succession. 5. Suitable riparian trees and shrubs should be planted along the watercourse draining through the site. Planting efforts should ensure that a multi-layered, undisturbed vegetative community established within the riparian areas over time. (f) A detailed list of appropriate species is provided in the rehabilitation plan. (g)The objective of the active planting and revegetation should be to improve biodiversity and ecosystem service delivery, buffer the aquatic ecosystems from impacts associated with the development and surrounding land use activities, and to limit establishment of alien/ruderal vegetation. To achieve this, it will be important that these areas are managed and maintained indefinitely, particularly in terms of control of invasive alien plants.								
	Erosion – The riparian areas are impacted by bank collapse and incision of the river channel, particularly just downstream of the Duiker road crossing.	1	Without	-3	-3	-3	-2	-11	Negative high
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-3	-3	-3	-3	-12	Negative high
			With	-2	-1	-1	-2	-6	Negative low
	Mitigation: (a) Ensure minimal or no disturbance outside of the development footprint area, particularly during construction. (b) Ensure that the stormwater management plan for the development minimises flow-related impacts to aquatic ecosystems located downstream. Interventions that can be considered, in addition to the stormwater runoff recommendations of the wetland report, include: 1. On-site storage/attenuation structures incorporated into the overall design layout. Open swales, properly sized to accommodate excess stormwater, particularly from roofs and paved areas. 2 Permeable pavers incorporated, where practical, into the design and construction of parking areas, walkways, etc. Topsoil from development area should be stockpiled in appropriately designated areas for re-use during landscaping and revegetation/rehabilitation.								

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
3	(c) As part of the rehabilitation process, erosion control measures (e.g. sediment traps, geo-membranes, etc.) should be employed to reduce erosion, particularly on steep slopes and banks within riparian areas. (d) Revegetation should commence as soon as possible to create vegetative cover on bare/exposed soils. (e) Stormwater run-off from the site will be piped under the existing access road and discharged onto the remainder of the overall site (5.64Ha). This will be done via a field outlet headwall with spreader blocks to reduce velocities and thus prevent erosion.								
	Solid waste dumping – Localised sites of illegal solid waste dumping occur throughout the site.	1	Without	-2	-2	-3	-2	-9	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-2	-3	-2	-9	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
	Mitigation: All construction materials and solid/liquid waste should be disposed in an appropriate and sensible manner.								
	Increased sediment loads, increased bed sedimentation and increased turbidity that will likely contribute to decreased local water quality and degradation in local aquatic habitat integrity.	1	Without	-2	-3	-3	-2	-10	Negative high
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-3	-3	-2	-10	Negative high
			With	-1	-1	-1	-1	-4	Negative low
Mitigation: (a) In mitigating this impact it is imperative that the construction servitude/working area is defined. The construction servitude/working area will comprise the following: (1) Soil stockpile area. (2) Equipment laydown and storage area. (3) Vehicle turning area. At watercourse crossings, a maximum construction working servitude of 4m should be allowed within the riparian, instream and/or wetland habitat. (b) No vehicle turning areas must be located within 32 m of any watercourse. (c) No equipment laydown or storage areas must be located within 50 m of any watercourse and/or within the 1:100 year floodline. (d) No soil stockpile areas must be located within 20 m of any watercourse. This impact is also intensified for layout alternative 2 as the development will then take up a larger footprint and be in closer proximity to the Mdloti River, thereby intensifying the impact.									
4	Inconvenience from noise and dust will pose a nuisance to nearby residents.	1	Without	-2	-2	-3	-3	-10	Negative high
			With	-2	-1	-2	-2	-7	Negative Moderate
		2	Without	-2	-2	-3	-3	-10	Negative high
			With	-2	-1	-2	-2	-7	Negative Moderate
5									

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No .	Impact	Alternat ive	Mitigat ion	Exte nt	Durati on	Intens ity	Probabi lity	Significan ce = E+D+I+P	Interpretatio n
6	Mitigation: (a) Frequent and effective dust-suppression is advised, particularly along dirt roads. (b) Dust must be suppressed on the construction-site during dry periods by the regular application of water. (c) Water used for this purpose must be used in quantities that will not result in the generation of run-off. (d) Surrounding communities and adjacent landowners are to be notified upfront of noisy construction activities. (e) Provide all equipment with standard silencers. (f) Maintain silencer units on vehicles and equipment in good working order. (g) Construction staff working in areas where the 8-hour ambient noise levels exceed 60 dBA should wear ear protection equipment.								
	Local labour will be recruited to perform short term, unskilled labour on the project.	1	Without	2	1	2	2	7	Positive moderate
			With	2	1	3	3	9	Positive moderate
		2	Without	2	1	2	2	7	Positive moderate
			With	2	1	3	3	9	Positive moderate
	Enhancement: It is recommended that every effort is made to employ local labour.								
	There exists the possibility of an encounter of a gravesite during construction	1	Without	-1	-1	-1	-1	-4	Negative low
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-1	-1	-1	-2	-5	Negative low
			With	-1	-1	-1	-1	-4	Negative low
7	Mitigation: (a) In the event that a grave is encountered during construction, all work must immediately cease and the CLO called to the site. (b) Contact must be made with AMAFA and the family contacted, if possible, to begin negotiations for possible relocations. This impact is also intensified for layout alternative 2 as the development will then take up a larger footprint, thereby intensifying the impact.								
	Chemical and toxic substance spillages	1	Without	-2	-2	-3	-3	-10	Negative high
			With	-1	-1	-2	-1	-5	Negative low
		2	Without	-2	-2	-3	-3	-10	Negative high
			With	-1	-1	-2	-1	-5	Negative low
	8	Mitigation: (a) measures involve preventing toxic spillages and severe disturbance to the bed of the river and stream and confining any impacts to the 4 m wide construction footprint. (b) Damage or destruction of protective grassland beyond this footprint that may lead to erosion should be avoided.							

