

# **FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

## ***PROPOSED DUBE TRADEPORT TRADE ZONE 2 LOCATED BETWEEN TONGAAT AND THE KING SHAKA INTERNATIONAL AIRPORT IN KWAZULU-NATAL***

**Prepared for:**

**Dube TradePort Corporation**  
P.O. Box 57757  
King Shaka Airport  
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**Submitted to:**

**Department of Environmental Affairs**  
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**MARCH 2014**

**SEF Project Code: 504597**  
**DEA Ref No: 14/12/16/3/3/2/341**  
**NEAS REF NO: DEA/EIA/0001216/2012**

## PURPOSE OF DOCUMENT

A period of **40 calendar days (3 April 2014 – 19 May 2014)** has been provided for public review of the Final Environmental Impact Report (EIR). All Interested and Affected Parties (I&APs) as well as State Departments have been notified of this review period. The Final EIR has been sent to DEA for decision making.

The Final EIR contains the following information:

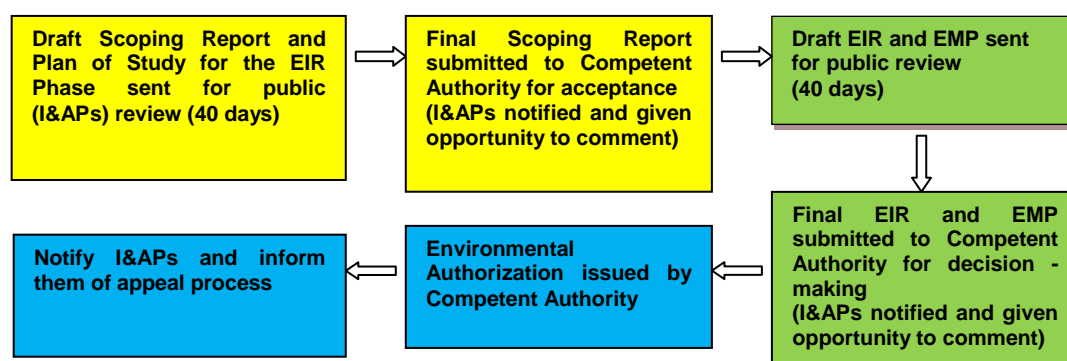
- A description of the project, including project motivation;
- A description of the environment affected by the project;
- The public participation process;
- Discussion of applicable alternatives;
- Assessment of impacts for the construction and operational phases; and
- The EAP's recommendations.

The Final EIR can be viewed at the following venue:

Name of public venue	Name of Contact Person	Contact Number(s)	Viewing Times
Tongaat Library 1 Victoria Avenue, Tongaat Central, KwaZulu-Natal	Ms. Vigie Padayachee	(032) 944 4734	Mondays (12h00 to 18h00) Tuesdays to Fridays (10h00 to 17h00) Saturdays (08h30 to 12h30)

Should you wish to participate in the S&EIR process by contributing issues and concerns/comments, please register as an I&AP by completing the enclosed Registration and Comment Sheet or you can visit SEF's website at <http://www.sefsa.co.za>. To register as an I&AP or comment on the project, click on "Stakeholder Engagement". Click on the "register" button and complete the compulsory fields to register as an I&AP. On completion of these fields, you will be logged in. Click on stakeholder engagement under categories on the right hand side of the page. Then click the **Final EIR for Proposed Dube TradePort Trade Zone 2 Project** to view the report and associated appendices. Should you have any problems in obtaining the information from the Internet, please feel free to contact SEF for assistance.

The flow diagram below highlights the phases in the project where I&APs have the opportunity to participate within the process.



## PROJECT SUMMARY

<b>Project Name</b>	Proposed Dube TradePort TradeZone 2
<b>Farm Name and Portions</b>	Remainder of Portion 9 of La Mercy Airport No. 15124
<b>Surveyor-General 21 Digit Codes</b>	NOFU00000001512400009
<b>Brief Development Overview</b>	<p>The King Shaka International Airport (KSIA) and Dube Trade Port (DTP) (<i>collectively termed the 'Airport'</i>) opened in May 2010. It has been described as far more than a new airport but rather as a stimulator and generator of economic growth for the KZN province and is, therefore, one of the Province's major priorities. The DTP development has been designed as a world class facility of diverse integrated activities that will attract a wide range of aviation-related businesses and investors, operators, users and tenants. The proposed site for this proposed development is approximately 160ha. As part of the Phase 1 development, a portion of the site has been developed for the Trade Zone, Support Zone and the KSIA (including a Cargo Terminal and Valuable Cargo Building) which opened in May 2010 and March 2012, respectively. The existing facility (KSIA and Cargo Terminal) has the capacity for 7.5 million passengers per annum and the capacity to handle 100 000 tons of cargo per annum with the capacity to expand to 2 million tons per annum. The applicant, Dube Trade Port Corporation (DTPC) intends to utilise the remainder of Portion 9 for the purposes of aviation-related activities (<i>such as repairs and maintenance to aircrafts</i>) are proposed at the site and light industrial development to be known as TradeZone 2. This would entail creating platforms, servicing the area and releasing it to the market for development.</p> <p>The following land uses are proposed for the Proposed TradeZone 2:</p> <ul style="list-style-type: none"> <li>• Airside/ cargo terminal; and</li> <li>• Proposed cadastral (<i>for the proposed light industrial land uses</i>);</li> <li>• General Aviation area; and</li> <li>• Airforce residential area.</li> </ul> <p>Access to the DTP Trade Zone 2 development will be from the Main Spine Road that links Watson Highway/Ushukela Highway to the Airport. The internal roads through the development site will have a road reserve ranging from 15m to 45m in width.</p> <p>In the long-term, it is proposed that Brake Drive must be upgraded to provide access into the DTP Trade Zone 2 Development for the generated traffic volumes. A new link road will be required to link Brake Drive and the Main Spine Road (<i>currently under construction</i>) through the DTP development. The proposed access road from Brake Drive will be subject to a separate Environmental Process.</p> <p>Aviation fuel will be stored in tanks to be located within bunded areas of the proposed General Aviation area.</p> <p>A telecommunication mast for aviation-related purposes is proposed. The design and type of telecommunication mast proposed for the Trade Zone 2 will be finalized once the project layout has been finalized.</p> <p>Advertising billboards will be erected at the light industrial land use area. The detail design of the billboards will be available during final design.</p> <p>Should the Developer's preferred layout be implemented, infilling of a significant amount of wetlands will take place on site. To mitigate this impact, the developer intends to rehabilitate wetlands at a candidate offset site occurring north of the study area within the similar Tongaat</p>

	River catchment. The purchase of the candidate site will be dependent on approval of this offset site by the DEA and the key state departments.
<b>Development Footprint</b>	The site is approximately 160 hectares (ha), however, the development footprint is approximately 140ha.
<b>Road Improvements</b>	<p>To mitigate the impact of the development-generated peak hour traffic volumes on the surrounding road network, the following intersection improvements are recommended:</p> <ul style="list-style-type: none"> <li>• The link capacity of the R102 and uShukela Drive can be increased by providing dual lanes per direction on each link. This should be implemented by eThekweni Transport Authority (ETA)/KwaZulu-Natal Department of Transport (KZN DOT) within 5 years as the existing traffic condition is not favourable.</li> <li>• The existing uShukela Drive / Tongaat off-ramp eastern intersection should be converted into a traffic signal controlled intersection in order to reduce delays experienced by the right turning traffic from uShukela Drive west approach towards Durban, it is recommended that a protected signal phase be provided.</li> <li>• The existing uShukela Drive / Tongaat off-ramp western intersection should be converted into a traffic signal controlled intersection in order to reduce delays experienced by the right turning traffic from off-ramp approach towards Westbrook. It is further recommended that a left slip lane towards Tongaat should be provided.</li> <li>• The new proposed DTP Spine road intersection on uShukela Drive should be signalised. Exclusive turning lanes should be provided as recommended in the Traffic Impact Assessment (see Appendix 6).</li> <li>• The existing intersection of uShukela Drive and R102 should be upgraded as per the TIA (see Appendix 6).</li> <li>• The proposed Brake Drive Link road will be required to intersect with the main DTP Spine Road. This will be subject to a separate Environmental Process.</li> <li>• It is further recommended that the intersection of R102 and Brake Drive should be upgraded. Refer to the recommendations in the TIA in Appendix 6 for thorough details.</li> <li>• The Traffic Impact Assessment should be submitted to the eThekweni Municipality, KZN DOT and SANRAL for approval.</li> </ul>
<b>Site Photographs</b>	Please refer to Appendix 2
<b>Provision of Services:</b>	
<b>Water</b>	<p><b>Construction Phase:</b> Water will be sourced from the eThekweni Municipality for construction-related activities and this will be supplemented by rainwater harvested from the Trade Zone 1 development.</p> <p><b>Operational Phase:</b> Water supply to the site will flow by gravity from the Inyaninga Reservoir via the existing bulk water network. The following upgrades to the existing bulk water supply infrastructure are proposed:</p> <ul style="list-style-type: none"> <li>• The water storage required for the existing and proposed developments that feeds off the Inyaninga Reservoir is estimated to be 8.19 Ml, thus a 2.2 Ml reservoir may need to be constructed alongside the existing reservoir to make up for the shortfall in the storage available.</li> <li>• In order to cater for fire flows to Trade Zone 2, it is proposed that 575m of the existing supply line leading up to the tie-in point for the new internal reticulation system be upgraded from a 200 mm Class 12 uPVC pipe to a 315 mm Class 12 uPVC pipe.</li> </ul> <p>Upgrades to the external bulk water supply infrastructure are required.</p> <p>Internal reticulation water pipelines ranging from 110mm in diameter to 315mm in diameter will be constructed through the development site. Water to each erven within the development site will be individually metered.</p>
<b>Stormwater Attenuation</b>	The stormwater system for the proposed Trade Zone 2 development is required for the collection, management and control of stormwater run-off from the proposed site. In accordance with the National Building Regulations "PART R Stormwater Disposal SABS 0400 – 1990", the eThekweni

	<p>municipal policy requires that privately owned sites may be required to manage and make provision for their own stormwater runoff.</p> <p>The general level of management required is that of controlling all runoff emanating from such a site in excess of that which would have occurred if the site was in its natural or original state. Such stormwater management may well be the provision of soak pits, structures such as attenuation ponds or tanks (with controlled outlets where necessary), all to ensure that the rate of runoff is reduced to pre-development states and that runoff is not concentrated onto adjacent neighbouring sites or other infrastructure, be it road drainage or valley lines, streams, etc.</p> <p>The designated catchment areas and the run-off was determined separately for each catchment area occurring within the development site. i.e. Catchment areas 1 to 5.</p> <p>Stormwater run-off from catchment areas 1 to 4 are proposed to drain into designated proposed attenuation ponds and the stormwater run-off from Catchment Area 5 and the Maintenance, Repair, Overhaul (MRO) will drain directly into the Hlawe River at the Watson highway culvert through energy dissipation measures implemented at the outflow.</p> <p>Two attenuation ponds are to be designed to attenuate flows from the proposed development. The attenuation ponds will be sized using the pre and post development method, and have been sized to retain water for flood events which are in excess of the pre- development run off using the 1: 50 year flood run-off volumes. The attenuation ponds are described below:</p> <ul style="list-style-type: none"> <li>• Attenuation Pond 1 is situated south-west of the proposed development inside the tributary stream. This pond will attenuate stormwater from Catchment Area 1 and 2 as well as stormwater from Trade Zone 1. The pond has been sized to have a capacity of 83 ML.</li> <li>• Attenuation Pond 2 is situated north-west of the proposed development and will attenuate stormwater from Catchment Areas 3 and 4 as well as the MRO. The pond has been sized to have a capacity of 58 ML.</li> </ul> <p><b>Internal Stormwater Drainage</b></p> <p>The storm water control philosophy will be to restrict post-development flows into the Hlawe River. In order to achieve this, it is intended to provide a 'sustainable drainage system' in line with international best practice. This will be achieved by a combination of on-site attenuation tanks for roof run-off, permeable paving to parking areas, and unpaved areas, etc. Excess stormwater run-off will be accommodated in the roadway drainage, which will drain into the bulk stormwater system. The stormwater system consists of combined surface, road and pipe systems. In order to determine surface water run-off, probabilistic relationships between the average daily rainfall, rainfall intensity, duration and return period are required.</p>
<b>Sewage</b>	<p><b>Construction Phase:</b> Portable chemical toilets will be provided for construction workers.</p> <p><b>Operational Phase:</b> The Northern Waste Water Treatment Works, which the Trade Zone 1 area drains into, has a capacity of 1.3ML and was initially designed as a temporary solution for the bulk sewerage treatment in the area, due to capacity constraints of the Tongaat Waste Water Treatment Works. The bulk sewerage for the Northern areas of KSIA thus, does not discharge into any municipal system and is treated on site at the Northern Waste Water Treatment Works.</p> <p>The internal sewer drainage network which will service the proposed DTP Trade Zone 2 development stands have been designed as a self-cleansing gravity sewer system which will drain all the stands and transport all sewerage outflow into the bulk sewer drainage system. The internal reticulation sewer pipe size will range from 110mm to 160mm.</p> <p>An external bulk sewerage pipeline system which will drain the entire existing KSIA area and also the proposed development areas of Trade Zone 2 (including the MRO facility) is required. The bulk sewer pipeline alignment will allow the sewerage to be transported to the Tongaat Waste Water Treatment Works.</p>

	<p>The flow calculated to be currently discharging into the Northern Treatment Works is approximately 48.1l/s. The total sewerage flow from the proposed development, which will thus have to be accommodated in the bulk external sewer pipeline to the Tongaat Waste Water Treatment Works, will be that of the existing flows plus the proposed development flows, which amounts to a total flow of 79.27l.</p> <p>With a flow of 79.27l, a pipe size of 315mm is required to drain the KSIA and the proposed development.</p> <p>A bulk sewer pipeline size of 500mm diameter, which enlarges to a 600mm wide pipe, is required to transport the sewerage flows to the Tongaat Waste Water Treatment Works. These demands and pipe sizing will be retained in the revised bulk sewer pipeline to the Tongaat Waste Water Treatment Works.</p> <p>Two options were assessed as part of the Basic Assessment process for transportation by the Hlawe River Bulk Sewer Pipeline as follows:</p> <p><b>Engineering and preferred Alternative:</b> A pipe size of 250mm is proposed to provide a gravity pipeline from the Agrizone development, which is proposed to connect to the Hlawe River Bulk Sewer line. However, this alternative is on hold due to non-compliance of that alignment with the KSIA Appeal Decision, as the proposed bulk sewer line was to traverse the 'conservation area'.</p> <p><b>Environmental Alternative:</b> The proposed alternative includes a pump station and sump system that is to be constructed at the Agrizone. The sewer network from the Agrizone development will discharge into the sump, from where it will be pumped with a 200mm diameter uPVC pipe to an inception chamber manhole that would be located at the Tradezone 2 development. The pump station at the Agrizone development will have a level switch which will activate the pump, once it reaches a certain level.</p> <p>The river will have to be crossed at a point along the route of the pumping main from the Agrizone pump station to the TradeZone 2 inception chamber manhole. At the river crossing, the pipe will be encased in concrete to protect the pipe from being damaged.</p> <p>The inception chamber manhole will be constructed out of concrete with the 200mm diameter pressurised pipeline coming in at a high level and a 500mm diameter uPVC gravity pipeline leaving the chamber at a lower level. With the incoming pipe being at a higher level than the outgoing pipe, it will allow the sewer to start gravitating to the next position once it reaches the inception chamber.</p> <p>The gravity 500mm pipeline will run along the edge of the platform and it will cross the river at the same point as the new proposed road and will run along the route as proposed by the previous Hlawe river bulk sewer pipeline system to the Tongaat Waste Water Treatment Works (WWTW).</p>
<b>Electricity</b>	<p><b>Construction Phase:</b> Diesel Generators will be used.</p> <p><b>Operational Phase:</b> The design and installation of the bulk electricity supply will be done by eThekweni Electricity.</p> <p>The following is anticipated regarding electrical reticulation:</p> <ul style="list-style-type: none"> <li>• 11kV supplies will be taken from the existing 132/11kV major substations and distributed along the main access roads to the Trade Zone 2 development. They will feed a series of distribution substations.</li> <li>• Distribution substations will be planned and positioned in key locations throughout the development.</li> <li>• 1kV cable routes will be planned to run in the road reserves adjacent or in close proximity to each proposed site, allowing sales and transfers of sites to take place.</li> <li>• Sites that require more than a 1MVA supply will be serviced by a substation (brickwork</li> </ul>

	<p>structure).</p> <ul style="list-style-type: none"> <li>• Smaller sites will either be equipped with their own mini-sub or supplied by a 400V feed from a shared substation (brickwork structure).</li> </ul> <p><b>Internal electrical reticulation and supply</b></p> <p>Internal reticulation and street lighting:</p> <ul style="list-style-type: none"> <li>• Internal reticulation will be performed by eThekweni Electricity. They will provide a metered supply at the boundary of each serviced stand.</li> <li>• Street lighting as well as public open space lighting will be designed according to SANS 10098.</li> </ul>
<b>Solid Waste</b>	<p><b>Construction Phase:</b> The Contractor will be responsible for the management and removal of all solid waste (refer to the Environmental Management Programme (EMPr) in Appendix 7.</p> <p><b>Operational Phase:</b> The development falls within the jurisdiction of eThekweni Municipality, and therefore Durban Solid Waste (DSW) will be responsible for provision of waste collection.</p> <p><b>WASTE MANAGEMENT AND DISPOSAL</b></p> <p>The comprehensive solid waste management plan will include, but not be limited to the following:</p> <ul style="list-style-type: none"> <li>• Contribution areas within the development.</li> <li>• Type of waste generation for the contribution areas.</li> <li>• Basic estimation of waste streams identified and waste volumes will be determined.</li> <li>• Potential recyclable waste streams will be highlighted.</li> </ul> <p>Based on this information, a recommendation will be given if the site should have a waste sorting facility or only a temporary waste storage area.</p> <p><b>DESIGN CRITERIA</b></p> <p>Based on the recommendation whether a waste sorting facility or temporary waste storage area will be needed, a design will be submitted to accommodate the type of waste area needed for the site.</p> <p>According to the Red Book guidelines, occupancy for buildings is one person per 50m<sup>2</sup>.</p>
<b>Telecommunication</b>	<p>DTPC currently manages all telecommunication data services in the adjacent area. A data centre currently exists at the Trade Zone Cyber port.</p> <p>The current existing DTPC design principles and data network distribution criteria to all sites within the Dube Trade Port Aerotropolis will apply.</p> <p><b>TELECOMMUNICATION AND DATA NETWORKS AND INFRASTRUCTURE</b></p> <ul style="list-style-type: none"> <li>• Sleeves will be installed alongside the internal roads, connecting the cyber port to all serviced stands.</li> <li>• Sleeves will be terminated in a manhole at the boundary of each stand.</li> <li>• A minimum of 4 x 110mm sleeves will be installed with draw boxes at anticipated tie-ins and road crossings. Draw boxes will not be installed more than 200m apart.</li> <li>• 3 x 40mm cable tubes will be installed in two of the four sleeves.</li> </ul>

## ENVIRONMENTAL ASSESSMENT PRACTITIONER

Strategic Environmental Focus (Pty) Ltd (SEF) is a privately owned company and was formed in 1997 with the objective of providing **expert solutions to pressing environmental issues. SEF is one of Africa's largest multi-disciplinary consultancies**, offering sustainable environmental solutions to private and public sector clients. With our integrated services approach in the management of natural, built and social environments; and with over a decade of experience, we bring a wealth of knowledge and expertise to each project.

### SEF's Vision

*SEF offers holistic and innovative sustainable solutions in response to global challenges.*

### SEF's Mission

*SEF is a national sustainability consultancy which provides integrated and innovative Social, Biophysical & Economic solutions while fostering strategic stakeholder relationships, underpinned by SEF's core values.*

SEF has assembled a team of professionals, consisting of a core of environmental experts with extensive experience in dealing with Environmental Impact Assessments (EIAs), Public Participation Processes, Architectural and Landscape Architecture, Mining and Environmental Management. SEF also has a team of specialist practitioners such as specialists in Heritage Impact Assessments (HIA), Wetland Delineation and Functional Assessments; Wetland/ Riparian Rehabilitation, Aquatic Assessments; Ecological (Fauna, Avifauna and Flora) Assessment, Visual Impact Assessments (VIAs), Soils and Agricultural Potential Assessments, Socio-Economic Assessments, etc.

SEF is a Qualifying Small Enterprise and a **Level 2 contributor in terms of the Broad Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003)** and has a procurement recognition level of 135%.

SEF commits itself to comply with the requirements and the implementation of a Quality Management System. The Quality Management System will be reviewed and implemented to continually improve efficiency and effectiveness of the organisation.

SEF uses a "green" approach to anything we embark on. We believe in using technology to our and the environment's best advantage. We encourage the use of green alternatives such as telephone and video conferencing instead of travelling for workshops and meetings and CDs instead of printed material, where possible.

The following project team members are involved in this S&EIR application process.

**Table 1: Project Team Members**

Name	Organization	Project Role
Mr. Mark Ryan	SEF	Project Manager
Ms. Natasha Lalie	SEF	Environmental Manager
Ms. Elaine Govender	SEF	Environmental Manager



**Mr Mark Ryan**

Mr Mark Ryan is an environmental consultant at SEF with seven (7) years' experience in Environmental Impact Assessment. Mark has special interest in EIA, environmental auditing and strategic environmental processes such as Environmental Management Frameworks. Mark has a Master of Social Science Degree (M.Soc.Sci) in Geography and Environmental Management from the University of KwaZulu-Natal. Mark is responsible for conducting environmental impact assessments for a wide range of projects that involve wastewater treatment plants, infrastructure such as bridges and roads, bulk water pipeline projects, residential and mixed use developments. Mark has experience in project management and administration as well as the planning and compilation of Scoping Reports, Environmental Impact Reports and Environmental Management Plans. Mark also has experience in environmental auditing of construction activities such as residential developments, office parks and golf courses.

**Ms Natasha Lalie**

Natasha has an MSc. Environment and Society and has been an Environmental Assessment Practitioner (EAP) for almost nine years. She has undertaken numerous Scoping Reports, Environmental Management Programmes (EMP's) and Exemption Applications, as required by the Environment Conservation Act, 1989 (Act No. 73 of 1989); Environmental Screening and Feasibility Studies; and S&EIRs as well as Basic Assessments (BAs), as required by NEMA and the EIA Regulations. She has been involved in a wide range of projects, which include waste management, industrial, township establishments, mixed-use development, road upgrades, infrastructure developments, change of land use, lodge developments, proposed bulk water pipelines, proposed transmission power lines, proposed filling stations, shopping centre developments and so on.

**Ms Elaine Govender**

Elaine graduated from the School of Environmental Sciences, University of KwaZulu-Natal, with a Bachelor's in Social Science degree in Geography and Environmental Management. She is currently enrolled for a BSc Honours in Environmental Management at the University of South Africa (UNISA). She has 5.5 years' experience in the environmental field. Elaine has been involved in all facets of the Environmental Impact Assessment process and Environmental Control Officer (ECO) monitoring of housing developments, Eskom powerlines and substations, roads and pipeline assessments and managing the EIA process. Elaine is a member of the KwaZulu-Natal branch of the International Association for Impact Assessment (IAIA).

**Table 2: Contact Details of Environmental Assessment Practitioner**

Name	Contact Details
Mr. Mark Ryan	Strategic Environmental Focus (Pty) Ltd Postal Address: PO Box 227, Pavilion, 3611 Tel: 031 266 1277 Fax: 031 266 6880 Email: <a href="mailto:mark@sefsa.co.za">mark@sefsa.co.za</a>

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## EXECUTIVE SUMMARY

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### 1 INTRODUCTION

Strategic Environmental Focus (Pty) Ltd as independent environmental consultants were appointed by Dube TradePort Corporation (Project Applicant) to conduct the Scoping and Environmental Impact Reporting (S&EIR) process for the proposed construction of Dube TradePort TradeZone 2 on the remainder of Portion 9 of La Mercy Airport No. 15124 near La Mercy within the eThekweni Municipality KwaZulu-Natal.

The Scoping Phase for the proposed project has been completed and the Final Scoping Report and Plan of Study for the EIR were submitted to the Department of Environmental Affairs (DEA) on the 27 August 2012. Approval to proceed to the EIR phase was received on 8 November 2012.

The purpose of this Final Environmental Impact Report is to provide responses to interested and affected parties (I&APs) and relevant State Departments and afford them and an opportunity to comment and provide input into the process going forward. All comments received during the review and commenting phase has been incorporated into the Final Environmental Impact Report for consideration by the approving authority, DEA.

### 2 BRIEF PROJECT DESCRIPTION

The KSIA and DTP (collectively termed the 'Airport') opened in May 2010. It has been described as far more than a new airport but rather as a stimulator and generator of economic growth for the province and is, therefore, one of the Province's major priorities. The DTP development has been designed as a world class facility of diverse integrated activities that will attract a wide range of aviation-related businesses and investors, operators, users and tenants. The proposed site for this proposed development is approximately 160ha. As part of the Phase 1 development, a portion of the site has been developed for the Trade Zone, Support Zone and the KSIA (*including a Cargo Terminal and Valuable Cargo Building*) which was opened in May 2010 and March 2012, respectively. The existing facility (*KSIA and Cargo Terminal*) has the capacity for 7.5 million passengers per annum and the capacity to handle 100 000 tons of cargo per annum with the capacity to expand to 2 million tons per annum. The DTP Corporation intends to utilise the remainder of Portion 9 for the purposes of aviation-related activities (*such as repairs and maintenance to aircrafts*) are proposed at the site and light industrial development to be known as Trade Zone 2. This would entail creating platforms, servicing the area and releasing it to the market for development.

The following land uses are proposed for the Proposed TradeZone 2:

- Airforce residential areas;
- Proposed cadastral (*light industrial land use*);
- Airside / cargo terminal; and
- General Aviation areas.

The 'conservation area' illustrated on the northern portion of the site is the 'offset area' for the KSIA/DTP Phase 1 development. There will be no development within the 'conservation area'.

Access to the DTP Trade Zone 2 development will be from the Main Spine Road that links Watson Highway/Ushukela Highway to the Airport. The internal roads through the development site will have a road reserve ranging from 15m to 45m in width.

In the long-term, it is proposed that Brake Drive must be upgraded / constructed to provide access into the DTP Trade Zone 2 Development for the generated traffic volumes. In addition, the new link road will be required to link Brake Drive and the Main Spine Road (*currently under construction*) through the DTP

development. The proposed access road from Brake Drive will be subject to a separate Environmental Process.

Aviation fuel will be stored in tanks to be located within bunded areas of the proposed General Aviation (GA) area.

A telecommunication mast for aviation-related purposes is proposed on the site. The design and type of telecommunication mast proposed for the Trade Zone 2 will be finalized once the project layout has been finalized.

Advertising billboards will be erected at the light industrial land use area. The detail design of the billboards will be available during final design.

TradeZone 2 is zoned Undetermined as per the eThekweni North Scheme. On receipt of the EA, a rezoning application to General Industry will be undertaken.

The controls as per Undetermined Zone are as follows:

Floor Area Ratio (FAR): 0.5

Percentage Coverage: 30%

Minimum Lot Size: 2 000m<sup>2</sup>

Building Line: 7.5m

S/SPACE: 5.0m

Controls as per General Industry Zone:

FAR: 1.0

Percentage Coverage: 70%

Minimum Lot Size: 1 800 m<sup>2</sup>

Building Line: 7.5m

S/SPACE: 2.0m

There will be total infilling of all the wetlands on the site for the proposed development, should the developer's preferred layout alternative be approved. Wetland Consulting Services (WCS) were appointed to compile the wetland delineation, offset and rehabilitation strategy report to assess the offsets. This will be explained in Section B-1.3 of the Final EIR. To mitigate this impact, the proponent intends to rehabilitate wetlands at a candidate offsite site. A candidate site has been identified that occurs north of the study area, within the same catchment as the study site i.e. Tongati River Catchment. In total, the wetlands within the study site represent 30.0 hectare equivalents of functional wetland area. To ensure a no-net-loss of wetland functional area from the local landscape, a gain of 30 ha-eq of wetland ecological integrity needs to be obtained through the successful rehabilitation of the candidate wetlands. Through successful wetland rehabilitation, the ecological integrity of the wetlands of the candidate site will be improved. This could potentially yield a gain of 49.4ha-eq.

A Traffic Impact Study (refer to Appendix 6) was conducted by Aurecon South Africa (Pty) Ltd for the proposed development. To accommodate the anticipated traffic calculated by the study the following intersection improvements are recommended:

- The link capacity of the R102 and uShukela Drive must be increased by providing dual lanes per direction on each link. This should be implemented by eThekweni Transport Authority (ETA)/KZN Department of Transport (KZN DOT) within 5 years as the existing traffic condition is not favourable.
- The existing uShukela Drive / Tongaat off-ramp eastern intersection should be converted into a traffic signal controlled intersection in order to reduce delays experienced by the right turning traffic from uShukela Drive west approach towards Durban, and it is recommended that a protected signal phase be provided.

- The existing uShukela Drive / Tongaat off-ramp western intersection should be converted into a traffic signal controlled intersection in order to reduce delays experienced by the right turning traffic from off-ramp approach towards Westbrook. It is further recommended that a left slip lane towards Tongaat should be provided.
- The new proposed DTP Spine road intersection on uShukela Drive should be signalised. Exclusive turning lanes should be provided as recommended in Chapter 11 of the TIA.
- The existing intersection of uShukela Drive and R102 should be upgraded as per Chapter 11 of the TIA.
- The proposed Brake Drive Link road is required to intersect with the main DTP Spine Road (*will be subject to a separate Environmental Application*). It is further recommended that the intersection of R102 and Brake Drive should be upgraded in order to accommodate the expected development traffic. Refer to Chapter 11 of the TIA for thorough details.
- The TIA has been submitted to the eThekweni Municipality and KZN DOT for comment and approval.

### 3 KEY IMPACTS

The following key impacts were identified during the Scoping Phase and were further investigated and assessed within this EIR.

#### **Biophysical Impacts:**

- Impact on ground and surface water due to hydrocarbon spillages during both the construction and operational phases of the development;
- Impact on wetlands and riparian areas due to creation of platforms during construction;
- Loss of wetland ecosystem and habitat through infill;
- Potential for soil erosion due to soil compaction and increased surface water run-off associated with establishment of hard internal surfaces and vegetation clearing during construction and operational phases;
- Impact on loss of flora/fauna as a result of construction activity such as vegetation clearing;
- Impact on avifauna as a result of the proposed aviation-related activities; and
- Impact on geological formations as a result of the proposed development;

#### **Socio-Economic Impacts:**

- Potential loss of viable and high potential agricultural land;
- Impact of air pollution caused by dust during construction;
- Impact of noise caused by construction activity;
- Impacts on heritage resources and culture;
- Impact on safety and security;
- Job creation during the construction and operational phases of the proposed project.
- Impacts on localised traffic;
- Impact on existing services;
- Compatibility with the municipal plans; and
- Impact on visual character.

#### **Cumulative Impacts:**

- Increased loss of viable and high potential agricultural land;
- Economic growth in the region;
- Cumulative impact of the proposed development and other developments within the KSIA/DTP Precinct;
- Increased traffic associated with additional road users; and
- Cumulative net loss of wetlands on site and total loss of wetland habitat in the KSIA/DTP development precinct.

### 4 PROJECT ALTERNATIVES

To give effect to the principles of NEMA and Integrated Environmental Management (IEM), an EIA should assess a number of reasonable and feasible alternatives that may achieve the same end result as that of the preferred project alternative. The following alternatives have been identified as part of this EIA:

#### **Site/ Location Alternatives:**

The developer owns the site which is strategically located and in close proximity to the Phase 1 of DTP and the KSIA. The development of the site would therefore be compatible with the adjacent land uses.

**Development Layout Alternatives:**Alternative 1: Developer's Preferred Layout

This would entail the total infilling of the wetlands and drainage lines on the site to cater for a maximum developable area (refer to the Layout Plan in Appendix 3).

Alternative 2: Environmental Preferred Layout

This would entail the implementation of a buffer width of 30m from the wetlands and drainage lines on site to maintain the ecological processes associated with the water resources on site and minimise the negative impacts on the downstream hydrological systems. The reduced development footprint will render the site unfeasible for the proposed TradeZone 2 Master Plan, due to insufficient space allocation which is required for General Aviation, Light Industry and the Airside/cargo terminal (Refer to the Layout Plan in Appendix 3).

**Land Use Alternatives**

Alternative 1: The Preferred Alternative is to develop the 160ha site into light industrial area, General Aviation and airside/cargo terminal to complement the existing adjacent infrastructure constructed during the Phase 1 KSIA/DTP development, including the MRO and the Watson Highway Link Road currently under construction. The remaining area on site would accommodate service roads and supporting services infrastructure.

Alternative 2: Would make allowance for only one land use on the entire site. As such, instead of the proposed development being divided to accommodate open spaces, various tenant specifications and service roads; the entire site would be developed for heavy industries only.

Alternative 3: Would make allowance for a layout that would accommodate both light industrial and residential use within TradeZone 2.

**No Development Alternative**

The 'no-go' or 'do nothing' alternative would be applicable if the proposed development is not approved by the DEA and the status quo of the site will remain. This option assumes that a conservative approach would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the proposed development not be undertaken, the study area will not be affected by any construction-related or operational phase impacts. Therefore, the present state of the biophysical, social and economic environment will remain, unaffected.

The site would remain undeveloped and commercial sugar cane farming would continue. The proposed general aviation associated Maintenance Repair Overhaul (MRO) facility and the new link road between the Cargo Terminal and uShukela Drive (formerly Watson Highway) would however, be underutilized. Refer to Appendix 3 for an illustration of the MRO facility in relation to the site boundary for DTP TradeZone 2. In addition to servicing the needs of the Cargo Terminal and Trade Zone area, the link road has been designed to accommodate additional traffic from surrounding areas earmarked for development. Against this background, this alternative would have huge implication for the infrastructure investment already made in the area.

The airport is anticipated to provide opportunities for new trade, a logistics gateway, additional cargo freight, direct international flights and an increased number of passengers in the long-term. Should the Trade Zone 2 development not take place, there would be no infrastructure to support the expansion of the airport to meet its provincial goals of growth in the economy. The investment made in Phase 1 of the KSIA/DTP development will not be fully utilized and supported. The province would stagnate in growth of the airport due to the lack of adequate infrastructure.

Failure to construct the Trade Zone 2 development will not unlock opportunities for economic and employment opportunities in the Greater La Mercy area and will not contribute to the Dube Aerotropolis<sup>1</sup> development plans.

The DTP has been identified as a key development node in the north, and this is evident in the eThekweni Municipality's IDP, as well as the northern spatial development plan, and the Tongaat/DTP LAP. In the absence of the Trade Zone 2 development, there would be stifled growth, not only in the northern region of the Municipality but also in the Southern African region, since the airport's international status will be undermined.

In the absence of the proposed TradeZone 2 development, there would be no need for additional services infrastructure such as the proposed 2.2ML reservoir to provide water to the proposed development. In addition, there would not be the need for the construction of additional bulk sewer pipelines to the Tongaat Waste Water Treatment Works (WWTW) to cater for the increased demand in sewerage requirements. The present status quo in terms of stormwater run-off would prevail and there would be no need for the construction of attenuation ponds. There would not be any pressure on the eThekweni Municipality to collect waste that would have been generated at the Trade Zone 2 development, if it were constructed and became fully operational.

The anticipated road upgrades that are envisaged by Traffic Engineer would not be required, should the Trade Zone 2 development not go-ahead.

There would not be any destruction of additional habitats, as there would not be any infilling of wetlands and drainage lines associated with the Trade Zone 2 development site. With the implementation of on-site rehabilitation measures to re-instate the wetlands and drainage lines, there would be increased biodiversity on the site. On the contrary, should the development not be approved, there could be a missed opportunity for rehabilitation of Hlawe River associated wetlands and riparian zones.

## 5 CONCLUSIONS AND RECOMMENDATIONS

In accordance with GN No. 543, the Environmental Impact Phase is aimed at identifying and assessing potential impacts caused by the proposed development. The ability to mitigate any of the identified impacts are also addressed and summarised into a working / dynamic Environmental Management Programme (EMPr) for consideration by I&APs and ultimately by the DEA.

Comments and/or concerns identified by Interested and Affected Parties (I&APs) during the review period of the **Draft** Environmental Impact Report have been incorporated into the Final Environmental Impact Report and has been submitted to the DEA for consideration.

Two layout alternatives have been presented in the Final EIR i.e. Environmentally Preferred Layout and the Developer's Preferred Layout.

### 1) Environmentally Preferred Alternative:

- The Environmentally Preferred Layout allows for non-encroachment of infrastructure into the wetlands, drainage lines and their associated 30m buffer area. The watercourses on site must be rehabilitated to allow for the increased biodiversity on site. This would also ensure that the hydrological flow patterns downstream of the site is not altered and the water courses are not

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<sup>1</sup> KSIA is a core piece of infrastructure with access to sea, road and rail linkages, within one of Southern Africa's strongest regional economies.

DTP development strategy will guide the development of the entire Airport City and create significant opportunities for all businesses in surrounding area ([www.thdev.co.za/developments/aerotropolis/overview](http://www.thdev.co.za/developments/aerotropolis/overview)).

An Aerotropolis is a new layout of urban form comprising of aviation intensive businesses and related enterprises extending up to 25 kilometres outward from major airports (<http://en.wikipedia.org/wiki/Aerotropolis>).

polluted. This measure would be in line with the conditions of the KSIA Appeal Decision for the broader KSIA/DTP Development Precinct.

- This alternative is similar to the no-go alternative as there would be a reduced development footprint that would render the proposed TradeZone 2 development unviable for development, as there would be insufficient space for land uses such as General Aviation, Cargo Terminal and light industrial development.

## 2) **Developer's Preferred Alternative:**

- Should the Developer's preferred layout be approved, then all the wetlands on site will be infilled / lost as a result of development activities such as platforming and the construction of both bulk infrastructure and top structures on the site.
- To mitigate the loss of wetlands, the proponent intends to rehabilitate wetlands at a candidate offsite site. A candidate site has been identified that occurs north of the study area, within the same catchment as the study site i.e. Tongati River Catchment. In total, the wetlands within the study site represent 30.0 hectare equivalents of functional wetland area. To ensure a no-net-loss of wetland functional area from the local landscape, a gain of 30 ha-eq of wetland ecological integrity needs to be obtained through the successful rehabilitation of the candidate wetlands. Through successful wetland rehabilitation, the ecological integrity of the wetlands of the candidate site will be improved. This could potentially yield a gain of 49.4ha-eq.

Should the developer's preferred layout be adopted, the following recommendations are suggested:

- Should the Provincially Protected Plants be removed, relocated or destroyed as a result of the proposed development, a permit from the Provincial Department of Agriculture, Forestry and Fisheries (DAFF) must be sought and approved. It is recommended that the Provincially Protected Plants be relocated to the 'conservation area' adjacent to the northern boundary of the site.
- In view of the close proximity of the proposed development to the airport, it is recommended that the design of the buildings within the study area incorporate noise reduction principles to minimize noise impacts on the occupants. Therefore, residential development is not recommended as an alternative for the proposed development. Industrial development and associated aviation-related activities are compatible land-uses that will complement the adjacent KSIA and DTP.
- There are requirements for additional services infrastructure to be constructed that fall outside of the site boundary of the Trade Zone 2 development site. It is therefore suggested that the following proposed services infrastructure form part of a separate Environmental Application for approval by the DEA:
  - Proposed 2.2Ml reservoir;
  - Bulk sewer pipelines;
  - Stormwater attenuation ponds
- The TIA recommendation to construct a Link Road from Brake Drive to the New Spine Road must form part of a separate Environmental Application.
- The developer must provide high standard traffic warnings and traffic calming measures where construction activities interfere with traffic.
- The fuel storage areas at the General Aviation area must be clearly demarcated and restricted to designated staff only. The fuel storage area must be adequately bunded to ensure that no contamination of underground water and catchment areas occurs.
- The transport, handling and storage of hazardous substances must comply with all the provisions of the Hazardous Substances Act, 1973 (Act No. 15 of 1973), associated regulations as well as SANS 10228 and SANS 10089 codes.
- A Contingency Plan must be put into place in case of leakages or spillages which are not detected and then lead to the contamination of underground water. Leak detectors on pressure systems must be included.
- Monitoring of volumes of the tanks must take place on a daily basis to detect unexplained losses due



to leakages.

- In the event of a spill, hazardous material may be generated. Such material must be disposed of at a suitably licensed waste disposal facility, with chain of custody documentation supplied as proof of end recipient.
- Hazardous and flammable substances must be stored and used in compliance with the applicable regulations and safety instructions.
- The 'conservation area' to the north of the site boundary must be clearly demarcated and there must be no encroachment of construction crew into this area. Stockpiles, construction vehicles and equipment, construction rubble etc, must not occur within the 'conservation area'. Prior to construction, the importance of the 'conservation area' and must be included in the Environmental Awareness Programme that the construction crew must be inducted on,
- The proposed development is in line with the local policies and guidelines such as the eThekweni Municipality's IDP, Northern Spatial Development Plan (NSDP), as well as the Tongaat/DTP Local Area Plan (LAP). Furthermore, a development framework plan for the expansion of the site has been prepared and approved by the local authority in 2008. The further development of the Trade Zone is in line with this plan.
- The proposed development will also contribute to local economic development and provide various employment opportunities to the local people with the eThekweni Municipality.
- In terms of agricultural activities and current land use, the impacts of the land use change is considered to be negligible on the surrounding areas.
- The site is generally stable and suitable for development, provided the recommendations as given in the Geotechnical Report are adhered to. It is recommended that a Geotechnical Engineer be appointed to inspect and approve all cut slopes, and cut and fill heights greater than 2m.

Having presented the two layout alternatives, the DEA is requested to approve the layout alternative that is based on the principles of sustainable development.

The applicant motivated for the Preferred Alternative by mitigating the infill of wetlands through the rehabilitation of wetlands at a candidate offset site. These wetlands have been identified as a National Ecosystem Priority Area and critical in terms of Ezemvelo Conservation Plan. Rehabilitation of the wetlands within the site may potentially improve the integrity of the wetlands to the extent that the number of hectare equivalents may be increased to 103.6ha. This is a potential gain of 49.4ha-eq, after a conservative estimate of the post-rehabilitation ecological state of the candidate wetlands.

This will appropriately achieve the no-net-loss functional area target, as well as provide leeway for any potential risk of failure of certain interventions.

The candidate site is considered appropriate and suitable for achieving both the wetland functioning target offset and the biodiversity target offset for the proposed development.

The DTP has been identified as a key development node in the north, and this is evident in the eThekweni Municipality's IDP, as well as the northern spatial development plan, and the Tongaat/DTP LAP. Should the proposed development not proceed with the Developer's Preferred Layout, there would be stifled growth, not only in the northern region of the Municipality but also in the Southern African region, since the airport's international status will be undermined. The Trade Zone 2 development forms part of the Greater KSIA/DTP Master Plan for growth of the Province, employment opportunities and the economy and the proposed infrastructure at TradeZone 2 would provide support to Phase 1 of the KSIA/DTP development. The proposed

development's key role in the Dube Aerotropolis<sup>2</sup> development plans must be considered in the DEA's Environmental Decision.

A variety of mitigation measures have been identified that will serve to mitigate the scale, intensity, duration or significance of the impacts that have a low to medium, medium to high and high significance rating. These include guidelines to be applied during the construction and operational phases of the project. The EMPs (Appendix 7) contains more detailed mitigation measures.

To ensure that identified negative impacts are minimised and positive impacts enhanced, the following clauses are recommended as conditions of the Environmental Authorisation:

- The EMP is a legally binding document and the mitigation measures stipulated within the document and EIR must be implemented.
- An independent Environmental Control Officer (ECO) must be appointed to manage the implementation of the EMP during the construction phase. Environmental Audit Reports must be compiled and made available for inspection.

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<sup>2</sup> KSIA is a core piece of infrastructure with access to sea, road and rail linkages, within one of Southern Africa's strongest regional economies.

DTP development strategy will guide the development of the entire Airport City and create significant opportunities for all businesses in surrounding area ([www.thdev.co.za/developments/aerotropolis/overview](http://www.thdev.co.za/developments/aerotropolis/overview)).

An Aerotropolis is a new layout of urban form comprising of aviation intensive businesses and related enterprises extending up to 25 kilometres outward from major airports (<http://en.wikipedia.org/wiki/Aerotropolis>).

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## LIST OF ABBREVIATIONS AND ACRONYMS

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<b>AEL</b>	Air Emissions Licence
<b>BA</b>	Basic Assessment
<b>CRR</b>	Comments and Responses Report
<b>DEA</b>	Department of Environmental Affairs
<b>DAFF</b>	Department of Agriculture, Forestry and Fisheries
<b>DWA</b>	Department of Water Affairs
<b>DTPC</b>	Dube TradePort Corporation
<b>DTP</b>	Dube TradePort
<b>DSW</b>	Durban Solid Waste
<b>DNSDP</b>	Draft Northern Spatial Development Plan
<b>DNL</b>	Day Night Average Sound Level
<b>EAP</b>	Environmental Assessment Practitioner
<b>EA</b>	Environmental Authorisation
<b>ECO</b>	Environmental Control Officer
<b>ETA</b>	Ethekwini Transport Authority
<b>EIA</b>	Environmental Impact Assessment
<b>EIR</b>	Environmental Impact Reporting
<b>EMPr</b>	Environmental Management Programme
<b>FEPA</b>	Freshwater Ecosystem Priority Area
<b>GA</b>	General Aviation
<b>GDP</b>	Gross Domestic Product
<b>GN</b>	Government Notice
<b>ha</b>	Hectares



<b>HIA</b>	Heritage Impact Assessment
<b>HGM</b>	Hydro geomorphic Unit
<b>I&amp;APs</b>	Interested and Affected Parties
<b>IDP</b>	Integrated Development Plan
<b>IEM</b>	Integrated Environmental Management
<b>IUCN</b>	World Conservation Union
<b>KSIA</b>	King Shaka International Airport
<b>KPI</b>	Key Performance Indicator
<b>KZN DAEEA</b>	KwaZulu-Natal Department of Agriculture and Environmental Affairs
<b>KZN DoT</b>	KwaZulu-Natal Department of Transport
<b>LAP</b>	Local Area Plan
<b>MRO</b>	Maintenance Repair Overhaul
<b>MAP</b>	Mean Annual Precipitation
<b>MAT</b>	Mean Annual Temperature
<b>ME</b>	Mitigation Efficiency
<b>mm</b>	Millimetres
<b>NEMA</b>	National Environmental Management Act, 1998 (Act No. 107 of 1998)
<b>NAD</b>	Northern Attenuation Dam
<b>NEMWA</b>	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
<b>NEMPAA</b>	National Environmental Management Protected Areas Act
<b>NHRA</b>	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
<b>NUDC</b>	North Urban Development Corridor
<b>NSBA</b>	Northern Spatial Biodiversity Act
<b>NSDP</b>	Northern Spatial Development Plan

<b>NWA</b>	National Water Act, 1998 (Act No. 36 of 1998)
<b>PGDS</b>	Provincial Growth and Development Strategy
<b>PSEDS</b>	Provincial Spatial Economic Development Strategy
<b>PES</b>	Present Ecological State
<b>PoS</b>	Plan of Study
<b>QDGC</b>	Quarter Degree Grid Cell
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SEF</b>	Strategic Environmental Focus (Pty) Ltd
<b>SFM</b>	Significance Following Mitigation
<b>S&amp;EIR</b>	Scoping and Environmental Impact Reporting
<b>SDF</b>	Spatial Development Framework
<b>SARCA</b>	South African Reptile Conservation Assessment
<b>SANRAL</b>	South African National Roads Agency Limited
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SUDS</b>	Sustainable Urban Drainage System
<b>TIA</b>	Traffic Impact Assessment
<b>VIA</b>	Visual Impact Assessment
<b>WOM</b>	Without Mitigation Measures
<b>WM</b>	With Mitigation Measures
<b>WF</b>	Weighting Factor
<b>WWTPP</b>	Waste Water Treatment Package Plant
<b>WWTW</b>	Waste Water Treatment Works

## GLOSSARY OF TERMS

Applicant	Any person who applies for an authorisation to undertake an activity or to cause such activity to be undertaken as contemplated in sections 24(5), 24M and 44 of the National Environmental Management Act, 19998 (Act No. 107 of 1998).
Ecology	The study of the interrelationships between organisms and their environments.
Environment	The surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Impact Assessment	Systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&EIR.
Environmental Management Programme	A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.
Interested and Affected Party	Any person or groups of persons who may express interest in a project or be affected by the project, positively or negatively.
Key Stakeholder	Any person who acts as a spokesperson for his/her constituency and/or community/organization, has specialized knowledge about the project and/or area, is directly or indirectly affected by the project or who considers himself/herself a key stakeholder.
Stakeholder	Any person or group of persons whose live(s) may be affected by a project.
Study Area	Refers to the entire study area encompassing all the alternatives as indicated on the study area or locality map.
Succession	The natural restoration process of vegetation after disturbance.
State Department	Any department or administration in the national or provincial sphere of government exercising functions that involve the management of the environment.

## SECTION A:INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by Dube TradePort Corporation (Project Applicant) to conduct the Scoping and Environmental Impact Reporting (S&EIR) process for the proposed construction of Dube TradePort TradeZone 2 on the remainder of Portion 9 of La Mercy Airport No. 15124 near La Mercy within the eThekweni Municipality KwaZulu-Natal.

### A-1 DESCRIPTION OF PROPOSED ACTIVITY

#### A-1.1 Locality

The site occurs approximately 40km north of the Durban CBD within the eThekweni Municipality. The site is strategically located between the town of Tongaat and the King Shaka Airport, with direct access to the existing national road and R102. The GPS points of the centre of the site are approximately 29°35'34.84" south and 31°07'31.91" east. Refer to the Locality map in Figure 1 and Appendix 1. In addition, refer to the Regional Map, Land cover map and Vegetation types of the study area in Appendix 1.