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
9	(c) Mitigation measures are likely to result in negative low levels of significance where impacts cause small negative changes in natural habitats and biota, but ecosystem functions remain essentially unchanged.								
	Impacts caused by pollution of waste. Negative impacts on the aquatic and wetland habitats and biodiversity include pollution due to spillage of toxic fluids or substances and waste materials and agitation or disturbance of the river and stream beds causing siltation downstream during the construction phase.	1	Without	-2	-2	-4	-3	-11	Negative high
			With	-1	-1	-2	-1	-5	Negative low
		2	Without	-2	-3	-4	-4	-13	Negative very high
			With	-1	-1	-2	-3	-7	Negative Moderate
	Mitigation: (a) Eating areas must not be located within 15 m of the wetland/riparian habitats. (b) Provide adequate rubbish bins and waste disposal facilities on-site and educate/encourage workers not to litter or dispose of solid waste in the natural environment but to use available facilities for waste disposal. (c) Clear and completely remove from site all general waste, constructional plant, equipment, surplus rock and other foreign materials once construction has been completed. (d) Recycling / re-use of waste is to be encouraged. (e) Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly at registered sites by a registered waste management company. (f) No litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period, but disposed of at an approved dumping site. (g) The construction-site must be kept clean and tidy and free from rubbish at all times.								
	The movement of machinery within the area of residual hydromorphic soils could cause compaction or physical disturbance of these soils	1	Without	-1	-1	-1	-1	-4	Negative low
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-1	-3	-4	-3	-11	Negative high
			With	-1	-1	-3	-2	-7	Negative Moderate
10	Mitigation: (a) In mitigating this impact it is imperative that the construction servitude / working area is defined. The construction servitude / working area will comprise the following: (1) Soil stockpile area. (2) Equipment laydown and storage area. (3) Vehicle turning area. (4) At watercourse crossings, a maximum construction working servitude of 4 m should be allowed within the riparian, instream and/or wetland habitat. (b) The temporary access roads must be strictly one-way and be a maximum width of 3 m. (c) No vehicle turning areas must be located within 32 m of any watercourse. (d) No equipment laydown or storage areas must be located within 50 m of any watercourse and/or within the 1:100 year floodline. (e) No soil stockpile areas must be located within 20 m of any watercourse.								

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
11	This impact is also intensified for layout alternative 2 as the development will then take up a larger footprint and be in closer proximity to the Mdloti River, thereby intensifying the impact.								
	Cement – spillages from poor mixing and disposal practices.	1	Without	-1	-2	-4	-3	-10	Negative high
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-1	-2	-4	-3	-10	Negative high
			With	-1	-1	-1	-1	-4	Negative low
Mitigation: No batching or chemical / fuel storage areas to be located within 50 m of the area of residual hydromorphic soils or the stream and associated riparian corridor.									
Sub-phase: Indirect Impacts									
12	Possible increased water turbidity (increased suspended solid load). Ultimately, the potential direct and indirect impacts of freshwater habitat will result in a deterioration in the local freshwater ecosystem ecological condition downstream, particularly increased turbidity and sedimentation within the downstream pool habitats. This will result in a local reduction in the availability of intact natural habitat, particularly if mitigation measures are not implemented effectively.	1	Without	-2	-2	-2	-2	-8	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-2	-3	-2	-9	Negative Moderate
			With	-1	-1	-2	-2	-6	Negative low
	Mitigation: (a) Instream sediment control measures must be instated. (b) Before any work commences in the river channel, sediment control / silt capture measures (e.g. bidim / silt curtains) must be installed downstream of the working areas within the river. (c) Quantities of silt fences/curtains shall be decided on-site with the engineer, contractor and ECO. (d) The ECO should be present during the location and installation of the silt curtains. (e) During works within the channel, the downstream silt fences/curtains must be regularly checked and maintained (de-silted to ensure continued capacity to trap silt), and repaired where necessary. (f) Other areas which are eroded or denuded of vegetation should receive topsoil and transplanted grassland sods such as those badly eroded areas. (g) A copy of the method statement will need to be made available at the construction-site offices/site camp at all times. (h) Run-off generated from cleared and disturbed areas / slopes that drains into rivers, streams or wetlands must be controlled using erosion control and sediment trapping measures like silt fences, sandbags, earthen berms and synthetic logs, particularly where slopes are exposed. (i) These control measures must be established at regular intervals perpendicular to the slope to break surface flow energy and reduce erosion as well as trap sediment. (j) Sediment barriers (e.g. silt fences, sandbags, hay bales, earthen filter berms, retaining walls and check dams) must be established to protect water								

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
13	resources from erosion and sedimentation impacts from upslope. (k) Sediment barriers should be regularly maintained and cleared so as to ensure effective drainage. (l) The berms, sandbags and/or silt fences must be maintained and monitored for the duration of the construction phase and repaired immediately when damaged. (m) The berms, sandbags and silt fences must only be removed once vegetation cover has successfully re-colonised the disturbed areas post-rehabilitation. This impact is also intensified for layout alternative 2 as the development will then take up a larger footprint and be in closer proximity to the Mdloti River, thereby intensifying the impact.								
	Methane gas can present a serious health risk, environmental and/or fire if unprotected exposure occurs. The primary hazard is the release of a toxic gas cloud into the outside atmosphere	1	Without	-2	-3	-3	-3	-11	Negative high
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-3	-3	-3	-11	Negative high
			With	-1	-1	-1	-1	-4	Negative low
	Mitigation: The client must liaise with SASOL and thereafter may implement mitigation measures, including: (a) Enclosure of the pipeline, Covering the pipeline with soil greater than 1.22 m will provide a reduction factor of between 0.2 to 0.7. (b) The pipeline was designed to transport oil at a higher pressure. The methane gas pipeline operates at 59 Bar. (c) The pipeline thickness (10.31 mm) this will also provide a reduction factor of at least 0.2. (d) The developer will ensure that all windows/glazing facing the pipeline will be provided with shatterproof / safety glass. (e) The developer will ensure that all ventilation systems (air conditioners) will be located away from the pipeline. (f) The developer and user will ensure that escape routes from within the building will be away from the pipeline.								
	Dissatisfied persons could attempt to sabotage the pipeline. This can cause an environmental pollution problem. This person(s) could also ignite the gas or cause an explosion.	1	Without	-2	-3	-3	-3	-11	Negative high
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-3	-3	-3	-11	Negative high
			With	-1	-1	-1	-1	-4	Negative low
	Mitigation: The developer will ensure access control. To reduce this risk management must ensure that site access is controlled/maintained and that education of employees to reduce dissatisfaction and to explain the potential consequences.								
	The physical disturbance of the wetland and river / riparian habitat (soils and vegetation) around the construction footprint will open up the riparian habitat to invasion by locally occurring indigenous and alien invasive, pioneer and ruderal plant species, particularly if rehabilitation of the disturbed areas is not undertaken effectively. Alien plants and weeds have the	1	Without	-2	-2	-2	-2	-8	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-4	-3	-3	-12	Negative high
			With	-1	-1	-2	-2	-6	Negative low

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No .	Impact	Alternat ive	Mitigat ion	Exte nt	Durati on	Intens ity	Probabi lity	Significan ce = E+D+I+P	Interpretatio n
	ability to out-compete and replace indigenous flora, which will in turn impact on natural biodiversity. Such an impact could result in the gradual invasion of the local riparian habitat by these undesirable species and the alteration of the current composition of the freshwater vegetation communities.								
	Mitigation: (a) The core impact must be avoided, that is the introduction or allowance of the occurrence of alien invasives in the construction area. (b) All alien invasives found must be immediately removed and disposed of responsibly in accordance with the requirements of the ECO. (c) No artificial plants are permitted to be brought to site. (d) Cleared areas must be planted with the present, indigenous grass sods as soon as is possible. (e) All alien invasive vegetation that has colonised the construction-site must be removed, preferably by uprooting. (f) The contractor should consult the ECO regarding the method of removal. (g) All bare surfaces across the construction-site must be checked for alien invasive plants at the end of every month and alien plants removed by hand pulling / uprooting and adequately disposed. (h) Herbicides should be utilised where hand pulling / uprooting is not possible. (i) ONLY herbicides which have been certified safe for use in wetlands by independent testing authority to be used. (j) The ECO must be consulted in this regard.								
	Introduction of foreign materials (hydrocarbons, cement, etc.); Additional soil disturbance and compaction; Introduction of pollutants associated with sewage infrastructure and general waste disposal; Increased surface runoff associated with hardened surfaces; and Destruction of freshwater ecosystems and habitat.	1	Without	-2	-2	-3	-2	-9	Negative Moderate
With			-1	-1	-2	-1	-5	Negative low	
2		Without	-2	-4	-3	-3	-12	Negative high	
		With	-2	-1	-2	-2	-7	Negative Moderate	
	Mitigation: (a) Implementation of the Wetland Rehabilitation Plan (GroundTruth, 2015). Due to the proximity of Duiker Road to the lower portion of HGM Unit 1, no engineered interventions have been prescribed. The aim of the rehabilitation is to mitigate the impacts of the potential development on-site, and potentially enhance the functioning and integrity of the freshwater ecosystems within the development site; with the primary objective for securing and improving the overall functioning and integrity of the system. In order to achieve these aims and objectives the rehabilitation strategy includes earthworks, intensive revegetation and alien plant control. Revegetation and continued alien plant control will assist in substantially improving the vegetation component of the wetland, however these initiatives will only prove to be efficient if continued management and maintenance of the alien vegetation is ensured.								
16									
17	Increased downstream drift by benthic invertebrates causing localised reductions in population densities.	1	Without	-2	-2	-3	-2	-9	Negative Moderate