The site is presently used for sugar cane cultivation.

The eastern boundary of the site is the KSIA and associated TradeZone 1 infrastructure. Existing commercial sugarcane plantations occur on the western and southern boundaries. The northern boundary is the 'conservation areas' set aside for the KSIA/DTP (Phase 1) development (*as illustrated on the Locality Map*). The new Spine Road (*Link Road*) from Ushukela Highway through the site is presently under construction. This road will serve as an access road to the entire Trade Zone development including Phase 1 development.

#### A-1.2 Surrounding Land Use

To further place the site in context, the land uses within all four major compass directions that surround the site are described in the Table 3 below.

**Table 3: Surrounding Land Use Table**

Direction	Land Use	Distance (m)
North	'Conservation Area' set aside for the KSIA/DTP (Phase 1) development	Adjacent to the site
	P426 road network	0.5km
South	Agricultural cane lands	Adjacent to the site
	King Shaka International Airport	Adjacent to the site
	Mount Moreland	3.5km
East	King Shaka International Airport	Adjacent to the site
	N2 road network	0.6km
West	Agricultural cane lands	Adjacent to the site
	R102 road network	2km



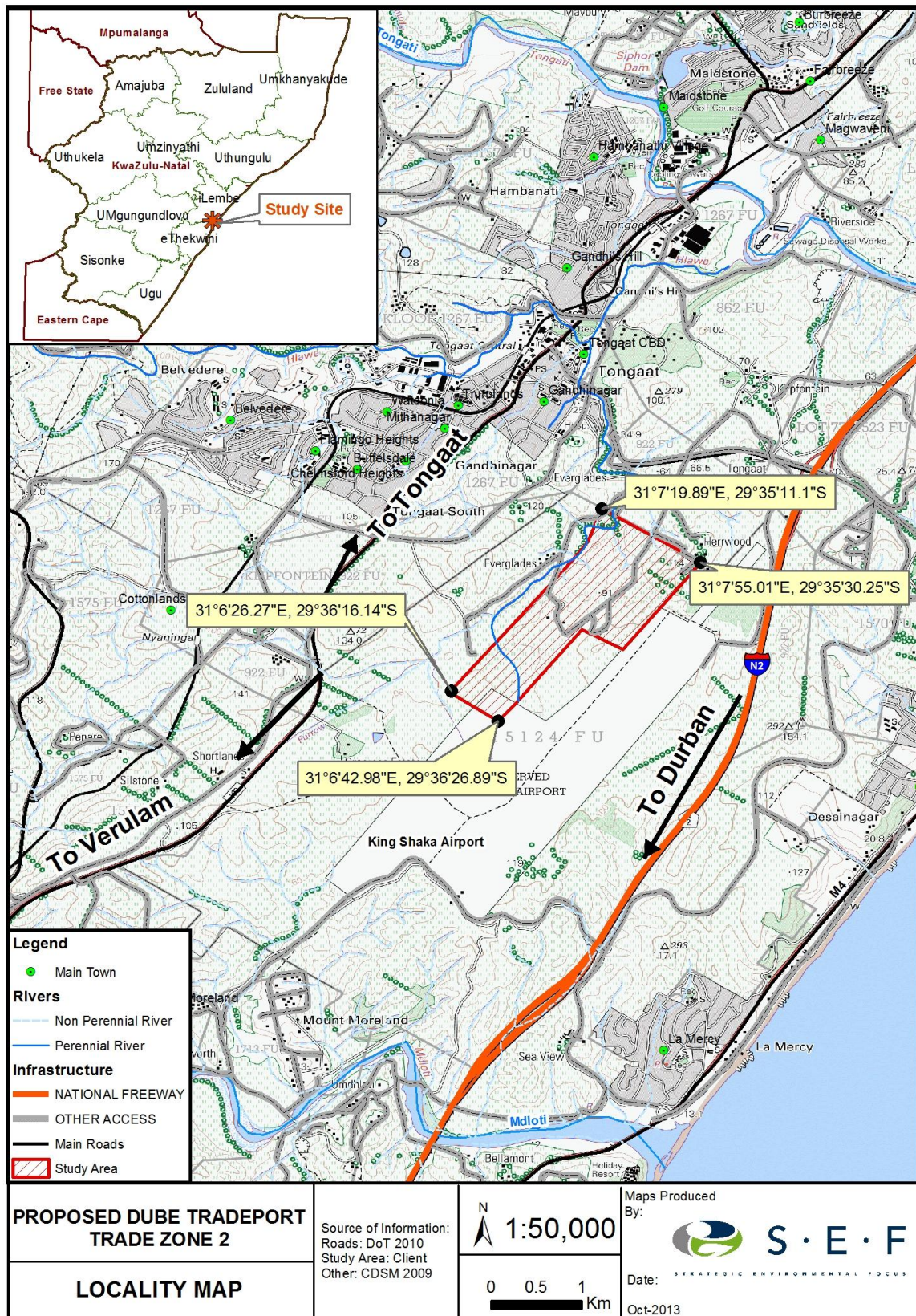


Figure 1: Locality Map of the site

## A-1.3 Details of the Project

### A-1.3.1 *Proposed Dube TradePort TradeZone 2*

The KSIA and DTP (collectively termed the 'Airport') opened in May 2010. It has been described as far more than a new airport but rather as a stimulator and generator of economic growth for the province and is, therefore, one of the Province's major priorities. The DTP development has been designed as a world class facility of diverse integrated activities that will attract a wide range of aviation-related businesses and investors, operators, users and tenants. The proposed site for this proposed development is approximately 160ha. As part of the Phase 1 development, a portion of the site has been developed for the Trade Zone, Support Zone, AgriZone and the KSIA (including a Cargo Terminal and Valuable Cargo Building) which was opened in May 2010 and March 2012, respectively. The existing facility (KSIA and Cargo Terminal) has the capacity for 7.5 million passengers per annum and the capacity to handle 100 000 tons of cargo per annum with the capacity to expand to 2 million tons per annum. The DTP Corporation intends to utilise the remainder of Portion 9 for the purposes of aviation-related business activities (such as repairs and maintenance to aircrafts) are proposed at the site and light industrial development to be known as TradeZone 2. This would entail creating platforms, servicing the area and releasing it to the market for development.

The following land uses are proposed for the Proposed TradeZone 2 (refer to the Site Development Plan in Appendix 3):

- Airforce residential areas;
- Proposed cadastral (*proposed light industrial land uses*);
- Airside / cargo terminal; and
- General Aviation area.

The 'conservation area' illustrated on the northern portion of the site is the 'offset area' for the KSIA/DTP Phase 1 development. As part of this application, no development is proposed to take place within the 'conservation area'.

Access to the DTP Trade Zone 2 development will be from the Main Spine Road that links Watson Highway/Ushukela Highway to the Airport. The internal roads through the development site will have a road reserve ranging from 15m to 45m.

In the long-term, the TIA report recommends that a Brake Drive (linking the proposed TradeZone 2 development into R102) must be constructed to provide access into the DTP Trade Zone 2 Development for the generated traffic volumes. In addition, the new link road will be required to link Brake Drive and the Main Spine Road (*currently under construction*) through the DTP development. The proposed access road from Brake Drive will be subject to a separate Environmental Process.

Aviation fuel will stored in tanks to be located within bunded areas of the proposed General Aviation area.

A telecommunication mast is proposed. The design and type of telecommunication mast proposed for the Trade Zone 2 will be finalized once the project layout has been finalized.

Advertising billboards will be erected at the light industrial land use area. The detail design of the billboards will be available during final design.

TradeZone 2 is Zoned Undetermined as per the eThekweni North Planning Scheme. On receipt of the EA, a rezoning application to General Industry will be undertaken.

The controls as per Undetermined Zone are as follows:

Floor Area Ratio (FAR):0.5  
Percentage Coverage: 30%  
Minimum Lot Size: 2 000m<sup>2</sup>  
Building Line: 7.5m  
S/SPACE: 5.0m

Controls as per General Industry Zone:  
FAR: 1.0  
Percentage Coverage: 70%  
Minimum Lot Size: 1 800 m<sup>2</sup>  
Building Line: 7.5m  
S/SPACE: 2.0m

As per the proposed layout, the development will result to significant infilling of the wetlands that occur within the study area. To mitigate this impact, the proponent intends to rehabilitate wetlands at a candidate offsite site within the similar Tongaat Catchment. A candidate site has been identified that occurs north of the study area, within the same catchment as the study site i.e. Tongati River Catchment. In total, the wetlands within the study site represent 30.0 hectare equivalents of functional wetland area. To ensure a no-net-loss of wetland functional area from the local landscape, a gain of 30 ha-eq of wetland ecological integrity needs to be obtained through the successful rehabilitation of the candidate wetlands. Through successful wetland rehabilitation, the ecological integrity of the wetlands of the candidate site will be improved. This could potentially yield a gain of 49.4ha-eq. In addition, the applicant has already initiated a Water Use Licence application as a result of the proposed encroachment into the natural watercourses and wetlands.

### **A-1.3.2      *Proposed Bulk Services***

Delta Built Environment Consultants were appointed by DTPC to compile the Engineering Services Report for Civil and Electrical Infrastructure (refer to this report in Appendix 6).

#### **a) Electricity Supply**

##### **(i) Status Quo**

The electrical supply in the development area falls under the authority of eThekweni Electricity. A 132kV spur transmission line feeds the northern section of eThekweni from the Ottawa Major through La Mercy Major and terminates at the Tongaat Major. Both La Mercy and Tongaat are equipped with 132/11kV step down transformers and an 11kV distribution platform for the two areas.

The two majors servicing the area were commissioned recently and are currently not at full capacity. The existing 132kV overhead transmission line linking the new Tongaat Major Substation to the La Mercy Major Substation is routed just to the north of Trade Zone 2 development. There is a registered servitude for this overhead powerline. The King Shaka / DTP development is currently supplied by an 11kV distribution line from the La Mercy Major. The existing capacity of the Trade Zone substation is 5MVA, which is adjacent to the new Trade Zone 2 development. This capacity has already been allocated to the Trade House, Trade Zone 1 and Cargo facilities and cannot support the demand of the Trade Zone 2 development.

At present, electricity is distributed via underground cables running along the servitudes adjacent to the internal roads of the development.

##### **(ii) External Bulk Electricity Supply**

The design and installation of the bulk electricity supply will be done by eThekweni Electricity. The calculated total demand is estimated as per the table below:



**Table 4: Stand estimates**

Area	Size	Factor	Total
Industrial stands	572 583 m <sup>2</sup>	80 VA/m <sup>2</sup>	46 MVA
Aircraft stands	776 112 m <sup>2</sup>	10 VA/m <sup>2</sup>	8 MVA

When a diversity of 70% is applied to the industrial stands, the estimated demand is 43MVA.

The following is anticipated regarding reticulation:

- 11kV supplies will be taken from the 132/11kV major substations and distributed along the main access roads to the Trade Zone 2 development. They will feed a series of distribution substations.
- Distribution substations will be planned and positioned in key locations throughout the development.
- 11kV cable routes will be planned to run in the road reserves adjacent or in close proximity to each proposed site, allowing sales and transfers of sites to take place.
- Sites that require more than a 1MVA supply will be serviced by a substation (brickwork structure).
- Smaller sites will either be equipped with their own mini-sub or supplied by a 400V feed from a shared substation (brickwork structure).

### **(iii) Internal Electrical Reticulation and Supply**

- Internal reticulation will be performed by eThekweni Electricity. They will provide a metered supply at the boundary of each serviced stand.
- Street lighting as well as public open space lighting will be designed according to SANS 10098.

## **b) Telecommunication and Data Services**

### **(i) Status Quo**

DTP currently manage all telecommunication data services in the adjacent area. A data centre currently exists at the Trade Zone Cyber port.

### **(ii) Design Criteria**

The current existing DTPC design principles and data network distribution criteria to all sites within the Dube Trade Port Aerotropolis will apply.

### **(iii) Telecommunication and Data Networks and Infrastructure**

- Sleeves will be installed alongside the internal roads, connecting the cyber port to all serviced stands.
- Sleeves will be terminated in a manhole at the boundary of each stand.
- A minimum of 4 x 110mm sleeves will be installed with draw boxes at anticipated tie-ins and road crossings. Draw boxes will not be installed more than 200m apart.
- 3 x 40mm cable tubes will be installed in two of the four sleeves.

## **c) Water Supply**

### **(i) External Bulk Water Supply**

Water supply to the site will flow by gravity from the Inyaninga Reservoir via the existing bulk water network.

The following upgrades to the existing bulk water supply infrastructure are proposed:

- The water storage required for the existing and proposed developments that feeds off the Inyaninga Reservoir is estimated to be 6.74 Ml, thus a 1 Ml reservoir may need to be constructed alongside the existing reservoir to make up for the shortfall in the storage available.
- In order to cater for fire flows to Trade Zone 2, it is proposed that 575m of the existing supply line leading up to the tie-in point for the new internal reticulation system be upgraded from a 200 mm Class 12 uPVC pipe to a 315 mm Class 12 uPVC pipe.



**(ii) Internal Water Supply and Reticulation**

The design of the water reticulation network will be conducted according to the design guidelines set out in the Red Book. Water to each erven will be individually metered. The proposed development falls in the Class B (moderate-risk area) fire-risk category as described in the Red Book, thus the reticulation system will be designed to accommodate the expected fire flows. Any additional requirements for individual erven over and above Red Book standards will have to be provided by the developer of the individual erven (e.g. booster connections, on site tanks, etc.)

The following parameters have been used in the calculation of the demands from each of the development stands:

- Development classification: Light Industrial
- Water consumption: 0.4kL/100m<sup>2</sup>
- Floor space ratio of development: 0.5
- Peak factor: 2.4

Internal reticulation water pipelines ranging from 110mm in diameter to 315mm in diameter will be constructed through the development site. Water to each erf within the development site will be individually metered.

**d) Solid Waste****(i) Status Quo**

Waste sorting facilities currently operating on site at the following locations:

- First line sorting at the 29°Degrees South in the support zone
- Agrizone
- Cargo
- Trade House
- ACSA's own sorting facility next to the Trade Zone only accessible from airside.

The development falls within the jurisdiction of eThekweni Municipality, and therefore Durban Solid Waste (DSW) will be responsible for provision of waste collection.

**(ii) Waste Management and Disposal**

The comprehensive solid waste management plan will include, but not be limited to the following:

- Contribution areas within the development.
- Type of waste generation for the contribution areas.
- Basic estimation of waste streams identified and waste volumes will be determined.
- Potential recyclable waste streams will be highlighted.
- Based on this information, a recommendation will be given if the site should have a waste sorting facility or only a temporary waste storage area.

**(iii) Design Criteria**

Based on the recommendation whether a waste sorting facility or temporary waste storage area will be needed, a design will be submitted to accommodate the type of waste area needed for the site.

According to the Red Book guidelines, occupancy for buildings is one person per 50m<sup>2</sup>.

Due to the uncertainty of the type of tenant, it is important to note that the following table provides a very conservative waste estimate. Each industry has its own waste profile and it would be different for warehouse, offices, industrial areas, etc.

**Table 5: Total waste estimate per day**

AREA	STAND SIZE (m <sup>2</sup> )	ESTIMATED BUILDING SIZE (m <sup>2</sup> )	ESTIMATED NO. OF PEOPLE	AVERAGE WASTE PER DAY
Total	391233	195616.5	3912.33	8798

**e) Sewage Treatment**

The design of the sewer reticulation system for the proposed Trade Zone 2 development, Trade Zone 1 cargo area, the four BAQ (Business Aviation Quadrants) areas, and the MRO facility will be that of a full waterborne sewerage reticulation system, and will be designed according to the following legislation, policies and requirements:

- National Environmental Management Act. No 107 of 1998;
- eThekweni Municipality Guidelines for the design of foul-water sewers, Part 1 1985;
- Guidelines for Human Settlement and Planning, Part 10: Sanitation;
- South African bureau of standards, Standardised specifications for civil engineering construction, LD Sewers (SANS 1200 LD – Sewers); and
- Policies and Practices of the eThekweni Municipality Water and Sanitation Unit.

**(i) Internal Sewer demands**

The internal sewer drainage network which will service the proposed development stands have been designed as a self-cleansing gravity sewer system which will drain all the stands and transport all sewerage outflow into the bulk sewer drainage system.

The following parameters have been used in the calculation of the demands from each of the development stands:

- Development classification: Light Industrial
- Daily flow demand: 20 000 l/ha
- Floor space ratio of development: 1.00
- Peak flow: 2

The total demand for the Trade Zone 2 development (including the MRO Facility) is approximately 31.10 l/s.

**(ii) Internal sewer pipe sizing**

Based on the demands calculated for each stand in the development area, the stipulated minimum slope and the pipe type, an appropriate pipe size for the transportation of sewerage from the various areas into the bulk sewer system has been calculated. The pipe sizes calculated to service the internal reticulation of the proposed development area range from 110mm to 160mm.

The internal sewer reticulation layouts have been developed for the proposed development areas and are provided in Appendix 6, refer to the Drawing Nos. P13092-CC-01-SR-002 and P13092-CC-01-SR-001.

**(iii) Bulk Sewerage Drainage – Outfall Sewer**

The Northern Waste Water Treatment Works was constructed as a temporary bulk infrastructure and is now reaching its maximum functional capacity. The new bulk sewer pipeline system which will drain the entire existing KSIA area and also the proposed development areas of the TradeZone 2 development, and the MRO facility is currently subject to a decision by the DEA.

The flow calculated to be currently discharging into the Northern treatment works has been investigated to be that of 48.17 l/s. The total sewerage flow from the proposed development, which will thus have to be accommodated in the bulk external sewer pipeline to the Tongaat Waste Water Treatment Works, will be that of the existing flows plus the proposed developmental flows, which amounts to a total flow of 79.27 l/s. With a flow of 79.27 l/s, a pipe size of 315mm has been calculated to be required to drain the KSIA and the proposed development area. It is known that this bulk sewer pipeline will not only serve the KSIA area, but also communities and various other areas along the course of the line. One significant area which this bulk sewer pipeline will have to serve is that of the AgriZone area.

The various areas that are required to drain into the bulk sewer line were identified, and the demands from these areas were calculated. A bulk sewer pipeline size of 500mm diameter, which enlarges to a 600mm wide pipe was calculated to transport the sewerage flows to the Tongaat Waste Water Treatment Works. These demands and pipe sizing will be retained in the revised bulk sewer pipeline to the Tongaat Waste Water Treatment Works.

A pipe size of 250mm has been previously calculated to provide a gravity pipeline from the AgriZone development, which was proposed to connect to the Hlawe River bulk sewer line. The use of gravity pipeline from the Agrizone development has been questioned due to environmental considerations, but from an engineering point of view, this would serve as the optimum solution as in general best practice, gravity sewer systems are preferred.

A scenario where the sewerage flows from the AgriZone development and is pumped to connect to the bulk sewerage line, is seen from an environmental point of view as a preferred option due to the shorter lengths in pipeline, which also decreases the interaction which this pipeline has with the Hlawe River. As such, two bulk sewerage configurations / options, have been considered for this TradeZone 2 development, as described in the project summary.

#### **f) Stormwater Management**

Delta Built Environment Consultants were appointed by DTPC to compile the Stormwater Management Plan Report for the proposed Trade Zone 2 Development (refer to this report in Appendix 6).

##### **(i) Background**

A Stormwater Management Plan for the DTP Trade Zone 2 development site was compiled by Delta Built Environment Consultants (refer to Appendix 6). The Stormwater Management Plan for the Trade Zone 2 Development builds on the Stormwater Management Plan that was undertaken by Ilembe Engineering Joint Venture Consortium in 2009. The purpose of the study conducted, was to establish the likely impacts that the proposed development would have on the environment, through the development and analysis of stormwater runoff models, and to illustrate the mitigating measures implemented during the project. Consideration of the airport development in its 'ultimate' phase was taken into account as part of that study, which includes the proposed Trade Zone 2 development which is subject of this report.

According to the Civil Infrastructure Report: Bulk Infrastructure Stormwater and Northern Attenuation Dam (NAD) Condition Assessment and Design Report conducted by Ilembe Engineering Joint Venture Consortium The surrounding site of the KSIA is described to have an East to West watershed which divides the site into two main drainage catchments. The Northern catchment, which drains to the Hlawe River via the 'Northern' and 'Western' outfalls, through an existing attenuation structure and into the Tongati River, and the Southern catchment which drains into the Umdloti River through the Mt Moreland 1 and 2 catchments. The proposed Trade Zone 2 development is located in the Northern catchment area and thus, the principles and recommendations from the Stormwater Management Plan Report and the various other reports will be referred to.

The Northern catchment drains into the Hlawe River via the “Northern” and “Western” outfalls, through an existing attenuation structure. The existing attenuation structure, referred to as the Northern Attenuation Dam (NAD) is located on a tributary of the Hlawe River in the KwaZulu-Natal Province, approximately 1.4km south-east of Tongaat, due north of the KSIA.

The NAD was completed in 1976, with design and construction supervision by Brunette Kruger Stoffberg and Hugo Consulting Civil Engineers. The NAD was originally intended to attenuate the increased storm flows off the airport platform (1975 design), and its location has the effect of attenuating the flow from the entire upstream Hlawe river catchment, approximately 1395 Ha in extent. From the assessment and calculations conducted in the above-mentioned reports, it was stated that *“the hydrological study illustrated that the proposed KSIA development has resulted in a minimal increase in the flows into the Northern Attenuation Dam, and that the impact is relatively small in comparison to the original design levels to warrant major modification of the dam.”*

The above study warranted the use of the following intervention measures at local points on the KSIA development in order to comply the above stated of the relatively small impact:

- Maintaining adequate ground cover at all places and at all times to negate the erosive forces of stormwater runoff.
- Containing potential soil erosion from construction footprints by constructing protection works to trap sediment at appropriate locations (cut-off trenches, earth berms, silt fences, sediment traps within attenuation structures).
- Re-establishing adequate ground cover immediately upon completion of construction.
- Stabilising watercourse inverts with revetment works.
- Reducing storm flow rates through the use of attenuation structures.
- Preventing pollution by suspended and dissolved solids in storm flows.
- Avoiding situations where natural or artificial slopes may become saturated and unstable.

The principles, standards and philosophies as described in the reports above have been adhered to and incorporated into the design of the Trade Zone 2 Development Stormwater Management Plan.

The principles of the Stormwater Management Plan is to comply with the following:

- Compliance with the eThekweni Municipality stormwater management policy;
- Compliance with the National Water Act (Act No. 36, 1998);
- Compliance with the Department of Environmental Affairs and Tourism (DEAT) specifications; and
- Current international best management practices.

The general level of management required, is that of controlling all runoff emanating from such a site in excess of that which have occurred if the site was in its natural or original state. Stormwater management measures that ensures that the rate of runoff is reduced to pre-development state and that runoff is not concentrated onto adjacent neighbouring sites or other infrastructure, be it road drainage or valley lines, streams, residential etc. must be implemented.

The eThekweni Municipality stormwater management policy requires that the post-development stormwater runoff state does not exceed the pre-development run-off state.

## **(ii) Development Catchment Areas**

In order to assess the pre- and post- catchment area run-off scenarios, the stormwater catchment areas of the proposed development are required. Stormwater catchment areas have been identified for the Trade Zone 2 development as presented on Drawing P13092-CC- 01-SW-01 (Catchment areas layout) in Appendix 6:

**(iii) Pre-Development Catchment Area Characteristics**

The pre-development catchment area characteristics of the proposed TradeZone 2 development are taken as the state in which the catchment area is undisturbed or in its natural state.

The catchment area can be described to have the following physical characteristics to which we can describe the site:

***Surface slope (Cs)***

- Lakes and pans – 30%
- Hilly Areas – 70%

***Permeability (Cp)***

- Permeable – 50%
- Semi-permeable – 50%

***Vegetation (Cv)***

- Thick bush and plantations – 50%
- Light bush and cultivated areas – 50%

**(iv) Post-Development Catchment Area Characteristics**

The post-development catchment area characteristics of the proposed Trade Zone 2 development are taken as the state in which the catchment area is after it has been completely developed.

The catchment area can be described to have the following physical characteristics to which we can describe the site:

- Lawns and lakes – 10%
- Industrial areas – 70%
- Streets – 20%

With these above-mentioned catchment area characteristics identified, the runoff for the pre- and post-development scenarios were calculated.

**(v) Attenuation Sites**

In modelling the impact of the hardened surfaces proposed as part of the development, all the catchments within the development area are predicted to experience an increase in the peak flows and volumes for the 1:10 year and 1:50 year as presented in Table 3-1 and Table 3-2 of the Stormwater Management Plan Report in Appendix 6, and would therefore require some form of mitigation measures. The increase due to the development is fairly high. It is therefore important that the increased runoff is addressed close to the original source (where practically possible).

The potential flood impacts within the development must be taken into account in the layout design, and the peaks can be attenuated to pre-development condition, minimising the erosion and silt deposition downstream of the development. The mitigation measures (during and after construction) would primarily consist of decreasing erosion/silt potential by attenuating the increased run-off generated from the additional hard surface areas.

The recommended option under the current conditions would be to attenuate the peak flows on site, prior to discharging back into the drainage lines. These areas are indicated on the Stormwater Management Plan, but the final hydrographs and positions will be routed to reduce the 1:10 year and the 1:50 year post-development peaks to the pre-development peaks. At this stage, only the total volumes that need to be attenuated and an approximate position where the proposed attenuation could be created, are provided, as this would depend on

the configuration of the final detailed layout and design of the internal reticulation.

The proposed attenuation sites which have been identified based on the current information are presented on Drawing P13092-CC- 01-SW-03 (Proposed attenuation sites layout) in Appendix 6:

The following stormwater infrastructure is proposed:

**Table 6: Proposed Stormwater Infrastructure**

Water Infrastructure	Description	Location	Volumes
Proposed attenuation pond 1	Serves as the retention facility for stormwater generated from Catchment areas 1, 2 and stormwater from Trade Zone 1.	Y: -10823.75 X: 3275573.31	83 Mℓ
Proposed attenuation pond 2	Serves as the retention facility for stormwater generated from Catchment areas 3, and 4.	Y: -11528.83 X: 3274770.78	58 Mℓ
Existing Watson Highway Culvert	Stormwater from catchment area 5 and the MRO will be channelled into this culvert.	Y: -12131.60 X: 3274964.10	N/A
Proposed River Crossing	This river crossing will facilitate the new Spine Road (Link Road) which will traverse the Hlawe River.	Y: -11608.43 X: 3274520.85	N/A

The proposed attenuation ponds will be sized using the pre- and post-development method, according to the Drainage Manual methodology, and furthermore, they have been sized to retain water for flood events which are in excess of the predevelopment run-off, using the 1:50 year flood run-off volumes. The attenuation ponds are described below:

- Attenuation Pond 1 is situated south-west of the proposed development inside the tributary stream. This pond will attenuate stormwater from Catchment Area 1 and 2 as well as stormwater from TradeZone 1. The pond has been sized to have a capacity of 83 ML.
- Attenuation Pond 2 is situated north-west of the proposed development and will attenuate stormwater from Catchment Areas 3 and 4 as well as the MRO. The pond has been sized to have a capacity of 58 ML.

The Water Use License Application for the proposed attenuation structures are currently underway and will be submitted to DWA.

#### **(vi) Stormwater Management for Trade Zone 2**

The Stormwater Management Plan has been undertaken taking into consideration the Stormwater Management Plan conducted for the greater King Shaka International Airport by the Ilembe Engineering joint venture consortium. The stormwater management philosophy of the Ilembe study should thus line up with the philosophy of the proposed Trade Zone 2 stormwater management philosophy. With that being said the stormwater philosophy which will be used for the Trade Zone 2 development, in line with the King Shaka

International Airport Stormwater Management Plan is as described in the subsequent sections.

#### **(vii) Stormwater Management Measures**

In order to mitigate the detrimental effects and the consequent potential for damage as a result of development at the site, the application of appropriate stormwater management techniques, thereby reducing the post-development flows at points of discharge, to flows comparative to pre-development are required. The natural equilibrium that exists within the downstream riverine environment should thus remain undisturbed. Such measures include, *inter alia*, the following:

- Maintaining adequate ground cover at all places and at all times to negate the erosive forces of stormwater runoff.
- Containing potential soil erosion from construction footprints by constructing protection works to trap sediment at appropriate locations (cut-off trenches, earth berms, silt fences, sediment traps within attenuation structures).
- Re-establishing adequate ground cover immediately upon completion of construction.
- Stabilising watercourse inverts with revetment works.
- Reducing storm flow rates through the use of attenuation structures.
- Preventing pollution by suspended and dissolved solids in storm flows.
- Avoiding situations where natural or artificial slopes may become saturated and unstable.

For the Trade Zone 2 development, two attenuation structures will be required to accommodate the increase in stormwater for the proposed development area.

It should be kept in mind that even though the attenuation structures as described above are required for the Trade Zone 2 development, they are actually temporary structures until the time where the King Shaka International Airport is developed to its ultimate state. The attenuation structures as described above will thus be amalgamated into the final development Stormwater Management Plan.

#### **(viii) Stormwater runoff control**

Formal surface and underground stormwater systems will be provided in the overall development for the acceptance of stormwater drainage, but it is important that the peak runoff rate does not exceed the hydraulic capacities of the elements in the major stormwater system. The following are general guidelines which will be followed for stormwater.

- **Buildings**

Any building will inevitably result in some degree of flow concentration, or deflection of flow around the building. The developer/owner shall ensure that the flow path of the stormwater is adequately protected against erosion and is sufficiently roughened to retard stormwater flow to the same degree, or more, as that found in the natural pre-development state of the site.

- **Roof Drainage**

Building designs must ensure that rainfall runoff from roofing and other areas, not subjected to excessive pollution, must be efficiently captured for re-use where possible for on-site irrigation and non-potable water uses.

- **Parking Areas and Yards**

Any external parking area, yard or other paved area will be designed to attenuate stormwater runoff from a major storm to an acceptable degree. Any area described above will discharge rainwater flowing over, or falling onto its surface, in a controlled manner either overland, or into an attenuation facility.

- **Roads**

Roads will be designed and graded to avoid concentration of flow along and off the road. Inlet structures at

culverts will be designed to ensure that the capacity of the culvert does not exceed the pre-development stormwater flow at that point and attenuation storage should be provided on the road and/or upstream of the stormwater culvert. Outlet structures at a road culvert or a natural watercourse will be designed to dissipate flow energy.

- **Stormwater Storage Facilities**

Attenuation ponds shall be integrated with the landscape on the site and will be designed to facilitate stormwater for 1 in 50 year return period. They will be unlined.

- **Channels**

Lined and unlined channels may be constructed to convey stormwater to a natural watercourse where deemed necessary and unavoidable. Channels must be constructed with rough artificial surfaces, or lined with suitable, robust vegetation, to be non-erodible and to provide maximum possible energy dissipation to the flow.

- **Energy Dissipaters**

Measures will be taken to dissipate flow energy wherever concentrated stormwater flow is discharged down an embankment or erodible slope and the resulting supercritical flow poses a significant risk to the stability of the waterway.

#### **(ix) Internal Stormwater Drainage**

The stormwater control philosophy will be to restrict post-development flows into the Hlawe River. In order to achieve this, it is intended to provide a 'sustainable drainage system' in line with international best practice. This will be achieved by a combination of on-site attenuation tanks for roof run-off, permeable paving to parking areas, and unpaved areas, etc. Excess stormwater run-off will be accommodated in the roadway drainage, which will drain into the bulk stormwater system. The stormwater system consists of combined surface, road and pipe systems. In order to determine surface water run-off, probabilistic relationships between the average daily rainfall, rainfall intensity, duration and return period are required.

#### **(x) Conclusion**

One of the negative impacts of the development is a substantial increase in the peak stormwater runoff flows for both the 1 in 10 and 1 in 50 year return periods. The increase in peak runoff will primarily be mitigated by the proposed attenuation ponds. However, the introduction of supplementary Sustainable Urban Drainage Systems (SuDS) technologies during the detailed design phase will further reduce the runoff flows. The unification of SuDS technologies and attenuation ponds is expected to reduce the post-development peak runoffs for the 1 in 10 and 1 in 50 year storms to pre-development levels.

#### **g) Proposed Access Road and road upgrades**

A Traffic Impact Assessment (TIA) was conducted by Aurecon (Pty) Ltd for the proposed DTP TradeZone 2 Project. Refer to the TIA in Appendix 6. To accommodate the anticipated traffic calculated by the study the following is proposed:

- The link capacity of the R102 and uShukela Drive must be increased by providing dual lanes per direction on each link. This should be implemented by eThekweni Transport Authority (ETA)/KZN Department of Transport (KZN DOT) within 5 years as the existing traffic condition is not favourable.
- The existing uShukela Drive / Tongaat off-ramp eastern intersection should be converted into a traffic signal controlled intersection in order to reduce delays experienced by the right turning traffic from uShukela Drive west approach towards Durban, and it is recommended that a protected signal phase be provided.
- The existing uShukela Drive / Tongaat off-ramp western intersection should be converted into a traffic signal controlled intersection in order to reduce delays experienced by the right turning traffic from off-ramp approach towards Westbrook. It is further recommended that a left slip lane towards Tongaat



should be provided.

- The new proposed uShukela Link road intersection on uShukela Drive should be signalised. Exclusive turning lanes should be provided as recommended in Chapter 11 of the TIA.
- The existing intersection of uShukela Drive and R102 should be upgraded as per Chapter 11 of the TIA.
- The proposed Brake Drive Link road (*to be subject to a separate Environmental Application*) must be provided to intersect with the main uShukela Access Link Road. It is further recommended that the intersection of R102 and Brake Drive should be upgraded in order to accommodate the expected development traffic. Refer to Chapter 11 of the TIA for thorough details.
- The TIA should be submitted to the eThekweni Municipality/Ethekweni Transport Authority (ETA), KZN DoT and SANRAL for approval.

### **A-1.3.3      *Details of the Construction Phase***

Subject to receiving Environmental Authorisation (EA) from DEA, the construction of the TradeZone 2 development will commence in Mid 2015. The construction period is estimated to be 5 years from inception to completion.

The appointed Contractor will be responsible to prepare a Construction Site Development Plan prior to establishing on site. This plan will indicate the boundaries of the site that encompasses all construction related activities, vehicle and pedestrian access points, laydown area/s, offices, stockpile areas, storage areas, ablution facilities, etc. This Site Development Plan must be approved by the appointed Environmental Control Officer (ECO) as provided for within the Environmental Management Programme (EMPr) (refer to Appendix 7).

The construction programme will reflect the separate work sections, in chronological order, according to the Contractor's intended production sequence, as described on the Construction Site Layout Plan.

Water sourced from the eThekweni Municipality and rainwater harvested from the TradeZone 1 development will be used during the construction phase. This water will be used for various activities on site, including dust suppression on dry, windy days.

Diesel generators will be utilised on site and stored within the storage area as far away from the wetland/ watercourse boundary as possible (as indicated on the Construction Site Development Plan).

The Contractor will be responsible for the management and removal of all solid waste from site during the construction phase) to a designated landfill site. A method statement for the management of waste must be drafted and signed off by the ECO prior to commencement of construction activities, as per the attached EMPr (Appendix 7).

### **A-1.3.4      *General Earthworks***

All earthworks should be carried out in a manner to promote stable development of the site. It is recommended that earthworks be carried out along the guidelines given in SANS 1200 (current version).

Where natural ground slopes are steeper than 1 vertical to 6 horizontal (6 degrees), the fill must be benched into the slope. Benches should be 0.5m deep and 2.0m wide.

Placement of fill layers should be undertaken in layers not exceeding 200mm thick when placed loose and compacted using suitable compaction plant to achieve 93% Modified AASHTO maximum dry density.

The clayey sub-soils will be impassable to construction traffic during and after periods of rainfall (when wet).

This material is moisture sensitive and will heave when wet under compactive effort, in which case it would need to be undercut and spoiled, as it may be uneconomical to wait for the material to dry. Furthermore, these clays will soften significantly when saturated, which could lead to excessive settlement of any supporting structure or paving.

Terraces should be graded to direct water away from the fill edges, and small earth bunds should be constructed along the crests of fills, to prevent overtopping and erosion of fill embankment slopes. These bunds should be a minimum 450mm wide and 300mm high.

Density control of placed fill material should be undertaken at regular intervals during fill construction.

Boulders larger than 200mm diameter or 1/3 of the layer thickness when loose should be removed from the fill material as these could complicate the compaction works, and also cause piping within fills. Furthermore, large boulders in fills could cause later problems during construction of foundations.

Cut and fill slopes soils should be formed to batters of 1 vertical to 2 horizontal and to a height not greater than 2 metres where retaining walls are not provided. Engineered fill slopes should be over-constructed and thereafter trimmed back to the required position.

Cuts in highly weathered bedrock should not exceed gradients of 1 vertical in 0.75 horizontal, provided there is no daylight bedding planes. Where bedding planes daylight out of the cut slope, the slope must be cut back to the exact angle, or flatter than the dip angle of the beds. Experience has shown that variations in dip and direction of dip can occur.

It is therefore recommended that a competent geotechnical engineering professional be appointed to inspect and approve all cut slopes.

Cut and fill heights, greater than 2 metres would need to be inspected and approved by an engineering geologist or geotechnical engineer with all Method Statement approved by the ECO.

### **A-1.3.5 Foundations**

#### **a) Lightly loaded Single- and Double-storey Structures**

The soils generally classified as low-expansive clays but in combination with relatively thick horizons of material, may lead to heave due to the cumulative effect of the deeply weathered soil profile. As such, cumulative heave of approximately 15 mm may be anticipated during the seasonal wetting and drying cycle.

Due to the danger of heave, some precautions need to be taken in founding the single-storey structures. The following precautions are recommended:

- All strip footings are lightly reinforced.
- Articulation joints at all internal and external doors, and openings are installed.
- Light reinforcement placed in masonry.
- Site drainage and service/plumbing precautions are taken.
- A 1.0 m wide concrete apron is constructed around the perimeter of the buildings to stabilise ground moisture conditions.

#### **b) Heavily Loaded Multi-Storey Structures**

For higher bearing pressures than that stated above, it is recommended that all foundation loads be transferred onto competent weathered bedrock of at least very soft rock strength where a maximum bearing capacity of 250 kN/m<sup>2</sup> is considered applicable.

For higher foundation pressures, structures will need to be supported on a piled foundation. Piles will need to be designed to carry the load predominantly in end bearing with a small component in skin friction.

The site is considered suitable for development, provided the recommendations given in the geotechnical report are followed. Site-specific geotechnical investigations will be required once the layout of the proposed development is known.

#### **A-1.3.6      *Cut and Fill Operations***

Cut and fill levels will be kept to a minimum in the design of the platform to reduce the influence on the natural topography. The fill banks of Platform 1 to the north-east and Platform 2 will be cut back to follow the contours of the 1 in 100 flood lines, as not to disturb the natural watercourse. The provided slope of the platforms will contribute to the managing and channelling of stormwater flow to a specified attenuation area so as not to disturb the environment.

#### **A-1.3.7      *Final Mass Earthworks Platform and Levels***

The preliminary first order cut and fill volumes which have been calculated for the construction of all the platforms after the optimisation process, are as follows:

- Total cut of 3 935 977 m<sup>3</sup>
- Total cut available for fill of 3 552 421 m<sup>3</sup>
- Total fill of 4 290 634 m<sup>3</sup>
- Fill available from Watson Highway Link Road contract 511 315 m<sup>3</sup>
- Fill shortfall volume 365 549 m<sup>3</sup>
- Top soiling volume of 254 820 m<sup>3</sup>

The fill shortage material will either be obtained from other excavations on site or imported from a reliable commercial source.

## **A-2      LEGAL REQUIREMENTS APPLICABLE TO THIS APPLICATION**

The application form informing the Department of the intent to obtain an Environmental Authorisation (EA) was submitted to the DEA on 9 May 2012. The project was subsequently registered and DEA issued the project with reference number DEA Ref: 14/12/16/3/3/2/341. Refer to Appendix 4 for the Application for Authorisation Form and the DEA acknowledgement of receipt of the application.

The Final Scoping Report (including the Plan of Study (PoS) for Environmental Impact Report (EIR) was submitted to the DEA on 27 August 2012 and was accepted by the DEA in a letter dated 8 November 2012 (refer to Appendix 4 for the acceptance of the Final Scoping Report and PoS for EIR).

The legislation, guidelines and policies applicable to this project are as follows:

### **A-2.1      NEMA and the Environmental Impact Assessment Regulations**

The EIA Regulations, promulgated under NEMA, focus primarily on creating a framework for co-operative environmental governance. NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by State Departments and to provide for matters connected therewith.

In terms of the EIA Regulations of 2010 and activities listed in GN No. 544 and 546 (requiring a Basic Assessment process) and GN No. 545 (requiring a S&EIR process), the following listed activities are deemed by the EAP to be applicable to the proposed Dube Trade Port Trade Zone 2 Project based on the information

provided by the project proponent and their consulting engineers and specialists.

It must be noted that activities requiring a Basic Assessment process, as well as activities requiring a S&EIR process are triggered by the proposed development. Therefore, according to the below listed activities, a situation arises, whereby the legal requirements of the activity listed in terms of GN No. 545 of 2010 supersede those of the activities listed in terms of GN No. 544 and 546 of 2010, and as such **this application has undergone a S&EIR process.**

The listed activities are deemed to include activities that could potentially have a detrimental impact on the social and biophysical state of an area and as such, are required to undergo an environmental impact assessment process.

GN No & Activity Number	Activity Description	Project Description
GN No. 544 of 18 June 2010	<p>The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water:</p> <ul style="list-style-type: none"> <li>i. with an internal diameter of 0,36 meters or more; or</li> <li>ii. with a peak throughput of 120 litres per second or more,</li> </ul> <p>excluding where:</p> <ul style="list-style-type: none"> <li>a. such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or</li> </ul> <p>where such construction will occur within urban areas but further than 32meters from a watercourse, measured from the edge of the watercourse.</p>	<p>The area has been earmarked for aviation-related activities as well as industrial activities. These activities will require water and will generate sewage and stormwater. The internal stormwater, sewerage and water reticulation systems to service the proposed development will be constructed within the water bodies and within 32m of the edge of the water courses.</p>
	<p>The construction of:</p> <ul style="list-style-type: none"> <li>(i) canals;</li> <li>(ii) channels;</li> <li>(iii) bridges;</li> <li>(iv) dams;</li> <li>(v) weirs;</li> <li>(vi) bulk storm water outlet structures;</li> <li>(vii) marinas;</li> <li>(viii) jetties exceeding 50 square metres in size;</li> <li>(ix) slipways exceeding 50 square metres in size;</li> <li>(x) buildings exceeding 50 square metres in size; or</li> <li>(xi) infrastructure or structures covering 50 square metres or more</li> </ul> <ul style="list-style-type: none"> <li>i. where such construction occurs within a watercourse or within 32 meters of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</li> </ul>	<p>The site has water courses running through it and they will be crossed as a result of the proposed buildings and supporting services infrastructure.</p>
	<p>The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic meters or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010.</p>	<p>The area has been earmarked for aviation-related activities as well as industrial activities. These activities will require water and it is anticipated that the infrastructure will fall within this listed activity.</p>

18	<p>The infilling or depositing of any material of more than 5 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from</p> <ul style="list-style-type: none"> <li>(i) a watercourse;</li> <li>(ii) the sea;</li> <li>(iii) the seashore;</li> <li>(iv) the littoral active zone, an estuary or a distance of 100 meters inland of the high-water mark of the sea or an estuary, whichever distance is the greater</li> </ul> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving</p> <ul style="list-style-type: none"> <li>(a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or</li> <li>(i) occurs behind the development setback line.</li> </ul>	<p>There are various water bodies on the site which would require infilling to create various platforms through dredging, excavation, removal or moving of soil, sand, rock and so on.</p>
39	<p>The expansion of</p> <ul style="list-style-type: none"> <li>(i) canals;</li> <li>(ii) channels;</li> <li>(iii) bridges;</li> <li>(iv) weirs;</li> <li>(v) bulk storm water outlet structures; and</li> <li>(vi) marinas;</li> </ul> <p>within a watercourse or within 32 meters of a watercourse, measured from the edge of a watercourse, where such expansion will result in an increased development footprint but excluding where such expansion occur behind the development setback line.</p>	<p>Bulk stormwater outlet structures will be constructed within a watercourse or within 32m of a watercourse.</p>
50	<p>The expansion of airports where the development footprint will be increased.</p>	<p>The proposed development will entail aviation-related activity such as the storage, repair and maintenance of aircrafts at the site.</p>

GN No. 546 of 18 June 2010	1	<p>The construction of billboards exceeding 18 square meters in size outside urban or mining areas or outside industrial complexes in KwaZulu Natal:</p> <ul style="list-style-type: none"> <li>i. A protected area identified in terms of NEMPAA, excluding conservancies;</li> <li>ii. National Protected Area Expansion Strategy Focus areas;</li> <li>iii. World Heritage Sites;</li> <li>iv. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</li> <li>v. Sites or areas identified in terms of an International Convention;</li> <li>vi. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</li> <li>vii. Core areas in biosphere reserves;</li> <li>viii. Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</li> <li>ix. Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined;</li> </ul> <p>In an estuary</p>	<p>The proposed activities will include advertising billboards in and/or near the site.</p>
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	3	<p>The construction of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast: (a) is to be placed on a site not previously used for this purpose, and (b) will exceed 15 meters in height, but excluding attachments to existing buildings and masts on rooftops.</p> <p>In KwaZulu-Natal</p> <ul style="list-style-type: none"> <li>i. In an estuary;</li> <li>ii. Outside urban areas, <ul style="list-style-type: none"> <li>(aa) A protected area identified in terms of NEMPAA, excluding conservancies;</li> <li>(bb) National Protected Area Expansion Strategy Focus areas;</li> <li>(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</li> <li>(dd) Sites or areas identified in terms of an International Convention;</li> <li>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</li> <li>(ff) Core areas in biosphere reserves;</li> <li>(gg) Areas within 10 kilometers from national parks or world heritage sites or 5 kilometers from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve;</li> </ul> </li> <li>iii. Areas seawards of the development setback line or within 1 kilometer from the high-water mark of the sea if no such development setback line is determined. Inside urban areas; <ul style="list-style-type: none"> <li>(aa) Areas zoned use as public open space;</li> <li>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.</li> </ul> </li> </ul>	<p>The area has been earmarked for aviation-related activities as well as industrial activities. These activities require telecommunication or radio transmission masts which are likely to exceed 15 metres in height. The mast will be located within the General Aviation area of the SDP. The design and type of the mast will be finalized during detail design stage.</p>
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GN No. 545 of 18 June 2010	3	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic meters.	Fuel will be stored on site with a combined capacity of more than 500m <sup>3</sup> . This will be comprised of aviation fuel and a limited amount of diesel/petrol for the aviation-related facilities. Fuel storage facilities will be located within bunded areas of the proposed General Aviation area.
	15	<b>Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more;</b> except where such physical alteration takes place for: ii. linear development activities; or iii. agriculture or afforestation where activity 16 in this Schedule will apply.	The site for the proposed development is approximately 160ha.

In accordance with the EIA Regulations (2010), an EIR must contain all the information that is necessary for the competent authority to consider the application and to reach a decision and must include those points included in Section 31(2) of Regulation 543 which are laid out in the table below. In order to facilitate review by the competent authority, this report is structured around these requirements.

NEMA Regulation 543, Section 31 Requirements	Relevant Section of the Report
Details of the EAP who compiled the report and the expertise of the EAP to carry out an environmental impact assessment	Page v-vi
A detailed description of the proposed activity	Section A
A description of the property on which the activity is to be undertaken and the location of the activity on the property.	Section A
A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.	Section B
Details of the public participation process conducted including: (i) Steps undertaken in accordance with the plan of study; (ii) A list of persons, organisations and organs of state that were registered as interested and affected parties; (iii) A summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and (iv) Copies of any representations and comments received from registered and affected parties.	Section C-4
A description of the need and desirability of the proposed activity	Section A-4
A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity.	Section E
An indication of the methodology used in determining the significance of potential environmental impacts.	Section D
A description and comparative assessment of all alternatives identified during the environmental impact process.	Section E
A summary of the findings and recommendations of any specialist report or report on a specialised process.	Section G
A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures.	Section F
An assessment of each identified potentially significant impact.	Section F
A description of assumptions, uncertainties and gaps in knowledge.	Section D
A reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section G
An environmental impact statement which contains a summary of the key findings and a comparative assessment of the positive and negative implications.	Section G
A draft environmental management programme	Appendix 7
Copies of any specialist reports and reports on specialist processes.	Appendix 6

## **A-2.2 National Water Act, 1998 (Act No. 36 of 1998)**

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways.

Of specific importance to this application is Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and must therefore comply with any prescribed waste standard or management practices.

Due to the various streams, wetlands, tributaries and drainage lines that occur on site as well as the construction of the Trade Zone 2 development and construction of stormwater attenuation ponds, according to the NWA, the proposed development may trigger the following water uses listed in Section 21:

- (b) storage of water;
- (c) impeding or diverting the flow of water in a watercourse;
- (d) engaging in stream flow reduction activity;
- (g) disposing of waste in a manner which may detrimentally impact on a water resource; and
- (i) altering the bed, banks, course or characteristics of a watercourse.

Accordingly, the Water Use Licence application has been lodged with the Department of Water Affairs (DWA) for the proposed DTP Trade Zone 2 development.

## **A-2.3 National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)**

The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA) aims to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development, to provide for specific waste management measures, to provide for the licensing and control of waste management activities, to provide for compliance and enforcement, to name but a few of the purposes of the Act.

## **A-2.4 Other Legal Requirements**

### **A-2.4.1 Acts**

#### ***Constitution of the Republic of South Africa***

The Constitution of the Republic of South Africa has major implications for environmental management. The main effects are the protection of environmental and property rights, the change brought about by the sections dealing with administrative law, such as access to information, just administrative action and broadening of the locus standing of litigants. These aspects provide general and overarching support and are of major assistance in the effective implementation of the environmental management principles and structures of the NEMA. Section 24 in the Bill of Rights of the Constitution specifically states that:

Everyone has the right -

- To an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -

- Prevent pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

***National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)***

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

This Act is applicable to this application for environmental authorisation, in the sense that it requires the project applicant to consider the protection and management of local biodiversity.