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No .	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
18			With	-1	-1	-2	-1	-5	Negative low
			Without	-2	-2	-3	-3	-10	Negative high
		2	With	-1	-1	-2	-2	-6	Negative low
	Mitigation: As per items 10 and 12 above.								
	Sewage pollution into the Mdloti River from possible leakages from and/or poor servicing of chemical toilets and/or informal use of surrounding bush by workers.	1	Without	-2	-2	-3	-2	-9	Negative Moderate
			With	-1	-1	-2	-1	-5	Negative low
		2	Without	-2	-2	-3	-3	-10	Negative high
			With	-1	-1	-2	-2	-6	Negative low
	Mitigation: (a) Sanitation – portable toilets (1 toilet per 10 users) to be provided where construction is occurring. (b) Workers need to be encouraged to use these facilities and not the natural environment. (c) Toilets must not be located within the 1:100yr flood line of a watercourse or closer than 50 m or from any natural water bodies including rivers, streams, riparian areas and wetlands. (d) Waste from chemical toilets must be disposed of regularly (at least once a week) and in a responsible manner by a registered waste contractor. (e) Toilet facilities must be serviced weekly and in a responsible manner by a registered waste contractor to prevent pollution and improper hygiene conditions. (f) Sanitation safe disposal / clearance certificates must be maintained on-site for construction duration.								
	Lack of alien plant control	1	Without	-2	-3	-3	-3	-11	Negative high
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-3	-3	-3	-11	Negative high
			With	-1	-1	-1	-1	-4	Negative low
Mitigation: (a) All alien invasive vegetation that has colonised the construction-site must be removed, preferably by uprooting. (b) The contractor should consult the ECO regarding the method of removal. (c) All bare surfaces across the construction-site must be checked for alien invasive plants at the end of every month and alien plants removed by hand pulling / uprooting and adequately disposed. (d) Herbicides should be utilised where hand pulling/uprooting is not possible. (e) ONLY herbicides which have been certified safe for use in wetlands by independent testing authority to be used. (f) The ECO must be consulted in this regard.									
19									
20	Due to an increased workforce in the local area (at the construction camp), there would be increased need for health	1	Without	-2	-1	-2	-1	-6	Negative low
			With	-1	-1	-1	-1	-4	Negative low

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No .	Impact	Alternat ive	Mitigat ion	Exte nt	Durati on	Intens ity	Probabi lity	Significan ce = E+D+I+P	Interpretatio n
21	services.	2	Without	-2	-1	-2	-1	-6	Negative low
	With		-1	-1	-1	-1	-4	Negative low	
	Mitigation: Given the nature of the area of the development, it is believed that such needs can be met.								
	Due to an increased worker population and potentially non-locals in the area, there may be incidents of increased crime, violence (domestic), and security incidents.	1	Without	-2	-1	-2	-2	-7	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-2	-1	-2	-2	-7	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
	Mitigation: (a) To as great an extent as possible, local labour must be sourced. (b) The Community Liaison Officer (CLO) must be regularly engaged and the community must be encouraged to work together to limit any possible crime.								
	Sub-phase: Cumulative Impacts								
	22	Possible reduced density and diversity in benthic invertebrate and fish communities as a result of reduced water quality (suspended solids impacting intolerance taxa), habitat degradation caused by smothering of aquatic habitat, changes instream-bed and biotope composition (i.e. reduced habitat suitability through the destruction of pool and/or riffle habitat).	1	Without	-2	-3	-3	-2	-10
With				-1	-1	-1	-1	-4	Negative low
2			Without	-2	-3	-4	-3	-12	Negative high
			With	-1	-2	-2	-2	-7	Negative Moderate
Mitigation: As per items 10 and 12 above.									
Average for Layout Alternative 1 without mitigation								-7.8	Negative Moderate
Average for Layout Alternative 1 with mitigation								-3.6	Negative low
Average for Layout Alternative 2 without mitigation								-8.9	Negative Moderate
Average for Layout Alternative 2 with mitigation								-4.6	Negative low

No-Go Alternative (compulsory)

No.	Impact	Significance = E+D+I+P	Interpretation
Phase: Construction - No-Go			
Sub-phase: Direct Impacts			
1	All the impacts outlined above will not apply to the No-Go alternative as the status quo will apply and the environment will remain as it is currently. However, it is important to note that the benefits associated with the development will also not materialise, and it must be noted that the majority of the impacts identified for the development were mitigated to a negative low or positive impact once the measures for mitigation were applied, indicating that maintaining the status quo is to lose the opportunity of a beneficial development with negligible environmental impacts.	0	Neutral

1.3. IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

It should be noted that most operational impacts are applicable to the end-users and their developments, which will be industrial and logistic type developments, but at this time, are not known in detail.

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the operational phase:

Not applicable – No site alternatives assessed

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the operational phase (please list impacts associated with each alternative separately):

Layout Alternatives

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
Phase: Operational – Layout Alternatives									
Sub-phase: Direct Impacts									
1	The extent of hardened surfaces in the catchment of watercourses could result in the increased occurrence of point source surface water discharges associated with the stormwater management system. The potential risks of flooding of on-site facilities (proposed light industrial facilities) but also off-site (existing access roads and wetland areas) is very small due to the reduce size of the developable area.	1	Without	-2	-2	-3	-2	-9	Negative Moderate
			With	-1	-2	-1	-1	-5	Negative low
		2	Without	-2	-2	-3	-3	-10	Negative high
			With	-1	-2	-1	-2	-6	Negative low
	Mitigation: (a) Stormwater drainage should be via open drains / swales adjacent to the road with energy check structures rather than concrete drains. (b) Under no circumstances must drop inlets and concrete pipes be utilised. (c) Wherever possible, the temporary chutes/berms must not be aligned perpendicular to the slope. (d) Outlet erosion protection structures must be designed to reduce outflows to energy levels that do not pose an erosion risk to downslope soils. (e) Outlet erosion structures must be properly installed along the grade and elevation of the slope. (f) Under no circumstances must the structures be placed higher than the ground surface thereby creating a drop off that may cause erosion. (g) Strict implementation of the Stormwater Management Plan must be ensured (Bosch Stemele, 2015).								
	Increased hardened surfaces within the catchment will result in a small increase in surface water runoff but more importantly it will result in increased runoff velocities at discharge points that will become areas at risk from erosion	1	Without	-2	-2	-3	-2	-9	Negative Moderate
			With	-1	-2	-1	-1	-5	Negative low
		2	Without	-2	-2	-3	-3	-10	Negative high
			With	-1	-2	-1	-2	-6	Negative low
	Mitigation: (a) Stormwater drainage should be via open drains / swales adjacent to the road with energy check structures rather than concrete drains. (b) Under no circumstances must drop inlets and concrete pipes be utilised. (c) Wherever possible, the temporary chutes / berms must not be aligned perpendicular to the slope. (d) Outlet erosion protection structures must be designed to reduce outflows to energy levels that do not pose an erosion risk to downslope soils. (e) Outlet erosion structures must be properly installed along the grade and elevation of the slope. (f) Under no circumstances must the structures be placed higher than the ground surface thereby creating a drop off that may cause erosion.								
2									