***National Heritage Resources Act, 1999 (Act No. 25 of 1999)***

The National Heritage Resources Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).

***KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008)***

KwaZulu-Natal Heritage Act provides for the conservation, protection and administration of both the physical and the living or tangible heritage resources of the Province of KwaZulu-Natal; and to establish a statutory Council to administer heritage conservation in the Province. Amafa / Heritage KwaZulu-Natal is the provincial heritage conservation agency for KwaZulu-Natal. Amafa was established as a statutory body in terms of the KZN Heritage Act of 1997, replaced by the KZN Heritage Act of 2008.

***National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)***

The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.

***Subdivision of Agricultural Land Act, 1970 (Act No. 70 of 1970)***

The purpose of the Act is to control the subdivision and, in connection therewith, the use of agricultural land.

***Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)***

To provide for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

***Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)***

To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

***National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)***

The NEMA: Air Quality Act states the following as its primary objective: "To reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national forms and standards regulating air quality monitoring, management and control by all spheres of government, for specific air quality measures, and for

matters incidental thereto.

Everyone has a right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:

- Prevent pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources.

And whereas minimisation of pollution through vigorous control, cleaner technologies and cleaner production practises is key to ensuring that air quality is improved, and whereas additional legislation is necessary to strengthen the Government's strategies for the protection of the environment, and more specifically, the enhancement of the quality of ambient air, in order to secure an environment that is not harmful the health or well-being of people.

#### ***Hazardous Substances Act, 1973 (Act No. 15 of 1973)***

The object of the Act is inter alia to 'provide for the control of substances which may cause injury or ill health to or death of human beings by reason for their toxic, corrosive, irritants strongly sensitising or flammable nature or the generation of pressure thereby in certain circumstances, for the control of electronic products, for the division of such substances or products into groups in relation to the degree of danger, for the production and control of such substances.

In terms of the Act, substances are divided into schedules, based on their relative degree of toxicity, and the Act provides for the control of importation, manufacture, sale, use, operation, application, modification, disposal and dumping of substances in each schedule.

Pollution control in South Africa is affected through numerous national statutes, provincial ordinances and local authority by-laws. Only the more significant legislation pertaining to the regulation of water, air, noise and waste pollution is dealt with in this section.

#### ***Civil Aviation Act, 2009 (Act No. 13 of 2009)***

To repeal, consolidate and amend the aviation laws giving effect to certain International Aviation Conventions; to provide for the control and regulation of aviation within the Republic; to provide for the establishment of a South African Civil Aviation Authority with safety and security oversight functions, to provide for the establishment of an independent Aviation Safety Investigation Board in compliance with Annex 13 of Chicago Convention, to give effect to certain provisions of the Convention on Offences and Certain other Acts Committed on Board Aircraft; to give effect to the Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation; to provide for the National Aviation Security Program; to provide for additional measures directed at more effective control of the safety and security of aircraft, airports and the like; and to provide for matters connected thereto.

#### ***Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)***

The Act recognises that everyone has a Constitutional right of access to any information held by the state and by another person when that information is required to exercise or protect any rights. The purpose of the Act is to foster a culture of transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their rights.

#### ***Planning and Development Act, 2008 (No. 6 of 2008)***

To provide for the adoption, replacement and amendment of schemes, to provide for the subdivision and consolidation of land; to provide for the development of land outside schemes; to provide for the phasing or cancellation of approved layout plans for the subdivision or development of land; to provide for the alteration, suspension and deletion of restrictions relating to land; to establish general principles for the permanent

closure of municipal roads or public places; to provide for the adoption and recognition of schemes, to provide for compensation in respect of matters regulated by the Act; to establish the KwaZulu-Natal Planning and Development Appeal Tribunal; to provide for provincial planning and development norms and standards; and to provide for matters connected therewith.

### ***The National Building Regulations and Building Standards Act 103 Of 1997***

“To promote the promotion of uniformity in the law relating to the erection of buildings in the areas of jurisdiction of local authorities for the prescribing of building standards and for matters connected therewith”.

### ***Sustainable Development***

The principle of Sustainable Development has been in the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) and given effect by NEMA. Section 1(29) of NEMA states that sustainable development means the integration of social, economic and environmental factors into the planning, implementation and decision-making process so as to ensure that development serves present and future generations. Thus sustainable development requires that:

- The disturbance of ecosystems and loss of biological diversity are avoided, or where they cannot be altogether avoided, are minimised and remedied;
- That pollution and degradation of the environment are avoided, are minimised and remedied;
- The disturbance of landscapes and sites that constitutes the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
- A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
- Negative impacts on the environment and on people's environmental rights be anticipated; and, prevented and where they cannot altogether be prevented, are minimised and remedied.

## ***A-2.4.2 Provincial Policies and/or Guidelines***

### ***Integrated Environmental Management (IEM)***

IEM is a philosophy for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (DEAT, 1992). The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels.

The Department of Environmental Affairs (DEA) Integrated Environmental Management Information Series guidelines are also considered during this S&EIR application process.

### ***National Spatial Biodiversity Assessment***

The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.

### ***Protected Species – Provincial Ordinances***

Provincial ordinances were developed to protect particular plant species within specific provinces. The protection of these species is enforced through permitting requirements associated with provincial lists of protected species. Permits are administered by the Provincial Departments of Environmental Affairs.

### ***Provincial Growth & Development Strategy (PGDS)***

The PGDS identifies the following six provincial priorities as key components in the province's drive to address the developmental challenges emanating from the province's socio-economic profile. The six provincial priorities are:

- Strengthening governance and service delivery;

- Sustainable economic development and job creation;
- Integrating investments in community infrastructure;
- Developing human capability;
- Developing a comprehensive response to HIV/AIDS; and
- Fighting poverty and protecting vulnerable groups in society.

The KZN Government believes that if the province's many comparative and competitive advantages are exploited to the full it will be possible to achieve the sustainably higher and shared economic growth which is necessary to address its many developmental challenges. The KZN Government aims to grow the economy even faster than the national average, so that the province's contribution to Gross Domestic Product (GDP) (16.3% in 2005) increases. The PGDS's economic target for 2014 is 7.5%.

The PGDS acknowledges that the Dube TradePort is a key intervention by the KwaZulu-Natal provincial government to cement its position as the premier transport, logistics and communication hub on the SADC region and the continent. It is expected to act as catalyst for economic development and labour-intensive growth throughout the province.

### ***Provincial Spatial Economic Development Strategy (PSEDS)***

The PSEDS is aimed at transforming the structure of the economy and narrowing and eventually eliminating the gap between the first and second economies. The four pillars of the strategy are as follows:

- Increasing investment in the province;
- Skills and capacity building;
- Broadening participation in the economy; and
- Increasing competitiveness.

The PSEDS identifies the sectors of the provincial economy which will drive the growth of the province and address unemployment and poverty as follows:

- Agriculture - including agri-industry (with opportunities to impact considerably on the economic needs of the poor through Land Reform);
- Industry - including heavy and light industry and manufacturing;
- Tourism - including domestic and foreign tourism; and
- Service sector - including financial, social, transport, retail and government.

The logistics and transport sector (including rail) in the services sector are also identified as important subsectors underpinning growth in all four sectors.

The PSEDS also acknowledges that the potential for industrial development in the province is anchored by the nodes of eThekweni and Umhlathuze. The corridors between these two nodes form the primary zone of industrial development in the province.

One of the principles of the PSEDS is that settlements and economic development opportunities should be channelled into activity corridors and nodes that are adjacent to or link the main growth centres. The eThekweni – Umhlathuze development corridor has been identified as having the potential for greatly impacting on economic growth and the development of impoverished areas.

### ***A-2.4.3 Local Policies and/or Guidelines***

#### ***a) eThekweni Municipality Integrated Development Plan (IDP)***

eThekweni Municipality's IDP (2009/2010) has identified the following challenges:

- Low economic growth and high rate of unemployment;
- Access to basic household and community services are less than optimal;

- Relatively high levels of poverty;
- Low levels of literacy and skills development;
- Sick and dying population affected by HIV/AIDS;
- Exposure to unacceptably high levels of crime and risk;
- Many development practices still unsustainable; and
- Ineffectiveness and inefficiency of inward-looking local government still prevalent in the Municipality.

In order to achieve the vision of the municipality six key choices have been identified which are used to create a framework around which the IDP can be implemented. These choices are as follows: -

- Improving our port and logistics Infrastructure;
- Using LUMS to increase densities and to reduce urban sprawl;
- Bridging the digital divide;
- Promoting public transport;
- Prioritising Eco-Tourism; and
- Ensuring ecological integrity.

These choices, together with the city's 8 Point Plan, provide the underlying basis upon which the city is to grow and develop.

With regard to economic development the municipality aims to contribute towards the achievement of the key national targets, that is, annual growth rate of 6% between 2010 and 2014, as per the Accelerated and Shared Growth-SA Initiative (ASGISA).

**b) *Draft Northern Spatial Development Plan (NSDP)***

According to the eThekweni Municipality's Draft Northern Spatial Development Plan (NSDP), dated June 2009, Tongaat and KSIA/Dube Trade Port Logistics Hub are located within the Northern Development Corridor, and new development opportunities associated with the hub must be integrated with existing urban development. The proposed development has taken into consideration the Draft NSDP.

The following information has been extracted from the Draft NSDP, which was available for comment until 20 October 2009:

**Dube Trade Port (King Shaka International Airport)**

The establishment of the new KSIA forms an integral part of the national logistics platform of the country and as such provide the base for the establishment of a new multi-functional logistics and intermodal transportation node that will provide a range of business, logistics, industry and service opportunities for the region and for the surrounding local areas.

**Tongaat CBD**

The existing town centre of Tongaat is to be regenerated, consolidated and enhanced to perform the role of a multipurpose business, social services and intermodal transportation terminal centre to serve surrounding urban areas within the northern urban development corridor as well as provide higher order services and transport services for the rural hinterland to the west.



Opportunity Areas

The establishment of the KSIA/Dube Trade Port as a major national air logistics hub will drive both the development of new and existing industrial areas to accommodate manufacturing (non-noxious industry) and logistics related industrial activity in the Northern Municipal Planning Region (NMPR). This development needs to be directed in a manner that contributes positively to the consolidation of existing successful industrial areas as well as to the restructuring of the northern metropolitan area with respect to the development of new well located employment zones. The existing and future industrial opportunity areas are intended to be non-noxious and should be developed in the following manner:

- **Dube TradePort**  
New manufacturing, business parks, logistic park and agricultural processing node
- **Dube Inyaninga**  
New logistics park and agricultural processing node
- **Dube North**  
New logistics, business park and agricultural processing node
- **Tonga Town**  
Consolidate manufacturing and services
- **Tonga North/uShukela Highway**  
New logistics and business park

**Table 7: Tongaat and Dube TradePort Local Area (Urban)**

<b>Role in the Metro</b>	<ul style="list-style-type: none"> <li>• International/national logistics infrastructure and support zone</li> <li>• National, provincial and local Gateway</li> <li>• Industrial Expansion Zone</li> <li>• Specialised and Intensive Agriculture</li> <li>• Mixed density and mixed income residential expansion (Tonga)</li> <li>• Conservation of environmental assets</li> <li>• Consolidation, protection and enhancement of the environment resource assets base located in the mid reaches of the Tongati catchment</li> <li>• Consolidation of agricultural and rural hinterland in support of UDL management, protection of rural lifestyles</li> <li>• Hinterland water based metropolitan level recreation related to environmental assets and the Dudley Pringle</li> <li>• Dam</li> </ul>
<b>Development Spines and Nodes</b>	<ul style="list-style-type: none"> <li>• Establish R102 Metropolitan Development Corridor between Verulam Town Centre and Tongaat</li> <li>• Establish KSIA/DTP as primary logistics installation and intermodal transportation node</li> <li>• Consolidate and enhance Tongaat Town centre as sub metropolitan service node and public transportation terminal</li> <li>• Establish new services and industrial/logistics node at Inyaninga as support to R102 metropolitan development corridor and DTP logistics park</li> </ul>

<b>Movement System</b>	<ul style="list-style-type: none"> <li>• N2, R102 and M4 provide regional access and linkage system</li> <li>• Bypass systems east or west to Tongaat Town Centre to be established in accordance with demands on the R102 system</li> <li>• Establish R102 interchange and access via N2/ Dube Trade Port link road</li> <li>• New spine between M41 and M27 / Dube Trade Port to facilitate movement and alleviate congestion on M4</li> </ul>
<b>Land Use and Density</b>	<ul style="list-style-type: none"> <li>• Consolidate existing formal settlements through renewal and densification along the metropolitan spine (R102)</li> <li>• Establish new mixed density residential areas in undeveloped zones</li> <li>• Upgrade informal settlements</li> <li>• Establish new mixed use high density housing developments along the R102 development spine (minimum 50du -70 du/ha) subject to noise constraints</li> <li>• Establish new industrial opportunity areas at Inyaninga, North-west of Dube Trade Port, on northern boundary at Frasers</li> <li>• Protect and enhance sustainability of high yielding agricultural areas through promotion of intensive agriculture</li> </ul>
<b>Open Space/Environment</b>	<ul style="list-style-type: none"> <li>• Consolidate and protect environmental assets surrounding the Dube Trade Port</li> <li>• Protect, manage and enhance open space and riverine systems within urban settlements to provide ecological services delivery and “break” in continuous urban settlement</li> <li>• Protect, conserve and enhance open space asset footprint contained in the Umdloti and Tongati catchments</li> <li>• Establish local recreational opportunities associated with the open space asset base and Dudley Pringle Dam</li> </ul>
<b>Service Levels</b>	<ul style="list-style-type: none"> <li>• Upgrade and/or consolidate capacity of waterborne sanitation to accommodate proposed increased densities</li> <li>• Proposed expansion of residential and industrial areas</li> <li>• Investigate electricity capacity with respect to proposed increase in density, expansion of residential and industrial areas and development of agricultural areas</li> <li>• Investigate water supply capacity with respect to proposed increase in density, expansion of residential and industrial areas and development of agricultural areas</li> <li>• Investigate capacity of telecommunication capacity with respect to increase in density and proposed expansion of urban areas</li> <li>• Investigate capacity of water supply, electricity and telecommunications commensurate with proposed agricultural and industrial development</li> </ul>

### **c) Tongaat-DTP Local Area Plans: North Urban Development Corridor**

#### Background

The Local Area Plan (LAP) for the Tongaat-DTP area is one of three LAPs prepared as part of a spatial and transport planning project for the Northern Urban Development Corridor (NUDC), situated in the northern planning area of the eThekweni Municipal area. This section focuses on the Tongaat-DTP local area. The LAP is situated within the municipality's hierarchy of plans below the NSDP.

The spatial aspects of the LAP for the Tongaat-DTP area have been undertaken in parallel to an intensive transportation planning exercise, focused around the upgrading of the R102 to accommodate the new KSIA and DTP and associated development that is likely to evolve of time in the surrounding area.

### Vision

The Tongaat-DTP LAP is a key component of the NUDC. It will be developed as a mixed-use development corridor which will consolidate existing and anticipated future population and economic growth in the northern metropolitan area into a spatial pattern that reinforces the new airport node as an internationally competitive 'Aerotropolis' whilst simultaneously establishing and/or enhancing the roles and characteristics of established and/or new development nodes, spines and neighbourhoods. It will do this through the integration of existing development with new opportunities for housing, business, industry, commerce and logistics through an efficient transport oriented urban form and through transportation systems and networks that will be multimodal and will promote the increased use of public transportation and accommodate the efficient movement of freight.

The urban form will be more compacted and structured and it will be punctuated by an integrated open space system that provides for the protection of biodiversity and for the recreational and cultural needs of the local and metropolitan population, whilst enhancing the resilience of the natural systems and local communities with respect to the implications of global climate change phenomena. The relatively undeveloped state of most of the land within the study area and most of the sub-areas within it, provide the opportunity to establish a settlement structure and form that will be distinctive and which sets a new precedent for the way living and working environments are developed and managed.

## **A-3 DETAILS OF THE APPLICANT**

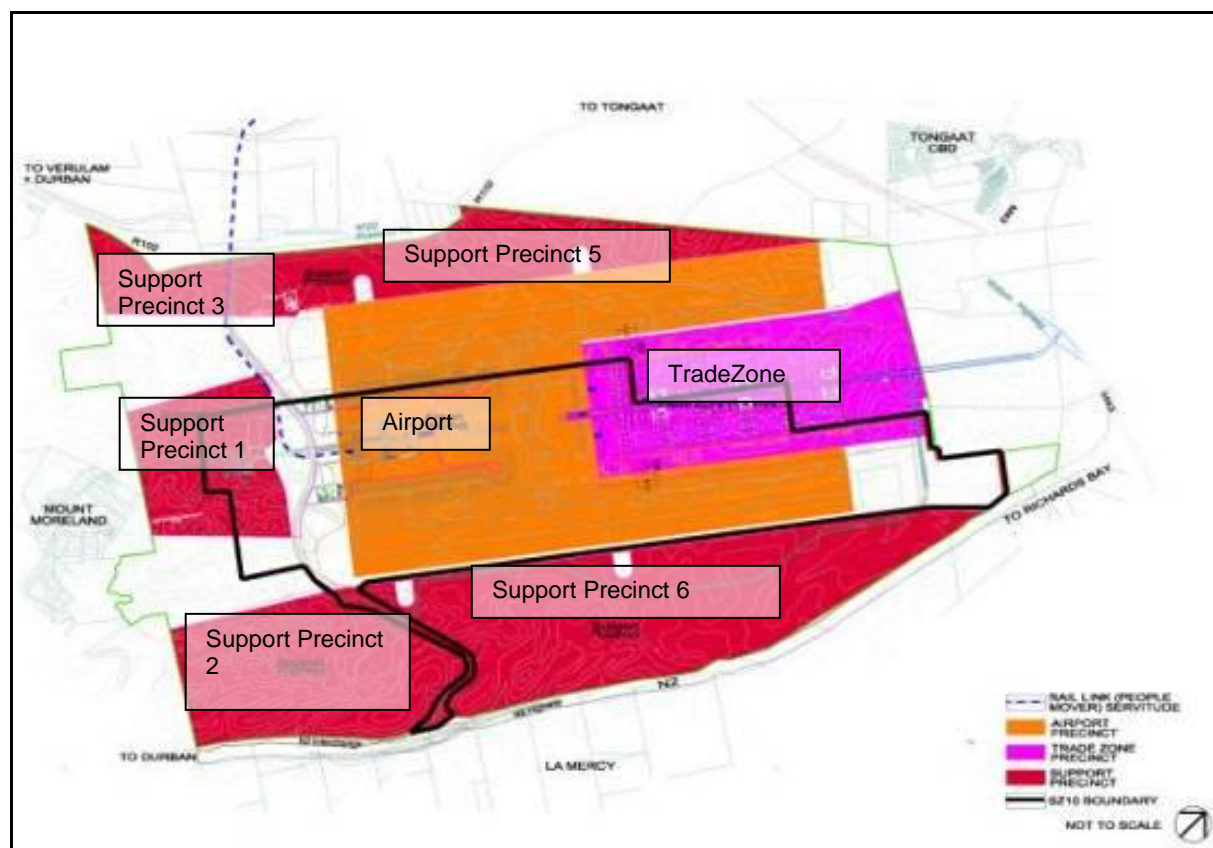
The details of the project applicant are:

Name of Applicant	Postal Address	Relevant Numbers
Dube TradePort Corporation Contact Person: Ms Saxen van Coller	P.O Box 57757 King Shaka Airport 4407	Tel: (032) 841 0000 Fax: (032) 814 0100

## **A-4 NEED AND DESIRABILITY OF THE PROJECT**

DTP Corporation intends to develop the site, which is referred to as the second phase of the TradeZone, or TradeZone 2. The TradeZone forms part of a larger development commonly referred to as The Dube TradePort (DTP) which extends over a landholding measuring 2 040 hectares. The DTP development has been designed as a world-class business, freight and passenger logistics facility that will create a highly competitive operating environment that will be geared to attract a wide range of investors, operators, users and tenants.

Phase 2 involves the provision for the relocation of the South African Air Force from the 'old' Durban International Airport, which is of national importance. Office space, workshops, hangars and a range of facilities associated with an Air Force Base would need to be built. The DTP currently consists of a number of development precincts. These precincts include the KSIA, TradeZone including Cargo Terminal, AgriZone, and Dube City. These precincts are illustrated in the figure below.



**Figure 2: The Dube TradePort Site**

The DTP precinct has a 50-year or a 2060 master plan in place, which would allow the airport precinct to be fully developed to handle up to 40 million passengers per annum, and up to over a million tonnes of cargo freight. The DTP TradeZone precinct can also be described as Portion 9 of the Farm La Mercy No 15124. The entire TradeZone area comprises of approximately 240 hectares. The cadastral boundary of the TradeZone, or Portion 9, is illustrated in the figure above.

Due to the fact that only a portion of the TradeZone 1 (~26 hectares) has zoning (Special Zone 10) which allowed for development, only this portion was included in the initial environmental impact assessment for the first phase build of the DTP site. Approximately 26ha of land was platformed and serviced and released to the market as part of TradeZone 1.

The new DTP incorporating the KSIA not only provides for an increased number of passengers and direct international flights, but critically, a new trade and logistics gateway for Southern Africa. It is therefore important to ensure this foundation and the associated significant investment that has been made is fully utilized and supported. For this reason, the proposed TradeZone 2 development will significantly contribute and complement this existing infrastructure that has been created. Furthermore, the development will also utilize and support the much needed new link road that is currently under construction as well as the proposed Maintenance Repair and Overhaul (MRO) facility for large aircrafts, currently under review by the DEA.

The greater La Mercy region, where the KSIA is located has, for some time, been identified for light industrial, new housing, economic and employment opportunities. The proposed development proposal aims to unlock

these opportunities and in so doing contribute to the Dube Aerotropolis<sup>3</sup> development plans. There is a substantial amount of existing and/or new service infrastructure proposed for this area and this development would therefore contribute towards the effective use of this infrastructure's capacity.

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<sup>3</sup> KSIA is a core piece of infrastructure with access to sea, road and rail linkages, within one of Southern Africa's strongest regional economies.

DTP development strategy will guide the development of the entire Airport City and create significant opportunities for all businesses in surrounding area ([www.thdev.co.za/developments/aerotropolis/overview](http://www.thdev.co.za/developments/aerotropolis/overview)).

An Aerotropolis is a new layout of urban form comprising of aviation intensive businesses and related enterprises extending up to 25 kilometres outward from major airports (<http://en.wikipedia.org/wiki/Aerotropolis>).

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## SECTION B: THE RECEIVING ENVIRONMENT

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In order to, with any level of confidence, assess the potential impacts of the proposed development on the receiving environment, one needs to first assess the baseline conditions found over the study area. Using this *Status Quo* one can then, broadly speaking, determine the likely impacts that will emanate from a specific development typology on a well-defined receiving environment.

### B-1 BIOPHYSICAL ENVIRONMENT

#### B-1.1 Geology and Geotechnical Suitability

Geosure (Pty) Ltd conducted the Geotechnical Assessment of the site (refer to Appendix 6). The following information is extracted from the Geotechnical Assessment:

##### a) Geology and Sub-soil Conditions

The site generally comprises fill, alluvial, colluvial and residual soils overlying weathered sandstone and shale bedrock of the Vryheid Formation. It is observed that much of the site is underlain by sandstone with a roughly oval shaped outlier of shale underlying the site towards the northern portion of the site.

The subsoil conditions can be described as follows:

- The clayey sub-soils are moisture sensitive and will heave when wet. When wetted, it may need to be spoiled during earthworks. These soils will also be impassable to construction traffic, both during and after periods of rainfall.
- The clayey sub-soils are also likely to show signs of heave and appropriate precautions will need to be put in place, in order to avoid damage to structures.
- Generally, poor sub-grade conditions can be anticipated for roads due to clayey sub-soils.
- The clayey sub-soils are likely to have low percolation rates, rendering these unsuitable for stormwater soak pits.
- Shallow groundwater conditions along valley heads and drainage lines. A perched water table may be present, both during and after periods of rainfall.
- Thick layers of un-compacted fill were identified at various positions.
- These will need to be excavated and replaced in engineered layers.
- Large stockpiles of material were identified on site that will need to be moved during development.
- The shale bedrock is likely to slake when exposed to the weather.
- Cuts along east and south-east facing slopes will need to be carefully assessed for day lighting bedding planes that could lead to instability.
- Subbase and base materials for roads will need to be imported to the site and also possibly selected fill of at least G7 quality in terms of TRH14 (1985).

##### b) Groundwater

A perched groundwater table can be expected, particularly during and after periods of rainfall and during the wet season. The groundwater seepage can be particularly strong under these conditions, with associated embankment/trench sidewall collapse as a result.

Wet and marshy conditions can be expected along valley heads and drainage lines often identified by dense vegetation.

##### c) Conclusion

Based on the results of the fieldwork undertaken during this investigation, it is considered that this site is generally stable and suitable for development, provided that the recommendations given in this report are

adhered to.

### **B-1.2 Soils and Agricultural Potential**

TerraSoil Science cc was appointed to conduct the agricultural assessment for the development site (refer to the Agricultural Assessment in Appendix 6).