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
3	Far reaching community benefits	1	Without	3	3	3	3	12	Positive high
			With	3	4	3	4	14	Positive very high
		2	Without	3	3	3	3	12	Positive high
			With	3	4	3	4	14	Positive very high
Enhancement: The development will enable far reaching connectivity, even inter-provincial.									
4	Increased traffic to the area once the end-users are operational	1	Without	-1	-1	-1	-1	-4	Negative low
			With	-1	-1	-1	-1	-4	Negative low
		2	Without	-1	-1	-1	-1	-4	Negative low
			With	-1	-1	-1	-1	-4	Negative low
Mitigation: The Traffic Impact Assessment has found that the current roads servicing the site are expected to remain at an acceptable level of service.									
5	Alien invasive plants – The remaining areas with natural vegetation are heavily infested with invasive alien plants. As a result, the ecological functionality and integrity of natural vegetation has been significantly affected.	1	Without	-1	-2	-3	-2	-8	Negative Moderate
			With	-1	-1	-2	-1	-5	Negative low
		2	Without	-1	-2	-3	-2	-8	Negative Moderate
			With	-1	-1	-2	-1	-5	Negative low
Mitigation: Develop and implement a comprehensive alien weed control programme to remove problematic plant species and prevent further spread and establishment. Invasive alien plants should be removed from the wetland/riparian areas and planned open spaces prior to rehabilitation and revegetation taking place. Allowance should be made for routine follow-ups until the time that there is either no presence or a negligible presence of these plants. Alien plant control work needs to be carried out by competent contractors									
6	The new development will generate the use of public transport but the proposed site is lacking in facilities for these vehicles to offload passengers, resulting in vehicles staging at the intersection for this purpose.	1	Without	-2	-4	-3	-3	-12	Negative high
			With	-2	-2	-2	-2	-8	Negative Moderate
		2	Without	-2	-4	-3	-3	-12	Negative high
			With	-2	-2	-2	-2	-8	Negative Moderate
Mitigation: It is recommended that a layby facility be included on Vincent Dickenson Road just downstream of the D499 intersection for both directions of travel. This will ensure safety of all road users.									
7	The proposed Industrial development is expected to generate some pedestrian volumes. Due to the social standing of	1	Without	-2	-4	-3	-3	-12	Negative high
			With	-2	-2	-2	-2	-8	Negative Moderate
7		2	Without	-2	-4	-3	-3	-12	Negative high
			With	-2	-2	-2	-2	-8	Negative Moderate

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
8	the area, the current pedestrian volume is quite high.		With	-2	-2	-2	-2	-8	Negative Moderate
	Mitigation: It is recommended that D499 be provided with a sidewalk along at least one side to accommodate all pedestrian movement.								
	The Canelands Extension will result in unlocking of key developments	1	Without	2	3	3	3	11	Positive high
			With	3	4	4	4	15	Positive very high
		2	Without	2	3	3	3	11	Positive high
			With	3	4	4	4	15	Positive very high
Enhancement: Overall the development will lead to beneficial impacts for the area.									
Sub-phase: Indirect Impacts									
9	Release of toxic cloud (Methane) without ignition, and/or a gas release which ignites. Two potential ignition scenarios exist – jet fire and/or vapour cloud explosion. The greatest risk to people around a pipeline which has ignited is the exposure to thermal radiation.	1	Without	-2	-3	-3	-2	-10	Negative high
			With	-1	-1	-1	-1	-4	Negative low
			Without	-2	-3	-3	-2	-10	Negative high
	2	With	-1	-1	-1	-1	-4	Negative low	
		Mitigation: The pipeline is underground and is in a servitude. The pipeline servitude is annually monitored on foot using gas detectors. During this inspection the foliage cover / growth is also monitored. Dead patches indicate gas leaks. In addition to this inspection, overhead helicopter inspections occur. This is performed once a month in rural areas and twice a month in urban areas. Pigging also occurs 6 monthly. All these preventative and precautionary measures must be continued by SASOL.							
	Failure of the SASOL pipeline (localised failure). This will result in release of Methane into atmosphere, Release of Methane into atmosphere. Formation of gas / vapour cloud in area and Release of Methane into atmosphere. No initial ignition, formation of gas / vapour cloud, and this blows towards Warehouse and other offsite properties No ignition of cloud - Toxic levels.	1	Without	-2	-3	-3	-2	-10	Negative high
			With	-1	-1	-1	-1	-4	Negative low
			Without	-2	-3	-3	-2	-10	Negative high
2	With	-1	-1	-1	-1	-4	Negative low		
	Mitigation: 1. Odour can be detected easy. 2. Maintenance program. 3. Inspection program. 4. Emergency response. 5. Training - all employees								