According to the findings of the Agricultural Assessment, two land types are found on the site i.e. Dc57 (dominant) and Ab144 (Land Type Survey Staff, 1972 – 2006). A description of the land types in terms of soils, land capability, land use and agricultural potential are discussed below:

#### **a) Land Type Dc57**

- *Land Type – General:* Dc land types accommodate areas dominated by duplex soils of the Estcourt, Sterkspruit, Swartland and/or Valsrivier forms. The Dc land types indicate areas where more than 10% of the landscape is composed of melanic, vertic or red structured soils.
- *Soils:* Predominantly shallow duplex soils with a distinct increase in clay content for surface to subsurface horizons in most landscape positions. Foot slope and valley bottom positions are dominated by wetland (soils with distinct hydromorphism) and recently transported (stratified) soils as well as distinct erosion channels.
- *Land capability and land use:* Almost the entire landscape has been transformed however and is currently used for the production of sugarcane. The sugarcane production extends into areas that qualify as wetlands.
- *Agricultural potential:* Medium to high depending on soil depth. The sugarcane production is predominantly dry land and as such yields of 40 to 60 tons per hectare are normally obtained. Higher lying areas are characterised by shallow and rocky soils and yields are normally lower than on the deeper soils on the foot slopes. This is also due to the increased water availability to the crop on lower slopes.

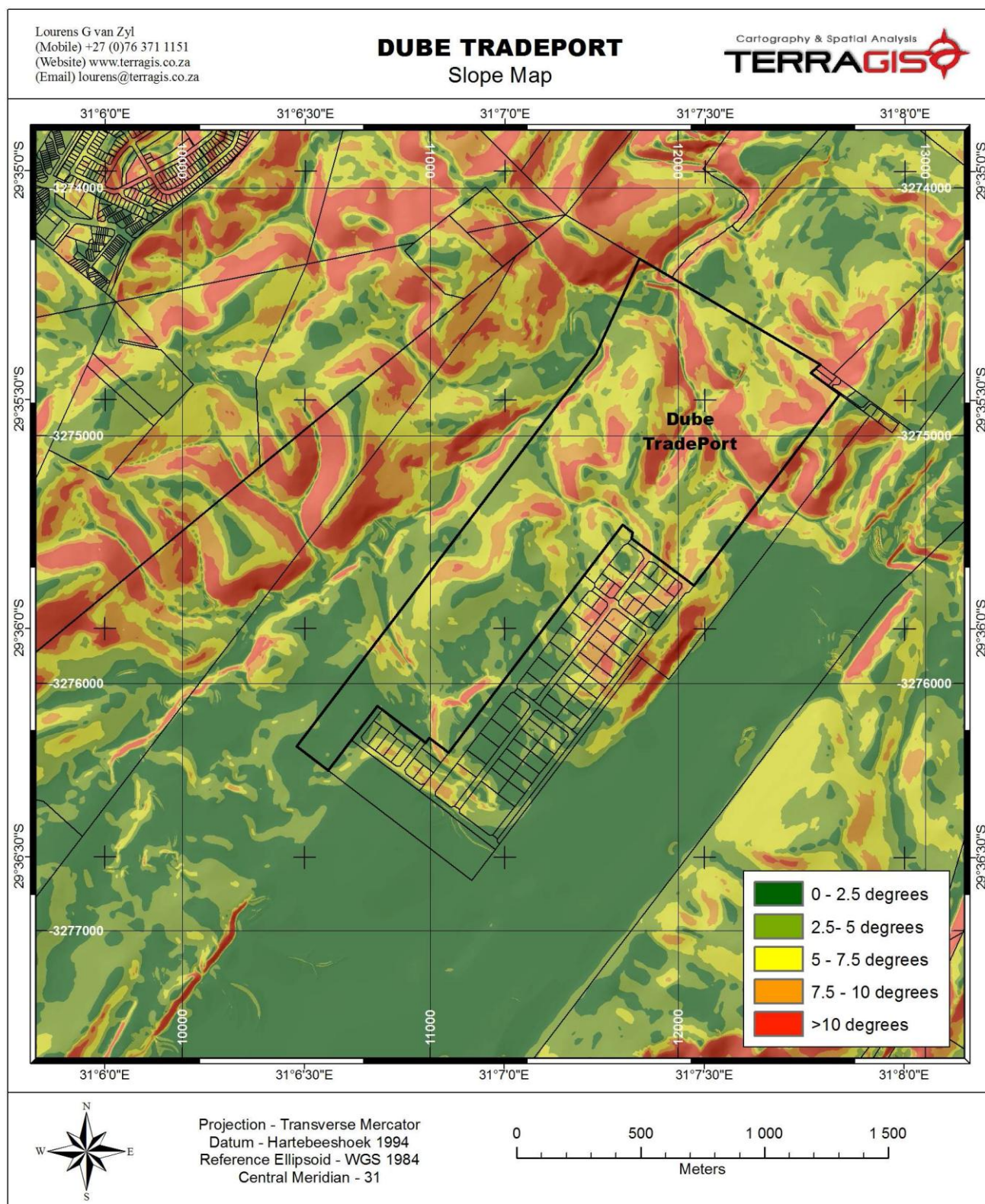
#### **b) Land Type Ab144**

- *Land Type – General:* Ab land types accommodate areas where red dystrophic and mesotrophic soils dominate.
- *Soils:* Predominantly deep red sandy soils derived from old dunes. Valley bottom positions are dominated by wetland (soils with distinct hydromorphism) and recently transported (stratified) soils as well as distinct erosion channels.
- *Land capability and land use:* In the natural state the soils are predominantly used for intensive grazing purposes. Almost the entire landscape has been transformed however and is currently used for the production of sugarcane. The sugarcane production extends into areas that qualify as wetlands.
- *Agricultural potential:* Medium to high depending on soil depth and slope. The sugarcane production is predominantly dryland and as such yields of 40 to 60 tons per hectare are normally obtained.

#### **c) Topographic Parameters**

There is a large elevation variation on the site and distinct drainage features drain the site to the north. The slope map (Figure 3) indicates that large areas of the site have slopes that exceed 10 degrees. These sloped areas pose significant risks in terms of tillage and crop production induced erosion. The erosion pressures on the site are evident in the massive erosion effects observed in the stream and drainage channels.





**Figure 3: Slope Map for the Study Area**

**d) Agricultural Potential of the Site**

The agricultural potential of the site varies according to soil depth. This in turn is dependent on the position in the landscape with soils on crests being generally shallower than soils on lower and less steep slopes. The shallow soils will yield sugarcane yields of less than 40 tons per hectare and the deeper soils can yield up to 60 tons per hectare, or even higher in the case of red structure soils (that were not found on the site). The land use mimics the agricultural potential in that very rocky areas on the crests have been excluded from



sugarcane production in the past. The steep slopes are problematic in terms of the maintenance of the production potential, mainly due to the degradation effect of successive erosion. The road construction activities have had a very big negative influence on the production potential of the site. This is mainly in the form of loss of suitable land as well as the compartmentalisation of the land through new no-go areas.

**e) Soil Potential Linked to Current Land Use and Status**

The current land use in the form of dryland sugarcane production is the optimal use for the land. Although other crops can be produced on the red structured soils their production potential will be limited on the shallower and duplex soils (dominating the specific site). Irrigated land uses are not advised for most of the site as the slopes are such that distinct erosion is predicted. The duplex and shallow soils are prone to erosion and cultivation of these soils should only continue in the presence of a dedicated land management plan in terms of erosion control and mitigation.

**f) Impact of the Land Use Change on the Surrounding Area**

The envisaged land use changes should not impact on the surrounding area if all relevant activities are contained within the development area. Storm water management should be adequate and such that no additional erosion is caused in downstream areas. In terms of agricultural activities and current land use, the impacts of the land use change is considered to be negligible on the surrounding areas.

### **B-1.3 Topography and Hydrology**

#### ***B-1.3.1 Topography***

The topography of the Trade Zone 2 area is characterised by highly dissected undulating coastal plains, covered to a great extent with sugarcane, vegetation, wetlands and watercourses. The area generally slopes towards the Hlawe River, which runs west of Trade Zone 2, with tributary streams intercepting and running across the proposed area and draining into the Hlawe River. The current topography at Trade Zone 2 is characterised as fairly hilly in gradient, with varying sloped undulations from the Trade Zone 2 Cargo area to the General Aviation Area.

#### ***B-1.3.2 Hydrology***

**a) Floodline Determination Assessment**

Sivest Civil Engineering Division undertook a Floodline Determination Assessment for the site. Refer to this assessment in Appendix 6.

Eleven sub-catchments were identified within the study area. A minimum contributing area of 1 km<sup>2</sup> was used as a threshold value to for catchment delineation. River reaches were defined using these sub-catchments along with flow accumulation and river segmentation analysis (see **Figure 3 of Appendix 6: Flood line Determination**). Each sub-catchment is associated with a single river reach however flood lines were only determined for seven applicable reaches (see **Figure 4 of Appendix 6**).

The 2m eThekwin contour dataset was used to generate an elevation model of the study area (see **Figure 6 of Appendix 6**). This model indicates the channel is well defined in the north eastern portions (see **Figure 7 of Appendix 6**) of the study area and also shows the northern side of the Hlawe River is more undulating than the southern side.

Maps indicating the location of the 1: 100 year floodlines and inundation are attached in Appendix A1 and A2. It is recommended that no development takes place within the defined 1 in 100 year floodline. It is also

recommended that a 20m safety buffer is imposed on the 1: 100 year floodline to ensure full compliance with the DWA policy<sup>4</sup>.

Flooding risk and hazard ratings are directly linked to probability of occurrence / flood frequency. Ultimately areas closer to the stream are exposed to more risk than areas further away. In order to signify this risk the 1:10, 1:50 and 1:100 flood peaks were modelled. Areas within the 1:10 year flood line at more risk to flooding than the 1:50 and 1:100 flood lines. The results of this analysis are show in **Appendix A3 of Appendix 6: Floodline Assessment**. Due to the incised nature of the channels the distance between the various flood lines is relatively small. Thus, the specialist's original recommendation that no development takes place within the defined 1 in 100 year flood line and protective buffer remains relevant.

#### **b) Wetland Delineation and Functional Assessment**

A Wetland, Offset and Rehabilitation Strategy was conducted by Wetland Consulting Services (WCS) (Pty) Ltd in October 2013. Refer to Appendix 6.

The proposed TradeZone 2 development is located within quaternary catchment U30D – Tongaati River Catchment of the KwaZulu-Natal Foreland Hydrological Region (DWAF, 2008). Water runoff from the study area feeds into the upper tributaries of the Hlawe River which drains in a north-easterly direction into the Tongaati River approximately 3.5 km downstream of the site and ultimately into the Indian Ocean. According to Freshwater Ecosystem Priority Areas (FEPAs) for the country, rivers and wetlands within the study area are not considered to be Freshwater Ecosystem Priority Areas (SANBI, 2011). Wetlands FEPA's are however located downstream of the site, after the confluence of the Hlawe and Tongaati River systems.

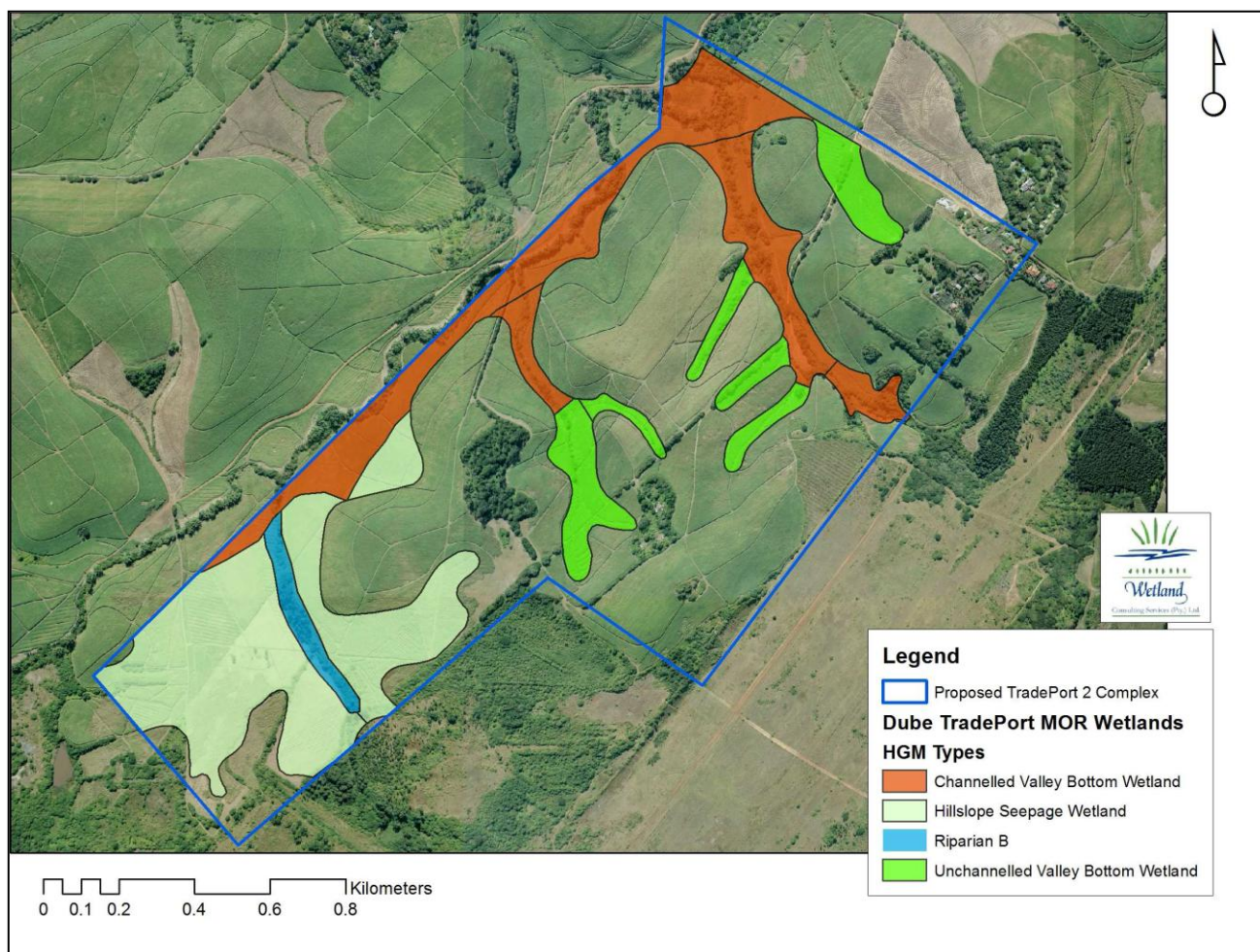
The results of the Wetland Delineation that was conducted according to "*A Practical Field Procedure for Identification and Delineation of Wetland and Riparian areas – Edition 1 (DWAF, 2005)*" identified the following wetland HGM units on the site:

- Six Unchannelled Valley Bottom Wetlands;
- Three Channelled Valley Bottom Wetlands;
- Three Hillslope Seep wetlands; and
- One Riparian B-channel.

Refer to Figure 4 for an illustration of the wetlands that occur on the site.

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<sup>4</sup> Policy and Guidelines for Developments within Floodlines.



**Figure 4: Distribution of Wetlands within the Study Area**

### **Wetland Functional Assessment**

#### **a) Hillslope Seepage Wetlands**

Hillslope seepage wetlands are predominantly associated with the sandstone derived soils and typically reflect the presence of seasonal, shallow interflow. They support conditions that facilitate both sulphate and nitrate reduction as interflow emerges through the organically rich wetland soil profile, and are thus thought to contribute to water quality improvement. They typically represent low energy environments where soil moisture conditions remain high throughout the year and can accumulate carbon. The presence of hillslope seepage wetlands indicates the emergence of water that is retained in the landscape but which is moving in the subsurface, with the rate of flow being a function of head, slope, soil depth and porosity. Because of this relationship hillslope seepage wetlands are often linked with flow augmentation.

The most important ecoservices provided by the seepage wetlands within the development site were stream flow augmentation, erosion control and water quality enhancement. These scores were, however, **Intermediate** with the other scores **Low** and **Moderately Low**. The original vegetation has been entirely replaced by sugarcane, and the biodiversity maintenance score is possibly exaggerated.

#### **b) Unchannelled Valley Bottom Wetlands**

Unchannelled valley bottom wetlands reflect conditions where surface flow velocities are such that they do not, under existing flow conditions, have sufficient energy to transport sediment to the extent that a channel is formed. Within the context of the site, and associated mostly with historic land use, most of the valley bottom systems have undergone a degree of channel incision. The core driving processes of subsurface lateral seepage and diffuse surface flow from the surrounding catchment are still operating, and in many cases the channel bed has stabilised and re-vegetated, allowing diffuse flow longitudinally through the

wetland and maintaining a level of wetland functioning, albeit depleted. It is expected that these systems play a role in retaining water in the landscape and slowly releasing this water to downstream reaches (stream flow augmentation) as well as in contributing to influencing water quality through for example mineralisation of rain water. These wetlands could be seen to play an important role in nutrient removal, including ammonia through adsorption onto clay particles. Extensive areas of the unchannelled valley bottom wetlands are also characterised by subsurface flows, which allow these wetlands to support conditions that facilitate both sulphate and nitrate reduction as interflow emerges through the organically rich wetland soil profile, and are thus thought to contribute to water quality improvement.

The results indicate that wetland functioning has been considerably compromised by the prevailing land use. Stream flow augmentation is underscored, while the flood attenuation component appears to be somewhat inflated. The values obtained for water quality enhancement are lower than expected. The scores obtained are mostly **Low** and **Moderately Low**.

### c) Channelled Valley Bottom Wetlands

Channelled valley bottom wetlands, through the erosion of a channel through the wetland, indicate that sediment loss and export is the dominant process, rather than sediment trapping. Erosion may be both vertical and/or lateral and reflect the attempts of the stream to reach equilibrium with the imposed hydrology. From a functional perspective channelled valley bottom wetlands can play a role in flood attenuation when flows over top the channel bank and spread out over a greater width, with the surface roughness provided by the vegetation further slowing down flood flows. Some sediment trapping can occur during flood flows, though under intermediate flow conditions they contribute sediment to downstream reaches. These wetlands play only a minor role in the improvement of water quality given the short contact period between the water and the soil and vegetation within the wetland.

The results of the functional assessment support these statements, with the scores being **Low** to **Intermediate**. The biodiversity component is improved by the fringe of riparian and remnant wetland vegetation usually associated with the channel..

### Impacts Undermining Wetland Ecological Integrity

The wetlands were assessed in terms of ecological integrity for each of the driving processes, namely:

- Hydrology
- Geomorphology, and
- Vegetation.

Table 8 presents a summary of the impacts that are considered to be undermining the various HGM type's ecological integrity. The landuse is essentially the same (*sugar cane plantations*), and hence the impacts tend to be similar across the wetland types. The scores obtained from the Wet - Health assessment are a reflection of the magnitude of the respective impacts.

**Table 8: Summary of impacts undermining Wetland Ecological Integrity**

Valley Bottom Wetland	Impact
Hydrology	<ul style="list-style-type: none"> <li>• Canalisation introduced by a combination of change in the runoff conditions in the catchment and drain excavation;</li> <li>• Periodic bare soil surfaces increasing runoff potential;</li> <li>• Confinement beneath road culverts;</li> <li>• Runoff from hardened surfaces in the catchments;</li> <li>• Point-source discharge of surface runoff into wetlands from infrastructure;</li> <li>• Interception of diffuse flow by linear features such as roads and drains;</li> <li>• Alien plants within the wetland, increasing direct water losses;</li> <li>• Sugarcane in the catchment and in the wetland, increasing water losses to evapotranspiration and biomass accumulation; and</li> </ul>

	<ul style="list-style-type: none"> <li>• Herringbone drain and ridge-and-furrow networks.</li> </ul>
Geomorphology	<ul style="list-style-type: none"> <li>• Erosional features below road crossings;</li> <li>• Lateral erosion from drain point-source discharge;</li> <li>• Periodic bare soil surfaces providing a source of sediment; and</li> <li>• Channel incision.</li> </ul>
Vegetation	<ul style="list-style-type: none"> <li>• Alien plant species infestation; and</li> <li>• Complete removal of native vegetation and replacement with sugarcane.</li> </ul>
<b>Hillslope Seep</b>	<b>Impact</b>
Hydrology	<ul style="list-style-type: none"> <li>• Sugarcane in the catchment and in the wetland, increasing water losses to evapotranspiration and biomass accumulation;</li> <li>• Herringbone drain and ridge-and-furrow networks;</li> <li>• Periodic bare soil surfaces increasing runoff potential; and</li> <li>• Periodic bare soil surfaces increasing runoff potential.</li> </ul>
Geomorphology	<ul style="list-style-type: none"> <li>• Periodic bare soil surfaces providing a source of sediment;</li> <li>• Erosion faces initiated by drain excavation; and</li> <li>• Change in runoff potential associated with bare soil following harvest and during first 6 months of growth.</li> </ul>
Vegetation	<ul style="list-style-type: none"> <li>• Complete removal of native vegetation and replacement with sugarcane.</li> </ul>

The vegetation has been Critically Modified simply because it has been completely removed. Generally the geomorphology component is stable, and has been **Slightly to Moderately Modified**. The soils are not duplex, and have a low erosive threat. The high rainfall regime and long growing season also encourages rapid growth and stabilisation. The hydrological impacts sustained have been severe, and the hydrology component of wetland health has been **Largely to Greatly Modified**.

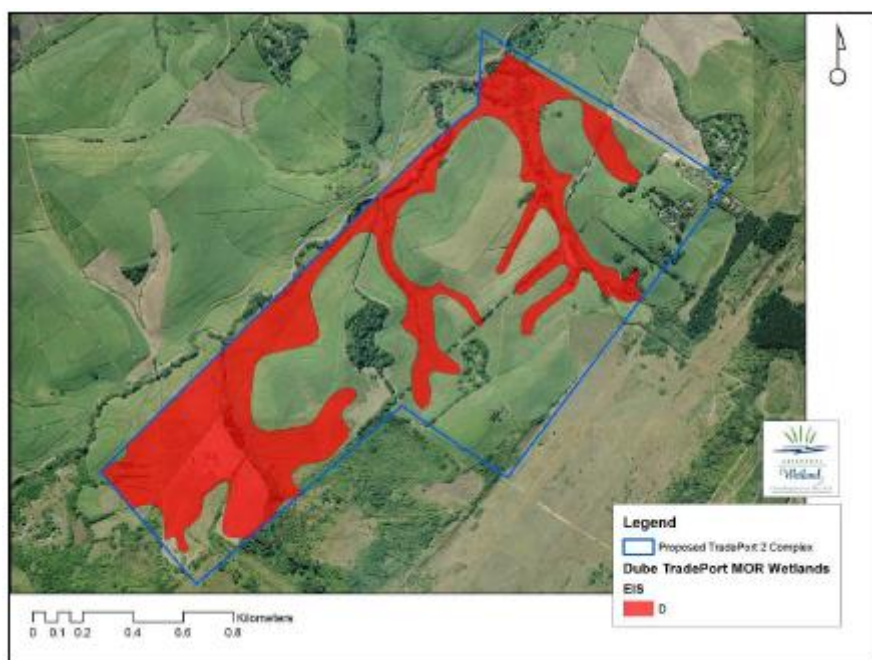
#### **Wetland Ecological Importance and Sensitivity (EIS) Assessment**

All of the wetlands were deemed to have **Low to Marginal** ecological importance and sensitivity due to:

- The extensive removal of the original wetland vegetation and its replacement with sugarcane;
- Infestation of the riparian vegetation by alien plants;
- Poor ecological connectivity across the landscape;
- Wetland habitat homogeneity across the landscape;
- The drainage of the wetlands, precluding recolonisation by hydrophytes; and
- The lack of suitable “source” areas for wetland flora and fauna.