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
11	trained. 6. Emergency plan 7. Access control and only authorized persons 8. Crisis Management plan required.									
	The development of the area to light industrial activities will increase the risk of pollution, especially to the existing wetlands within the remainder of the site. Primary anticipated increased pollution includes hydrocarbons from vehicles, total suspended solids (TSS) from the industrial portion of the development and minor domestic waste from the associated office portion of the development. In addition pollution from construction materials for the proposed development and associated facilities is also a potential risk.	1	Without	-2	-3	-3	-2	-10	Negative high	
			With	-1	-1	-1	-1	-4	Negative low	
			Without	-2	-3	-3	-3	-11	Negative high	
	2	With	-1	-1	-2	-2	-6	Negative low		
	Mitigation: (a) measures involve preventing toxic spillages and severe disturbance to the bed of the river and stream and confining any impacts to the 4 m wide construction footprint. (b) Damage or destruction of protective grassland beyond this footprint that may lead to erosion should be avoided. (c) Mitigation measures are likely to result in negative low levels of significance where impacts cause small negative changes in natural habitats and biota, but ecosystem functions remain essentially unchanged. (d) Measures to be applied to reduce pollutants include litter traps at all outlets and possibly swales at Green Open Spaces. These measures will be applied at the point source (individual sites and road reserves) as far as possible. (e) First flush systems may be required on the individual sites to prevent oils and other pollutants entering the drainage system, this requirement will be dependent on the future land use.									
	Sub-phase: Cumulative Impacts									
	12	Sedimentation could occur due to accumulated material on hardened surfaced which is transported to the existing wetlands during storm events can lead to a build-up of transported material in the wetlands. This material normally contains the bulk of the	1	Without	-2	-2	-3	-3	-10	Negative high
				With	-2	-1	-1	-1	-5	Negative low
			Without	-2	-2	-3	-3	-10	Negative high	
2	With	-2	-2	-2	-2	-8	Negative Moderate			

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	pollutants.								
	Mitigation: Implementation of the Stormwater Management Plan and Wetland Rehabilitation Plan. (a) Reduce stormwater flow variance of the pre-development flows by discharging stormwater via a headwall into the remainder of the site; (b) Prevent the concentration of stormwater runoff at any point where erosion is a possibility. This will be prevalent near areas with high impermeability (roof structures, large surfaced areas) and embankments. (c) Avoid ponding on-site, especially near building structures, (d) Avoid destabilisation of existing and proposed embankments, (e) Ensure compliance to local authority standards, (f) Construction of pollution reducing systems, and (g) Ensure that the construction of stormwater control systems is executed in a safe and acceptable manner.								
	The wetland areas receive water from the existing property predominantly via overland runoff. It is expected that some subsurface drainage through the perched water table between the bedrock and the more clayey sands is expected. Improper management of stormwater on-site could negatively affect these areas by insufficient recharging of the wetlands.	1	Without	-1	-2	-2	-2	-7	Negative Moderate
With			-1	-1	-1	-1	-1	-4	Negative low
2		Without	-1	-2	-3	-3	-3	-9	Negative Moderate
		With	-1	-1	-2	-2	-2	-6	Negative low
13	Mitigation: Implementation of the Stormwater Management Plan and Wetland Rehabilitation Plan.								
Average for Layout Alternative 1 without mitigation								-6.0	Negative low
Average for Layout Alternative 1 with mitigation								-2.1	Negative low
Average for Layout Alternative 2 without mitigation								-6.4	Negative low
Average for Layout Alternative 2 with mitigation								-2.8	Negative low

No-Go Alternative (compulsory)

No.	Impact	Significance = E+D+I+P	Interpretation
Phase: Operational - No-Go			
Sub-phase: Direct Impacts			
1	All the impacts outlined above will not apply to the No-Go alternative as the status quo will apply and the environment will remain as it is currently. However, it is important to note that the benefits associated with the development will also not materialise, and it must be noted that the majority of the impacts identified for the development were mitigated to a negative low or positive impact once the measures for mitigation were applied, indicating that maintaining the status quo is to lose the opportunity of a beneficial development with negligible environmental impacts.	0	Neutral

1.4. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING OR CLOSURE PHASE

Not applicable – No decommissioning phase.

However, rehabilitation post construction is addressed in the EMPr attached as Appendix F

1.5. PROPOSED MONITORING AND AUDITING

For each phase of the project and for each alternative, please indicate how identified impacts and mitigation will be monitored and/or audited.

Alternative S1 (preferred site)**Alternative S2**

N/A

N/A

Alternative L1 (preferred alternative) and L2

It is recommended that monitoring occur at a weekly frequency for the duration of the construction phase. The detailed items which will constitute the ECO checklist must be extrapolated from the detailed EMPr provided in Appendix F.

No monitoring or auditing is recommended for the planning and design, and decommissioning phases as this would not be applicable.

Monitoring and auditing for the operational phase refers to auditing the successful implementation of rehabilitation, or which could be considered the last aspect of the construction phase. Thereafter, maintenance of the area of an acceptable environmental quality standard must be ensured by the end-users. THD ensures a transfer of ethical responsibility by writing such conditions into the sale agreement of their land.

3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative S1 (only site)

The Canelands industrial area is situated in the northern region of the EM and on the northern edge of Verulam. Portion 2026 is situated in the north eastern quadrant of Canelands industrial area, adjacent to the north coast railway line.

The major road in this area is the R102, a Provincial Main Road (MR2) and a major north-south regional route linking Durban with the northern sector of the eThekweni Municipality and beyond.

The identified site is an extension to an existing industrial development and therefore is situated in a compatible area. The natural environment has informed the development, in that the developed platform will only cover 1.56 ha of the 7.23 ha gross land available (should the preferred alternative be authorised as recommended).

The remaining 5.67 ha is to be preserved as open space and maintained by a steward. This open space comprises the sensitive habitats of the site.

Alternative S2

Alternative L1 (preferred alternative)

Layout Alternative 1 emerges as the preferred alternative after conducting the impact assessment.

The footprint of this alternative is significantly lower than alternative 2 and is recommended for authorisation.

Alternative L2

Layout Alternative 2 emerges as the less preferred alternative after conducting the impact assessment.

The footprint of this alternative is significantly higher than alternative 1 and is not recommended for authorisation.

The following table highlights the preferred alternative for each of the planning, construction and operational phase. It excludes the decommissioning phase which is not applicable to this development.

Table 6: Evaluation of Alternatives

Planning Phase		
Average for Layout Alternative 1 without mitigation	-2.5	Negative low
Average for Layout Alternative 1 with mitigation	4.2	Positive low
Average for Layout Alternative 2 without mitigation	-3.8	Negative low
Average for Layout Alternative 2 with mitigation	1.8	Positive low
Construction Phase		
Average for Layout Alternative 1 without mitigation	-7.8	Negative Moderate
Average for Layout Alternative 1 with mitigation	-3.6	Negative low
Average for Layout Alternative 2 without mitigation	-8.9	Negative Moderate
Average for Layout Alternative 2 with mitigation	-4.6	Negative low
Operational Phase		
Average for Layout Alternative 1 without mitigation	-7.8	Negative Moderate
Average for Layout Alternative 1 with mitigation	-3.6	Negative low
Average for Layout Alternative 2 without mitigation	-8.9	Negative Moderate
Average for Layout Alternative 2 with mitigation	-4.6	Negative low

No-go alternative (compulsory)

All the impacts outlined above will not apply to the No-Go alternative as the *status quo* will apply and the environment will remain as it is currently.

However, it is important to note that the benefits associated with the development will also not materialise, and it must be noted that the majority of the impacts identified for the development were mitigated to a negative low or positive impact once the measures for mitigation were applied, indicating that maintaining the status quo is to lose the opportunity of a beneficial development with negligible environmental impacts.

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SECTION F. RECOMMENDATION OF EAP

Is the information contained in this report and the documentation attached hereto in the view of the EAP sufficient to make a decision in respect of this report?

YES X

NO

If "NO", please contact the KZN Department of Economic Development, Tourism & Environmental Affairs regarding the further requirements for your report.

If "YES", please attach the draft EMPr as Appendix F to this report and list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

Conclusion

All planning directives of the local, provincial and national governments advocate for the opportunities which arise from this development. In the EAP's opinion, the benefits negate or outweigh the negative impacts of the project.

It is therefore recommended that a positive environmental authorisation be issued with a validity period of five (5) years.

In conclusion, the development is recommended for environmental authorisation as the negative impacts are negligent in comparison to the social and economic benefits to be realised. Alternative 1 is recommended.

The specialist assessments provided the following conclusions on the proposed development:

Ecology:

The proposed development will not have a significant impact on the ecological state of the vegetation that is directly affected. Furthermore, opportunities exist to rehabilitate non-developed areas of the site to allow establishment of natural vegetation. Not only will this improve the integrity and functionality of terrestrial and aquatic ecosystems on-site, but will also enhance ecological connectivity within the broader landscape setting.

Traffic:

Based on the analysis conducted the following conclusion can be drawn with regards to the traffic impact of the proposed Canelands Extension:

- All intersections are currently working at an excellent LOS, however the Vincent Dickenson and D499 intersection needs to be upgraded which could be a result of the design life of the intersection being reached.
- The analysis of the additional development traffic and the five year predicted traffic show the intersections operate at a good LOS, with minimal delays and queue lengths at intersections.
- The impacts to the surrounding road network are negligible, due to the small size of the development.
- Due to the rural nature of the community, pedestrian movement and public transport usage in the area are high.
- The road safety around the development area is poor, providing no pedestrian sidewalks, road signage, road marking and laybys for public transport.

Heritage:

No heritage sites occur on the footprint. The study area was surveyed by foot yet no archaeological sites or artefacts were observed. The area is also not part of any known cultural landscape. No heritage and/or archaeological sites were located on the survey. The study area also does not form part of any known cultural landscape.

It is therefore suggested that the proposed development may proceed as no heritage sites are in any immediate danger of being destroyed or altered.

Aquatic (Surface Water and Wetlands):

The assessments undertaken to determine the baseline conditions of the Mdloti River, revealed that there were various impacts affecting the systems. Most of these impacts were only minor and had not affected the integrity of the site to a large degree. The site upstream of Canelands Extension was in a good condition in terms of both the biological water quality and habitat integrity. The construction and other activities upstream near the water treatment works do, however, pose a threat to the overall condition of the site. The site downstream of Canelands East was also in a good condition and showed signs that water quality and habitat integrity had improved compared to the upstream site.

The baseline assessment identified that the affects from Canelands Extension were leading to an improved water quality of the Mdloti River. It is recommended that future activities on-site should not allow the water quality of the downstream site to decline below that of the upstream site.

Majority (70%) of the plants identified during the site visit are invasive alien species which supports the fact that the vegetation is generally highly disturbed. Although opportunities for wetland rehabilitation are limited within the development site, the removal of alien vegetation within HGM Unit 1 and re-vegetation with appropriate indigenous riparian vegetation marginally improves the integrity of this system. It is assumed that no rehabilitation measures can be implemented within the remaining portions of HGM Unit 2, therefore, the integrity of the system is expected to decrease in the post-development landscape. **However, the gain of 0.17 ha equivalents for HGM Unit 1 and the loss of 0.03 ha equivalents for HGM Unit 2 equates to an overall gain of 0.14 ha equivalents for the entire site. Therefore the assessment indicates and overall net gain in wetland functional units.**

The proposed development layout encroaches into portions of the identified 2.9 ha of wetland habitat. Despite these systems having been significantly modified by historical agricultural activities, mitigation measures are deemed as necessary, in accordance with the Strategic Wetland Management Framework for the eThekweni Northern Region. The framework recognises that the overall loss of wetland habitat in the region is below sustainability thresholds, and as such, mitigation measures should be based on achieving a 'net gain' rather than 'no net loss'.