Refer to the Figure below for an illustration of the EIS of the on-site wetlands. The wetlands fall within the Recommended Ecological Management Class D and the EIS category of Low/Marginal. *This implies that wetlands are not ecologically important and sensitive at any scale. The biodiversity of these wetlands is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.*





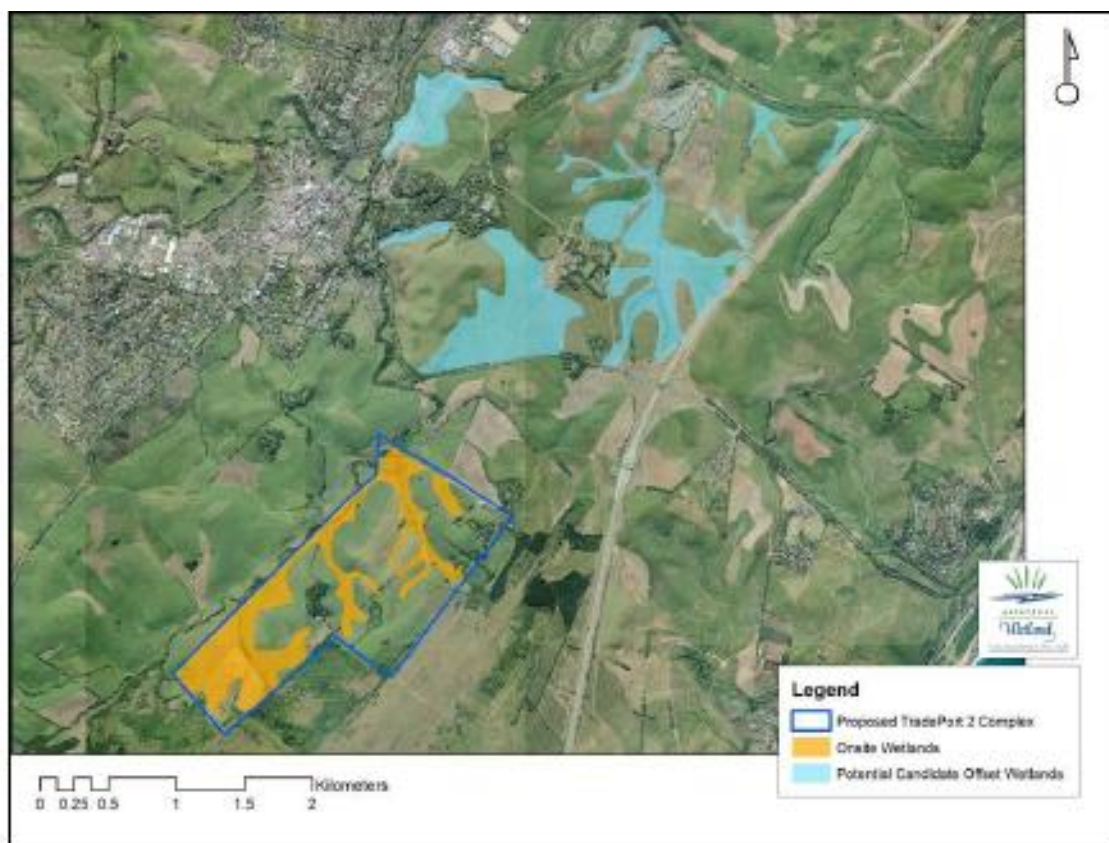
**Figure 5: EIS of the onsite wetlands**

### c) Wetland Offset Site

There will be infilling of the wetlands on the site as a result of the proposed TradeZone 2 development (*should the Developer's preferred alternative be approved*). It is therefore envisaged that rehabilitation and restoration of wetlands at a suitable candidate (*off site offset*) site be implemented to ecologically counterbalance the wetlands removed through the activities associated with the development. The candidate site occurs on north of the study area within the same Tongaat catchment. The acquisition of the candidate offset wetland property (*candidate offset site*) by the applicant will only be undertaken once approval by the DEA and the relevant environmental authorities i.e. eThekweni Municipality, EKZNW and DWA.

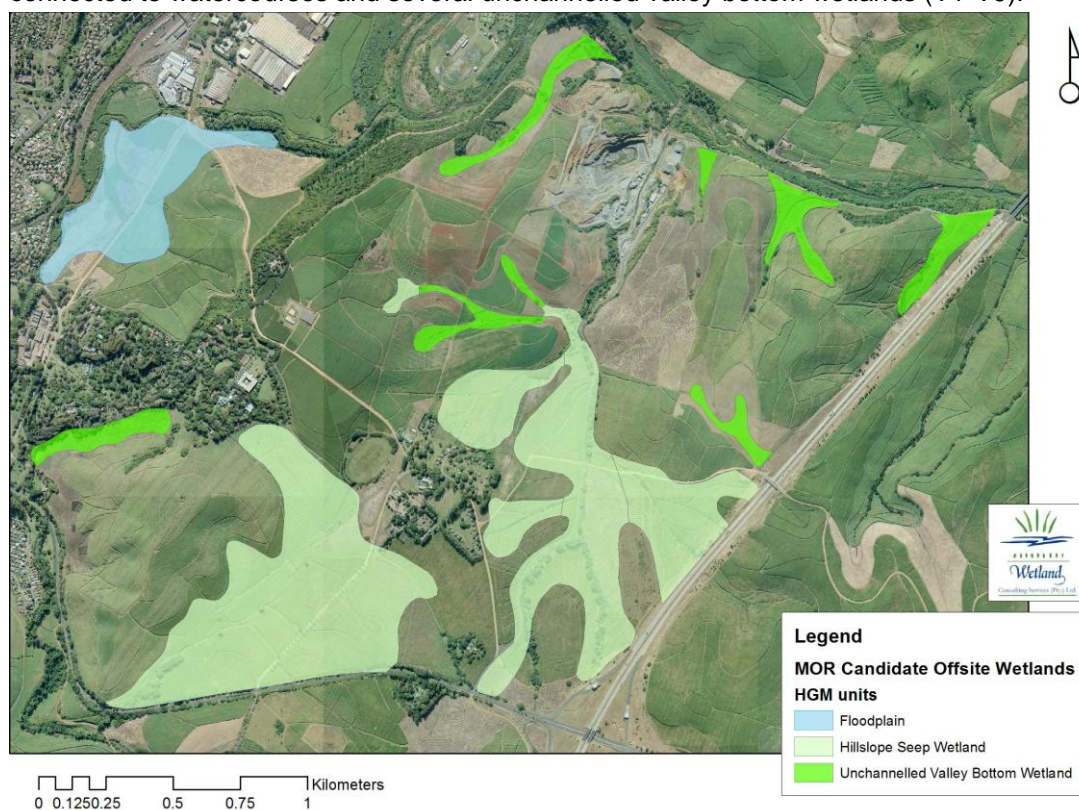
Several candidate wetlands were identified to the north of the site. These were considered suitable because:

- They are in the same catchment, feeding the *Tonga River*;
- They are situated in close proximity to the wetlands that are to be removed. The ecological benefits accrued by rehabilitation are therefore likely to be conferred directly to the landscape that has undergone a loss in wetland functioning;
- They consist mostly of the same hydrogeomorphic units as those that fall within the development site. The large seepage wetland in particular is important because it is sensitive to changes in catchment hydrology, and it is impossible to replicate. The identification of large seepage wetlands in the candidate site provides a valuable opportunity to offset the loss of the large onsite seepage wetland. The similarity of the HGM units also increases the likelihood that the same important ecological services forgone by the development will be reinstated by rehabilitating the candidate wetlands.



**Figure 6 Location of the offsite wetlands relative to the proposed development**

The candidate wetlands consist of one floodplain component (F1), several hillslope seepage (HW) wetlands connected to watercourses and several unchannelled valley bottom wetlands (V1-V9).



**Figure 7: HGM Classification of the candidate wetlands**

### **Present Ecological State of the Wetlands at the Candidate Site**

The present Ecological State (PES) of the wetlands was used to calculate the current functional area, or number of hectare equivalents, of the wetlands in both the onsite and candidate area. Rapid assessments were also undertaken of the candidate wetlands under the hypothetical post-rehabilitation scenario, and the gain in hectare equivalents calculated to estimate whether the rehabilitation measures will satisfy the no-net-loss of wetland habitat principle stipulated as the primary goal of offsetting.

The land use is also commercial sugarcane production, and the impacts sustained are the same as those evident within the proposed development site. These are as follows:

- Herringbone and Ridge-and-Furrow excavated drain networks;
- The complete removal of natural vegetation, and its replacement with sugarcane;
- Alien plant infestation;
- Confined flow through road culverts;
- Water losses via evapotranspiration and biomass accumulation by sugarcane in both the wetland and the catchment;
- Interception of flow by roads, swales, contours and drains;
- A change in the runoff characteristics associated with periodic bare soil surfaces; and
- High nutrient loads entering the wetland from the surrounding agricultural lands.

### **Calculation of Hectare Equivalents**

A hectare equivalent is a quantitative expression of the ecological integrity of a wetland hydro-geomorphic (HGM) unit under a given land use. It represents the common currency that enables the wetland functional area restored to the landscape by restoration, rehabilitation and artificial creation to be compared to that removed from the landscape by a development. Most environmental authorities advocate a no-net-loss of resources approach, be it to biodiversity or wetland functioning, and the hectare equivalent provides the conceptual means of judging whether these rehabilitation objectives have been satisfied.

The approach advocated by the recently released SANBI document “Towards a best-practice guideline for wetland offsets in South Africa” (MacFarlane et al, 2012) was used to determine the target offset.

### **Rehabilitation Strategy for the Candidate Wetlands**

The rehabilitation strategy, which serves as a precursor to a rehabilitation plan, comprises a description of the types of measures to be investigated once the authorities are satisfied that the approach has the potential to appropriately offset the wetland losses associated with the development. A subsequent rehabilitation plan would entail detailed and complimentary input from a suitably qualified environmental engineer and a wetland ecologist. The ecologist would be responsible for identifying problems undermining the hydrological, geomorphological and vegetative integrity of the habitat on the site and deciding on appropriate measures to address these. The engineer would be responsible for designing appropriate earthen, gabion and/or concrete interventions to achieve the objectives outlined by the wetland ecologist. For the purposes of this study the rehabilitation strategy will consist of:

- An evaluation of the problems undermining wetland ecological integrity of the candidate wetlands; and
- A description of the types of interventions required to address these problems and reverse their influence. These may consist of hardened structures such as gabions, concrete weirs, rock-masonry structures and reno-mattresses, or softer structures such as ecologs and earthen berms.

A conceptual rehabilitation strategy for the suitable wetlands is provided in this report.

### **Rationale behind the Compensatory Hectare Equivalents**

Environmental authorisation is likely to require some sort of initiative aimed at offsetting the wetlands removed from the landscape by the development. This may take the form of:

- Offsite mitigation: the identification of suitable wetland habitat outside the boundaries of the development, and the implementation of rehabilitation measures that result in an appropriate gain in



hectare equivalents. This will compensate for the functional wetland area lost to the development;

- Onsite mitigation: the rehabilitation of wetlands that lie within the boundary of the development, but have been excluded from the development footprint; and
- The creation of new wetlands on previously terrestrial habitat; and
- The reintroduction of wetland habitat to the post-development landscape. These wetlands may be within previously existing wetland habitat, but the catchment drivers and topography have been completely transformed. The wetlands are therefore constructed to be compatible with the new landscape.

The underlying principle is that the hectare equivalents gained by these measures should appropriately offset those removed by the development. However, there is a considerable risk of failure of rehabilitation or wetland creation measures. The risk may be associated with shortcomings in the implementation of rehabilitation interventions or future changes in the catchment land use. To account for the risk of failure, the authorities usually attach a mitigation ratio to the target hectare equivalent figure. This usually increases the area of wetland to be rehabilitated, the rationale being that this will counterweigh the failure of individual rehabilitation measures.

According to our current understanding, the offset target is separated into two subparts, namely:

- The *wetland functioning target*, which represents the gain in wetland functional area that is required to ensure a no net loss of wetland functioning from the landscape. This employs the risk of failure multiplier and the temporal risk multiplier; and
- The *conservation target*, which incorporates the conservation, threat status or protection multiplier, which ensures that there is a no net loss or a gain in biodiversity value for the local landscape following the development.

Internationally, a ratio of at least 1:1.5 is generally needed to achieve 1:1 compliance on the ground, but there has been a recent tendency to adopt higher mitigation ratio's, to a maximum of 1:10, depending on the state of the wetland being impacted upon and the risk of failure of the mitigation (NRC 2001).

To calculate hectare equivalents and the required wetland offset targets, the revised SANBI wetland offset calculator was used, as detailed in the document: "*Towards a best-practice guideline for wetland offsets in South Africa: Final Report, SANBI, 2012*". These guidelines are currently (2013) undergoing a review process by the Department of Water Affairs, other government departments and expert stakeholders. The process should result in the formal endorsement of these guidelines as a Department of Water Affairs guideline document in early 2014. SANBI is releasing the current version for use by the wetland community as we feel that it will both be useful to the wetland community, and also allow the identification of any problems in the document before formal endorsement. However, these guidelines currently have no formal status and cannot be considered to be formally endorsed by any government department." (SANBI, 2012). The SANBI offset guideline document is available from Stephen Holness (sholness@nmmu.ac.za). This guideline document as it current stands recommends a range of mitigation ratios, or multipliers, that are closely tied to the following:

- Ecological integrity of the wetland itself (wetland conditions);
- Treat status of vegetation types;
- Habitat and vegetation conditions;
- National and regional conservations plans and targets; and
- Wetland biodiversity.

The multipliers are then determined based on area weighing all the above components and thus give variety of multipliers based on these attributes.

### **Offset Targets/Requirements**

The results of the wetland offset calculations using SANBI revised offset calculator are represented in summarised form across Table 5.1 of the Wetland Offset report (Appendix 6). The wetland functional area of

each HGM unit within the study site was calculated under the current scenario. The respective hectare equivalents values, as well as the total are presented in **Table 6**. Hectare equivalents (ha-eq) are a quantitative expression of a wetland's ecological integrity, even though it is based on largely qualitative data. It is an amalgamation of the wetland health scores and the area of the wetland. In total, the wetlands within the study site represent 30.0 hectare equivalents of functional wetland area. To ensure a no-net-loss of wetland functional area from the local landscape, a gain of **30 ha-eq** of wetland ecological integrity needs to be obtained through the successful rehabilitation of the candidate wetlands.

There is an inherent risk of failure associated with rehabilitation, due to a range of factors such as incorrect construction of interventions, incorrect timing of implementation and unseasonal rainfall. To allow for the risk of failure to achieve the desired offset, a multiplier is applied depending on the type of offset applied (refer to **Table 7**). For rehabilitation this multiplier is 1.5, bringing the target functional area gain to 45ha-eq.

There is also a temporal multiplier. This is aimed at preventing losses in wetland biodiversity resulting from the removal of wetland habitat before suitable replacement habitat has been provided for re-colonisation. The most likely scenario is that wetland rehabilitation will be completed 5 years from the impacts from the development taking place, rendering a multiplier of 1.5. This takes the target ha-eq gain to **67.5ha-eq**. However it should be noted that the developer may be able to reduce this target by fast-tracking the rehabilitation project. There is also a case to be made for the development being exempted from this multiplier, the rationale being that the proposed development area does not contain habitat or species of conservation importance, and has a low wetland biodiversity value in general.

### Potential Hectare Equivalent Gains

Hypothetical post-rehabilitation Wet-Health assessments were carried out on the candidate wetlands. The results are presented in **Table 10** of the Wetland Offset Report (**See Appendix 6**). The wetlands within the site consist of 153.7ha, and in their current state represent approximately 54ha-eq of functional wetland area. Successful wetland rehabilitation may potentially improve the ecological integrity of the wetlands to the extent

It should be noted that:

- This assumes a reduction in the area of the catchment under commercial sugarcane;
- A vegetation integrity score of 7/10 is considered the maximum possible due to the primary grassland component of intact coastal seeps being essentially impossible to restore;

The functional area gains satisfy the no-net-loss priority requirement of the target offset. There are also sufficient gains to offset any possible risk of failure of certain interventions. If the temporal multiplier is included, then these candidate wetlands will not meet the target. In our opinion, however, there is no rational reason to include this multiplier since the onsite wetlands are unlikely to support biodiversity components that are not already present in the offset sites.

### Summary of Wetland Offset

#### Main candidate site – Option 3

- The wetland functioning offset target is 30ha-eq, based on the priority objective of securing a no-net-loss of wetland functioning from the landscape;
- The risk-of-failure multiplier is 1.5, which increases the target to 45ha-eq;
- The temporal multiplier is also 1.5, increasing the target to 67.5ha-eq;
- In our opinion applying the temporal multiplier is unnecessary given the low biodiversity value of the wetlands in the proposed development site;
- The proposed offset site contains approximately 154ha of wetland habitat;
- It is considered to appropriately fulfil all of the important requirements for an offsets site;
- Rehabilitation of the wetlands within the site may potentially yield a gain of 49.4ha-eq, this after a

conservative estimate of the post-rehabilitation ecological state of the candidate wetlands;

- This will appropriately achieve the no-net-loss functional area target, as well as provide leeway for any potential risk of failure of certain interventions;

#### **Additional possible candidates' sites**

- The wetland functioning offset target is 30ha-eq, based on the priority objective of securing a no-net-loss of wetland functioning from the landscape;
- The risk-of-failure multiplier is 1.5, which increases the target to 45ha-eq;
- The temporal multiplier is also 1.5, increasing the target to 67.5ha-eq;
- In our opinion applying the temporal multiplier is unnecessary given the low biodiversity value of the wetlands in the proposed development site;

#### **Option 1**

- The proposed offset site contains approximately 121ha of wetland habitat;
- Rehabilitation of the wetlands within the site may potentially yield a gain of 34.4 ha-eq, this after a conservative estimate of the post-rehabilitation ecological state of the candidate wetlands;
- This will appropriately achieve the no-net-loss functional area target provided divisors are excluded. If these are included this sites will not meet offset requirements/targets.

#### **Option 2**

- The proposed offset site contains approximately 120ha of wetland habitat;
- Rehabilitation of the wetlands within the site may potentially yield a gain of 49.8 ha-eq, this after a conservative estimate of the post-rehabilitation ecological state of the candidate wetlands;
- This will appropriately achieve the no-net-loss functional area target provided divisors are excluded. If these are included this sites will not meet offset requirements/targets.

#### **Option 4**

- The proposed offset site contains approximately 47.2 ha of wetland habitat;
- Rehabilitation of the wetlands within the site may potentially yield a gain of 26.1 ha-eq, this after a conservative estimate of the post-rehabilitation ecological state of the candidate wetlands;
- This will appropriately achieve the no-net-loss functional area target provided divisors are excluded. If these are included this sites will not meet offset requirements/targets.

The biodiversity component of the offset, using the threat-status multiplier, was not included in this study because the method of calculation of the multiplier is in the process of being formulated. This should be reviewed once this is available;

In the Wetland Ecologist's opinion, the candidate sites (Option 1 and 2 with an exception of Option 4) are appropriate and suitable for achieving wetland functioning offset targets for the proposed development with the exclusion of the divisors based on the motivations provided and should be supported by the authorities. It is also our recommendation that Option 3 should be a prioritised before Option 1 and 2 above.

### **B-1.4 Climate**

The site falls within Bioresource Group 1 – Moist Coast Forest, Thorn and Palm Veld. Rainfall in this area is mainly in summer. Dry periods of several weeks can be expected to occur, and this has an effect on the yield of sugar cane. Summers are hot while winters are mild. Frost is very rare and humidity is very high (Camp, 1997).

The table below provides information on the climate data from 2000 to 2008. The climate data was obtained from the South African Sugar Association (SASA) Experiment station in Tongaat.

**Table 9: Climate Data from SASA Experiment Station in Tongaat**

YEAR	RAIN	TMX	TMN	RHP	EVP	DBA	WBP	RHA	RHP	SUN	WND
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	(mm)	(°C)	(°C)	(%)	(mm/d)	(°C)	(°C)	(%)	(%)	(h)	(km/d)
2000	1300.7	25.9	16.1	71	4.5	18.6	20.7	87	71	6.4	149.7
2001	930.8	26.0	16.0	69	4.9	19.2	20.2	83	69	6.5	141.5
2002	950.3	25.9	15.5	64	4.5	19.2	19.9	81	64	6.3	132.4
2003	596.1	25.8	14.7	65	4.4	19.3	19.9	80	65	6.5	144.5
2004	932.1	26.0	15.6	65	4.0	19.5	20.2	79	65	6.5	122.7
2005	685.1	26.4	15.6	65	3.9	19.8	20.2	80	65	6.1	126.7
2006	1307.1	26.3	15.1	66	3.9	19.7	20.2	80	66	6.2	131.5
2007	894.0	26.0	15.4	64	4.4	19.9	19.9	77	64	6.5	145.8
2008	862.9	25.9	15.7	64	4.1	19.7	19.8	79	64	5.9	126.6

**Legend:**

TMX	Maximum Temperature
TMN	Minimum Temperature
RHP	Relative Humidity 14h00
EVP	A-pan evaporation
DBA	Dry bulb 08h00
WBP	Wet bulb 14h00
RHA	Relative humidity 08h00
RHP	Relative humidity 14h00
SUN	sunshine hours
WND	Wind run

**B-1.5 Flora and Fauna**

SEF (Pty) Ltd conducted an Ecological Assessment for the proposed development site which focussed on the floral and faunal assemblages on the site. Refer to the Ecological Assessment in Appendix 6.

**B-1.5.1 Flora**

The study site is located within the Indian Ocean Coastal Belt which covers the seaboard in KwaZulu-Natal and Eastern Cape (Mucina & Rutherford, 2006). The tropical appearance of the vegetation associated with the Indian Ocean Coastal Belt is a result of a mixture of growth forms such as trees, lianas and epiphytes while grass plays a subordinate role in this biome. The land use in this biome is primarily sugarcane farming in KwaZulu-Natal and subsistence farming in the Eastern Cape, which resulted in the loss of vast areas containing natural vegetation. The Indian Ocean Coastal Belt (biome) is divided into smaller units known as vegetation types. According to Mucina & Rutherford (2006), the study area is situated within the KwaZulu-Natal Coastal Belt (refer to Figure 2 of the Ecological Assessment) which occurs only in KwaZulu-Natal from Mtunzini in the north to Margate in the south where the altitude ranges from 20-450 meters above sea level.

The KwaZulu-Natal Coastal Belt consists of dissected undulating coastal plains while some primary grassland still occurs in hilly, high-rainfall areas where there are no pressures from fire and grazing regimes. This vegetation type is affected by very extensive sugarcane fields, timber plantations and residential areas (Mucina & Rutherford, 2006). Important taxa recorded from this vegetation type include *Cyperus natalensis*, *Eragrostis lappula*, *Helichrysum longifolium*, *Senecio dregeanus* while geophytic herbs include, *Kniphofia gracilis*, *K.rooperi*, *Pachystigma venosum*, *Zeuxine africana*, *Strelitzia nicolai* and trees such as *Anastrabe integerrima* and *Acacia nilotica subsp. Kraussiana*. Two species from this vegetation type have already gone extinct; *Vernonia africana* and *Barleria natalensis* while *Kniphofia pauciflora* is endemic.

### a) Vegetation Communities

Four vegetation communities; *disturbed drainage lines*, *disturbed remnant forest* and *scrub patches*, *disturbed wetlands*, and *transformed habitat (sugarcane)* and *transformed habitat (construction)* were recorded on site.

#### 1) *Disturbed drainage lines*

Drainage lines were recorded in the lower lying areas of the study site and ranged from small temporary drainage lines with scrub vegetation to larger permanent drainage lines with disturbed riparian vegetation.

Species diversity along the drainage lines was very low due to disturbance and extensive invasions by alien vegetation such as *Eucalyptus*, *Pinus*, *Sesbania* and *Solanum mauritianum*. Indigenous species recorded from this section included *Albizia adianthifolia* (Flat-crown), *Trichillia emetica* (Natal Mahogany), *Ekebergia capensis* (Cape Ash) and *Phoenix reclinata* (Wild Date Palm). The larger drainage lines were extensively invaded by *Bambusa balcooa* (Indian Bamboo), *Schinus terebinthifolius* (Brazilian Pepper Tree) and *Montanoa hibiscifolia* (Tree daisy).

#### 2) *Disturbed remnant forest and scrub patches*

Small patches of remnant coastal forest and scrubs were recorded in seven localities within the study area. These forest and scrub patches were highly disturbed and invaded by numerous alien species such as *Eucalyptus* species, *Lantana camara* and *Pinus* species. One patch in the centre of the study area contained old buildings and most of the species recorded from this clump were used for landscaping and included species such as *Jacaranda mimosifolia* (Jacaranda), *Bougainvillea* species and *Eucalyptus* species. Indigenous species recorded from these areas included *Trichillia emetica* (Natal Mahogany) and *Ficus lutea* (Giant Leaved Fig).

Other forest patches within the study area were smaller and supported indigenous species such as *Strelitzia nicolai* (Natal Wild Banana), *Calodendron capense* (Cape Chestnut) and *Vitellariopsis marginata* (Natal Bush Milkwood) although the undergrowth was severely invaded by species such as *Canna indica*, *Lantana camara*, *Solanum mauritianum* and *Chromolaena odorata*.

#### 3) *Disturbed wetlands*

Wetland areas found in the study area were highly disturbed or transformed by sugarcane fields and supported limited indigenous vegetation. Disturbed wetlands in the south western section of the study area supported species such as *Cyperus esculentus* (Yellow Nutsedge), *Centella asiatica* (Marsh Pennywort), *Imperata cylindrica* (Cotton Wool Grass), *Eulophia speciosa*, *Gladiolus dalenii* and the exotic *Mimosa pudica* (Pantrop weed) while wetlands located in the sugarcane fields were devoid of any indigenous vegetation.

#### 4) *Transformed habitat (sugarcane and construction)*

At the time of the survey at the end of October 2012, large scale ground clearing operations were already taking place within the study area and these areas were devoid of any vegetation.

Extensive sugarcane (*Saccharum* species) fields were also present throughout the study area while abandoned sugarcane fields were dominated by weeds such as *Senecio polyanthemoides*, *Lantana camara*, *Bidens* and *Conyza* species.

### b) Plants of conservation concern

These plants are nationally protected by the National Environmental Management: Biodiversity Act (Act No. 10 of 2004). Within the context of this report, plants that are Declining and Rare are also referenced under this heading.