The ecosystem services were evaluated in terms of supply and demand. The supply score was based on the potential and effectiveness of a specific wetland at providing an ecosystem service (Macfarlane and Edwards, 2015). **In the 'reasonably attainable' rehabilitated state the potential would remain the same as the current state but the effectiveness is anticipated to increase based on the implementation of effective rehabilitation measures.**

It is anticipated that in the post-development landscape setting, each of the wetland systems within the development site would remain within the same EIS categories, as a result of the rehabilitation associated with the proposed development. The hydro-functional importance is strongly linked to the fact that the systems will receive runoff from the industrial development areas and improved water retention and distribution patterns as a result of the rehabilitation.

Wetland habitat in the reasonably attainable rehabilitated state will equate to approximately 0.36 functional equivalents. Based on the development impact on 0.24 ha, the wetland habitat is considered to decrease in functioning by approximately 0.12 functional equivalents to 0.24 functional equivalents. This loss would be addressed through the functional and ecosystem conservation offset targets of 0.09 functional equivalents and 0.09 habitat hectare equivalents, respectively.

The Framework for Improved Wetland Management (EcoPulse, Version 0.3, December 2015), a deliverable of the Climate Resilience Plan, states that economic growth and development has resulted in widespread exploitation of natural resources and a general erosion of natural capital across much of the eThekweni Municipality. This has been clearly demonstrated in the northern area of eThekweni which houses the study area, where historical agricultural practices have resulted in almost total destruction of natural habitats. As part of a partnership, THD as a key local role-player has therefore committed themselves to interact constructively in order to ensure that development of the region takes place in a manner that provides a model for government-private sector partnership that can deliver sustainable development. This is reflected through the meaningful collaboration achieved to date and common agreement to implement policies and practices that are underpinned by a new vision for the project area. This has been applied to the Canelands Extension proposed development. The new approach the assessing the impacts to the wetlands considers a sustainability threshold, and what the environment can sustain. The framework states that in assessing impacts and calculating wetland offset requirements, there are three components that need to be specifically assessed when evaluating offset requirements: Water Resources and Ecosystem Services, Ecosystem Conservation, and Species of Conservation Concern. In each case, the significance of potential impacts needs to be

assessed as part of the environmental authorisation process, and offset requirements need to be calculated for any significant impacts on wetland ecosystems. In the case of the Canelands Extension, the impacts to water resources and ecosystem services is at a low enough level to mitigate thereby having limited impact on ecosystem conservation and no species of conservation concern have been identified in the study area.

A strategic framework for improved wetland management has recently been developed for eThekweni Municipality's Northern Spatial Development Plan Area (Macfarlane, 2015, cited in Deliverable 4 of the Climate Resilience Framework, Strategic Wetland Offset Assessment, Version 0.3, December 2015), and has received in-principle buy-in from the key landowners involved, namely the DTPC, THD and the EM. This framework clearly articulates the initial proposed policy objectives and implementation framework for wetland management in the study area. This includes specific goals for wetland offsets that cater for a full spectrum of functions and values provided by wetlands. Such an initiative is testament to the continued commitment of THD to socio-economic development which is under-pinned by sustainability and conservation.

MHI RA:

The SASOL gas pipeline was designed according to the adequate specifications at the time of development. The pipeline is operated and maintained according to recognised and prescribed procedures. SASOL employees are trained and there is reasonable supervision, control and auditing.

The developer must liaise with SASOL and determine or accept mitigation measures to limit the risk to the general public. Developers and their tenants still however need to implement an Emergency Plan. The purpose of this Emergency plan is outlined in the EMPr.

Summary

In light of the above, it can be concluded that the proposed Canelands Extension does not pose a significant risk to the receiving and surrounding environment and no fatal flaws have been identified. It is therefore the recommendation that this development be given environmental authorisation which stipulates that the mitigation measures identified by the specialists and EAP are strictly adhered to.

SECTION G: APPENDICES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s) and Maps

Appendix B: Site Photographs in 8 compass points

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

D1 – Engineering Services Report

D2 – Vegetation report

D3a – Wetland Delineation and Rehabilitation Plan (2012)

D3b – Updated Wetland Functionality Assessment and Rehabilitation Plan (2015)

D3c – Aquatic Assessment (2015)

D4 – Heritage Impact Assessment

D5 – Geotechnical Investigation

D6 – Traffic Impact Assessment

D7 – Major Hazardous Installation Risk Assessment (THD commissioned and SASOL commissioned)

D8 – Stormwater Management Plan

D9 - Copies of Specialist Declarations and Ecological Validity

Appendix E: Public Participation Process (PPP)

E1 – PPP Summary

E2 – Background Information Document (BID)

E3 – Site Notices

E4 – Advertisement

E5 – I&AP Database

E6 – Comments and Response Report (Issues Trail)

E7 – Comments Received

Appendix F: Draft Environmental Management Programme (EMPr)

Appendix G: Other information

G1 – Water Use Licence Application Pre-Application Meeting Documents

G2 – Curriculum Vitae of EAP

G3 – Climate Resilience Framework Deliverables