A minimum of ten (10) plant species of conservation concern have been recorded in the Quarter Degree Square (QDGC) (Raimondo *et al.*, 2009; POSA, 2011) and these species including habitat requirements and

likelihood of occurrence in the study area are listed in Table 5. Removal of these plants could require a permit and should be accompanied by either a rehabilitation plan where the plants will be re-established or the plants should be rescued and replanted at a suitable site.

**Table 10: Species of conservation concern that could potentially occur in the study area**

Species	Conservation Status	Habitat requirements	Likelihood of occurring within study area
<i>Crinum macowanii</i>	Declining	In grassland, rocky areas, near rivers	Likely
<i>Kniphofia littoralis</i>	Near Threatened	Marshy coastal areas	Likely
<i>Cineraria pinnata</i>	Near Threatened	Coastal grassland	Unlikely since the coastal grassland within the study area has been transformed
<i>Elaeodendron croceum</i>	Declining	Coastal forests	Likely, although the remaining forest patches are highly disturbed
<i>Lotonis dichiloides</i>	Critically Endangered, Possibly Extinct	Grasslands within the Indian Ocean Coastal Belt	Highly Unlikely since the grassland associated with the study area has been transformed
<i>Hypoxis hemerocallidea</i>	Declining	Grasslands	Unlikely since the grassland in the study area has been transformed. It is however a hardy bulb which can resprout if the topsoil was not disturbed
<i>Disperis woodii</i>	Declining	In coastal grassland	Unlikely since the grassland in the study area has been transformed
<i>Mystacidium aliciae</i>	Vulnerable	In thick scrub in shade	Likely. It could be growing in one of the remaining forest / scrub patches
<i>Adenia gummifera</i>	Declining	Forest and scrub from the coast to 1200m.a.s.l	Likely. Limited suitable habitat within the forest and scrub patches
<i>Cassipourea malosana</i>	Declining	Evergreen forest, thicket and swamp forest	Unlikely. The existing forests & scrub have been heavily impacted on and it is unlikely that suitable habitat is present

### c) Provincially Protected Plants

A number of plants are not threatened, but are listed as protected on the KwaZulu-Natal Nature Conservation Management Amendment Act (Act No.5 of 1999). Table 10 lists the protected species which has been confirmed in the study area as well as those for which suitable habitat was recorded.

**Table 11: Protected plants identified and which could occur within the study area based on suitable habitat (species in bold were confirmed in the study area)**

Species	Conservation Status	Habitat Requirements	Occurrence in study area
<i>Brachystelma</i> species	Protected Schedule 7	Wide range	Likely since the entire genus is protected
<b>All <i>Gladiolus</i> species</b>	<b>Protected Schedule 7</b>	<b>Wide range</b>	<b>Confirmed, <i>Gladiolus dalenii</i></b>
All <i>Hyacinthaceae</i> species	Protected Schedule 7	Wide range	Likely that some species from various genusses protected could occur within the study area
All <i>Kniphofia</i> species	Protected Schedule 7	Low-lying areas associated with wetlands, rivers and marshes	Likely although suitable habitat on site was severely disturbed
<b>All species in <i>Orchidiaceae</i></b>	<b>Protected Schedule 6</b>	<b>Wide range</b>	<b>Confirmed: <i>Eulophia speciosa</i></b>

A permit from the KZN Department of Agriculture, Forestry and Fisheries (DAFF) – Forestry Directorate, is required should the Protected plants be removed, relocated or destroyed as a result of construction.

### d) Alien and invasive plants

Extensive alien invasions were recorded throughout the study area (Table 11) and included *Bambusa balcooa* (Indian Bamboo) in the larger drainage lines with *Canna indica* (Wild Canna) and *Solanum mauritianum* (Bugweed) in the disturbed forest / scrub patches.

**Table 12: Protected plants identified and which could occur within the study area (species in bold was confirmed in the study area)**

Family/Species	Level	Protection	Occurrence in study area
<i>Amaryllidaceae</i>	Whole genus	Schedule 4: Protected flora	Confirmed
<i>Ammocharis coranica</i>	Species	Schedule 6: Protected flora (section 23)	Highly Likely – plants with similar leave structure recorded, no flowers present to confirm species
<b><i>Apocynaceae</i></b>	<b>All <i>Pachypodium</i> species</b>	Schedule 4: Protected flora	<b>Confirmed (<i>Pachypodium succulentum</i>)</b>
<i>Boophone disticha</i>	Species	Schedule 6: Protected flora (section 23)	Highly Likely
<i>Euphorbia obsea</i>	Species	Schedule 4: Protected flora	Likely
<i>Huernia</i> spp.	Whole genus	Schedule 6: Protected flora (section 23)	Highly Likely
<i>Liliaceae</i>	All Aloe species	Schedule 4: Protected flora	Confirmed, <i>Aloe claviflora</i> , <i>Aloe variegata</i> , <i>Aloe striata</i>
<i>Mesembryanthemaceae</i>	Whole genus	Schedule 4: Protected flora	Confirmed

Family/Species	Level	Protection	Occurrence in study area
<i>Stapelia</i> spp.	Whole genus	Schedule 6: Protected flora (section 23)	Likely

### **B-1.5.2 Fauna**

Majority of the site has been transformed by existing sugar cane cultivation, dirt roads and construction activity for the Link Road. The remaining natural areas were disturbed and largely infested with exotic vegetation. Although disturbed, faunal habitat in the study area comprised a few small drainage lines, bush clumps / remnant forest patches and a disturbed wetland area dispersed between the cultivated fields, roads, and earthworks area.

Although comprising mostly exotic species the bush clumps represent arboreal habitat providing shelter, feeding and breeding habitat for many faunal species, especially birds. Bird species observed within these areas were typical of forest edge and/or woodland habitat.

Watercourses and wetlands are usually areas of high faunal diversity as the riparian environment and dense vegetation provides abundant cover, feeding and breeding habitat for many species of invertebrates, birds, mammals, reptiles and amphibians. When it is available, surface water provides drinking water for many faunal species while the soft sand in river beds and banks provide perfect burrowing environments for small to medium sized mammals, reptiles and invertebrates. The increase in prey and vegetation attracts a high diversity of birds, as well as terrestrial mammals and reptiles, including predators. Drainage lines and the associated riparian vegetation also tend to be corridors of movement through the landscape for fauna and flora. They are especially important in cultivated or transformed landscapes where most of the natural terrestrial habitat is relatively inhospitable or has been destroyed or transformed.

#### **a) Avifauna**

The area is high in avifaunal diversity with approximately 431 bird species occurring within Quarter Degree Grid Cell (QDGC) 2931CA and the region of the study site. Of this total, approximately 40 species (20%) are marine pelagic and it is highly unlikely that they will be found on or near the site. Of the remaining 391 terrestrial species, approximately 376 species (96%) are associated with a forest or woodland / grassland or farmland mosaic (including inland water systems). A total of 66 bird species were observed during the field survey and are listed in Appendix C of the Ecological Assessment, along with their national (Barnes, 2000) and global (IUCN [World Conservation Union] Red List of Threatened Species, 2012) conservation status. Bird species observed on site were a mixture of grassland and woodland species, many associated with riparian habitat.

A lower level of endemism exists in the eastern regions of South Africa, compared to the central and western sections of the country, with only 32 endemic bird species occurring in QDGC 2931CA. Conversely, due to the higher avifaunal diversity present, a larger proportion of species are of conservation concern compared to the central and western regions. A total of 48 bird species occurring in the QDGC are of conservation concern either nationally (Barnes, 2000) or globally (IUCN, 2012) (Appendix D of the Ecological Assessment).

Four bird species endemic to southern Africa and one species of conservation concern (i.e. with a status higher than Least Concern) were confirmed to occur in the area of the study site during the field survey. These included the Near Threatened Woolly-necked Stork (*Ciconia episcopus*) and the Endemic Natal Spurfowl (*Pternistis natalensis*), Southern Tchagra (*Tchagra tchagra*), Southern Boubou (*Laniarius ferrugineus*) and Cape White-eye (*Zosterops capensis*). Additionally, one species of conservation concern and seven species endemic to southern Africa were given a high probability of occurring in the study area due to the presence of suitable breeding and/or foraging habitat, but were not recorded during the field survey (Appendix D of the



Ecological Assessment). Such species included the globally Near Threatened European Roller (*Coracias garrulus*) and the Endemic Fiscal Flycatcher (*Sigelus silens*), Rufous-winged Cisticola (*Cisticola galactotes*), Barratt's Warbler (*Bradypterus barratti*), Cape Grassbird (*Sphenoeacus afer*), Cape Sparrow (*Passer melanurus*), Cape Longclaw (*Macronyx capensis*), Cape Weaver (*Ploceus capensis*), and Sweet Waxbill (*Estrilda melanotis*).

Appropriate habitat, represented mainly by the wetland and riparian areas, existed on site for a further 12 bird species of conservation concern and seven species endemic to southern Africa. However, due to the level of degradation and the disturbance of the surroundings (intensive farming and airport), these species were given a medium probability of occurring in the study area (Appendix D of the Ecological Assessment).

## **b) Mammals**

The region includes a relatively high diversity of mammals with approximately 88 indigenous species expected to occur within QDGC 2931CA according to the IUCN. These species are listed in Appendix E of the Ecological Assessment along with the probability of each species occurring in the study area as well as their national (Friedmann & Daly, 2004; DEAT, 2007) and global (IUCN, 2012) conservation status. Six mammal species were identified on the study site during the field survey by sight or field evidence such as spoor, droppings or burrows (Appendix E of the Ecological Assessment). All species identified have a conservation status of Least Concern nationally and globally. A further nine species were given a high probability of occurring in the study area due to the presence of suitable habitat, one of which is protected by national legislation, namely the Cape Clawless Otter (*Aonyx capensis*). A further 34 species were given a medium probability of occurring on the study site including six species of conservation concern (Appendix E of the Ecological Assessment). Suitable habitat exists on the site for these species however due to the level of degradation and disturbance of the surroundings (intensive farming and airport) they are unlikely to occur there.

## **c) Herpetofauna**

### **(i) Reptiles**

According to Reptile MAP, a continuation of the Southern African Reptile Conservation Assessment (SARCA) (ADU, 2012), 46 reptile species have been confirmed to occur within QDGC 2931CA (Appendix F of the Ecological Assessment). While no reptile species were observed on the study site during the field survey, 16 species were given a high probability of occurring on the site due to the presence of suitable habitat. Although six of these species are endemic to southern Africa, the majority have not had their conservation status adequately evaluated.

### **(ii) Amphibians**

According to Minter et al. (2004), 26 amphibian species have been confirmed to occur within QDGC 2931CA. Three amphibian species were identified during the field survey, while suitable habitat was observed for a further nine species which were given a high probability of occurring on site (Appendix G of the Ecological Assessment). None of these species were of conservation concern. A further six species were given a medium probability of occurring on the study site including two species of conservation concern (Appendix G of the Ecological Assessment). Suitable habitat exists on the site for these species however due to the level of degradation on the site and disturbance of the surroundings (intensive farming and airport) they are unlikely to occur there.

### **(iii) Lepidoptera (Butterflies)**

South Africa is home to about 666 species of butterflies (Woodhall, 2005). Butterflies, like most invertebrates are highly sensitive to environmental change making them more vulnerable to the presence of toxins in the ecosystem. The most significant causes of habitat loss for butterflies include invasive alien vegetation, changing fire regimes, agricultural activities, urbanisation, plantation forestry, increased grazing and road construction (Henning et al, 2009). According to the South African Butterfly Conservation Assessment

(SABCA), 243 butterfly species occur within QDGC 2931CA, one of which is of conservation concern (Appendix F of the Ecological Assessment). However, it is highly unlikely this species will occur within the study area due to lack of suitable habitat.

### **B-1.6 Ecological Sensitivity**

Based on the findings of the ecological assessments, ecologically sensitive habitats or areas of conservation importance were mapped for flora and fauna (Figure 8).

#### **a) Areas of High Sensitivity**

Since the natural vegetation in the study area was degraded, no areas were highlighted as highly sensitive.

#### **b) Areas of Medium-High Sensitivity**

All drainage lines within the study area were classified as medium-high ecological sensitivity. The highest faunal activity was observed in the riparian areas around drainage lines and such features in the landscape act as corridors for movement for fauna and flora. The degraded wetland system in the western corner of the study site was also classified as medium-high sensitivity since this area has the potential to provide suitable habitat for sensitive faunal and floral species.

#### **c) Areas of Medium Sensitivity**

All remaining areas containing natural vegetation were classified as medium ecological sensitivity. Although these areas were degraded and low floral species diversity was recorded at the time of the survey, one plant species of conservation concern was confirmed to occur in this area. These areas were also utilised by faunal species, especially birds.

#### **d) Areas of Low Sensitivity**

Areas where natural vegetation no longer existed such as the old and current sugar cane fields, buildings, roads and earthworks were classified as low ecological sensitivity.

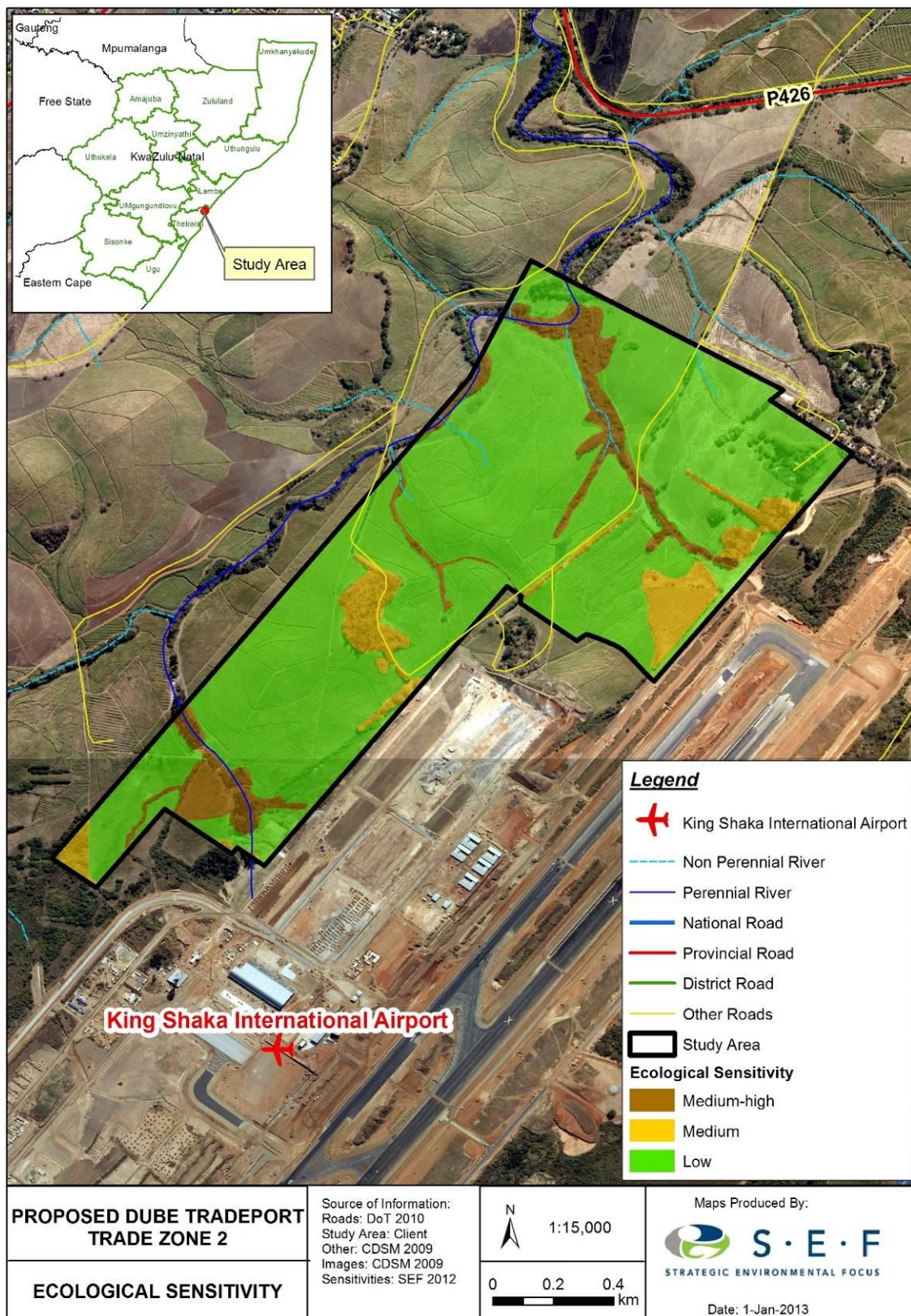


Figure 8: Ecological sensitivity



## B-2 SOCIAL ENVIRONMENT

### B-2.1 Heritage

As per the National Heritage Resources Act, 1999 (Act No. 25 of 1999) a Heritage Impact Assessment was conducted for the proposed development site. The assessment was conducted by Strategic Environmental Focus (Pty) Ltd in December 2012 (refer to Appendix 6).

The study revealed the presence of a dilapidated building (house ruin) which could be over 60 years. This structure occurs at approximately 29°35'53.01"S and 31°07'05.97"E. This structure is protected by the National Heritage Resources Act, 1999 (Act No. 25 of 1999) and a permit will be required to be applied for, with Amafa, should the building be impacted upon by the proposed development.



**Photo 1: A collapsed house (possibly over 60 years)**

If it is decided that this house ruin is demolished, a Phase II Built Heritage Study to assess its significance and determine its age, and Permit Application with Amafa will be required, as this structure is protected by the NHRA.

It is therefore recommended, from a heritage point of view that the establishment of the Dube Trade Port Trade Zone 2 proceed, with adherence to the conditions listed in Section 6 of this report.

Construction activities should be limited to the proposed development boundary. If the size of the footprint is increased at a later stage, a heritage specialist should be involved in order to assess how the increase in the size of the footprint will affect heritage resources.

Herrwood occurs adjacent to the site boundary. There are ancestral graves at Herrwood. During the construction phase of the project, the graves at Herrwood must be respected and will be out of bounds to the construction crew. Construction activity must be confined to the site boundary of the TradeZone 2 development and the contractor and Site Manager must ensure that construction crew do not encroach into Herrwood. This management measure is included in the Environmental Management Programme (EMPr).

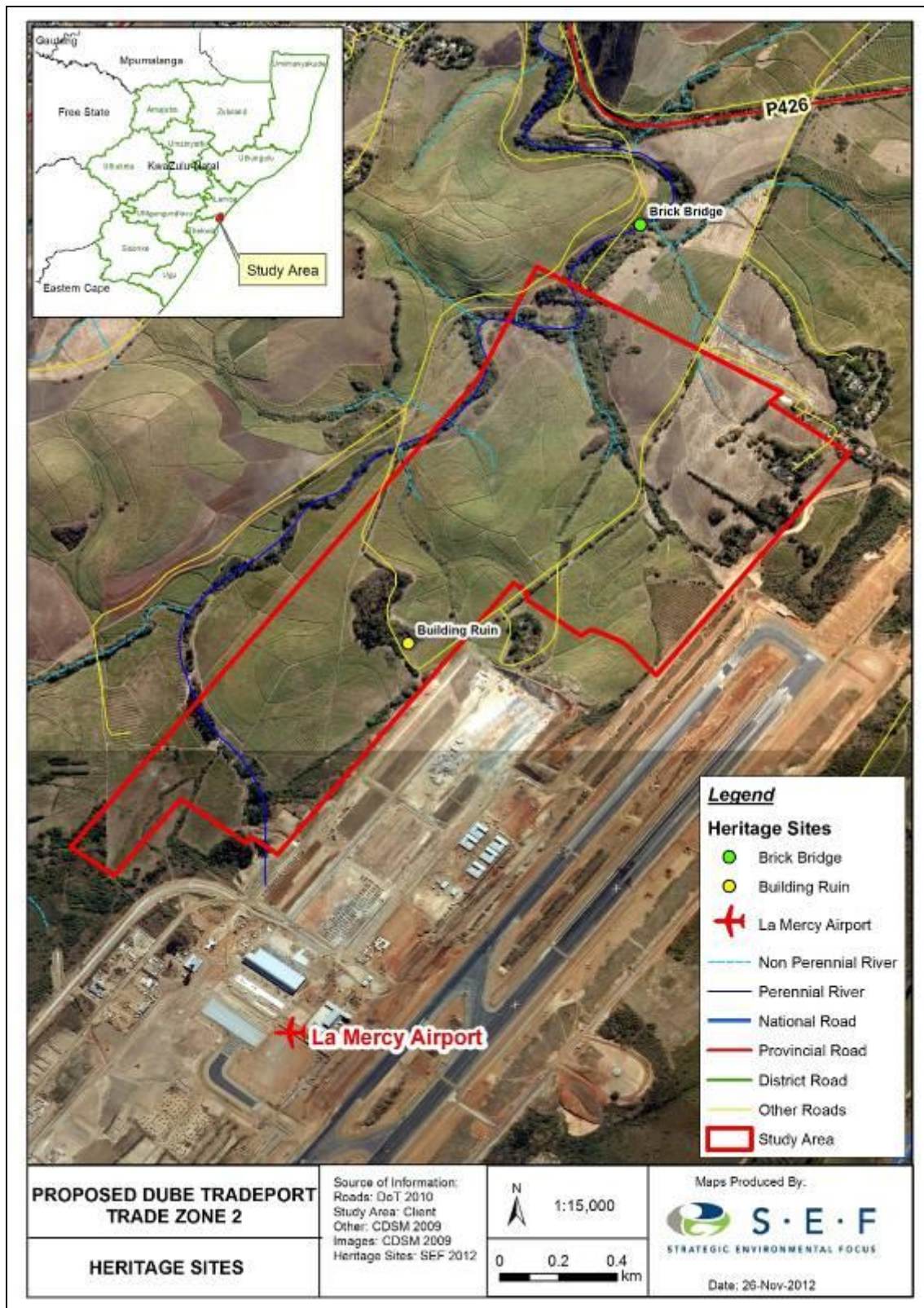


Figure 9: Location of the building ruin on the study site

## **B-2.2 Visual**

The KSIA and DTP Trade Zone 1 are notably extensive features in the landscape and the land uses of the proposed development may blend in or be compatible with these adjacent land uses. There are no residential areas in close proximity to the site and therefore, the proposed development will not be visually obtrusive.

## **B-2.3 Noise**

The site that is earmarked for the proposed development falls within the sensitive noise zones of 55dB for 2010, 2015 and 2035 noise contours of the KSIA. The site is presently impacted by noise generated from aircraft flights.

As mentioned in the Northern Urban Development Corridor (NUDC) for the Tongaat-DTP Local Area Plan (LAP) (2010), the operations of KSIA and DTP have a negative impact on neighbouring land uses due to noise. This is particularly applicable to residential neighbourhoods where the ambient noise exceeds acceptable levels. For planning purposes, the eThekweni Municipality has adopted an 'in-principle' decision to use the noise contours for the 2035 development footprint of the airport as a guideline to directing urban development. Any development within the 55dB DNL (Day Night Average Sound Level)<sup>5</sup> contour is considered sensitive to noise (SANS 1010) and must adhere to additional development controls if permitted.

In view of the close proximity of the proposed development to the airport, it is recommended that the design of the buildings within the study area incorporate noise reduction principles to minimize noise impacts on the occupants. Therefore, residential development is not recommended as an alternative for the proposed development. Industrial development and associated aviation-related activities are compatible land-uses that will complement the adjacent KSIA and DTP.

## **B-2.4 Air Quality**

Changes to the ambient air quality in the immediate vicinity of the project can be expected during the construction and operation phases. During construction, this will primarily be a result of land clearance, construction vehicles travelling on exposed surfaces and earthworks in the form of dust generation.

During the operational phase, the nuisance aspect of dust will be minimal, as the area is sparsely populated and people do not reside in close proximity to the site. There will be indirect impacts in the form of increased localised emissions from increased vehicular traffic. Should any of the activities at the proposed light industrial facility generate any noxious gas emissions, the responsible tenant must obtain an Air Emissions Licence (AEL) from the eThekweni Municipality prior to commencement of the operation/activity.

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<sup>5</sup> DNL is Day Night Average Sound Level – recognised industry standard to measure average aircraft noise levels over a 24 hour period.

## SECTION C: ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

### C-1 APPROACH TO THE EIA

An Environmental Impact Assessment (EIA) is an effective environmental planning tool. It identifies the environmental impacts of a proposed project and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.

The EIA for this project complies with the requirements of the National Environmental Management Act, 1998 (Act 107 of 1998) [NEMA] and the NEMA EIA Regulations, 2010 of the DEA. The guiding principles of an EIA are listed below.

#### Definition of the term “environment”

The term “environment” is used in the broadest sense in an environmental impact assessment. It covers the physical, biological, social, economic, cultural, historical, institutional and political environments.

### C-2 GUIDING PRINCIPLES FOR AN EIA

The EIA must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and an open-door policy by the proponent. Technical information must be communicated to stakeholders in a way that is understood by them and that enables them to meaningfully comment on the project.

There should be ongoing consultation with Interested and Affected Parties (I&APs) representing all walks of life. Sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis. There should finally be opportunities for input by specialists and members of the public. Their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

The eight guiding principles that govern the entire process of EIA are as follows (see Figure below):

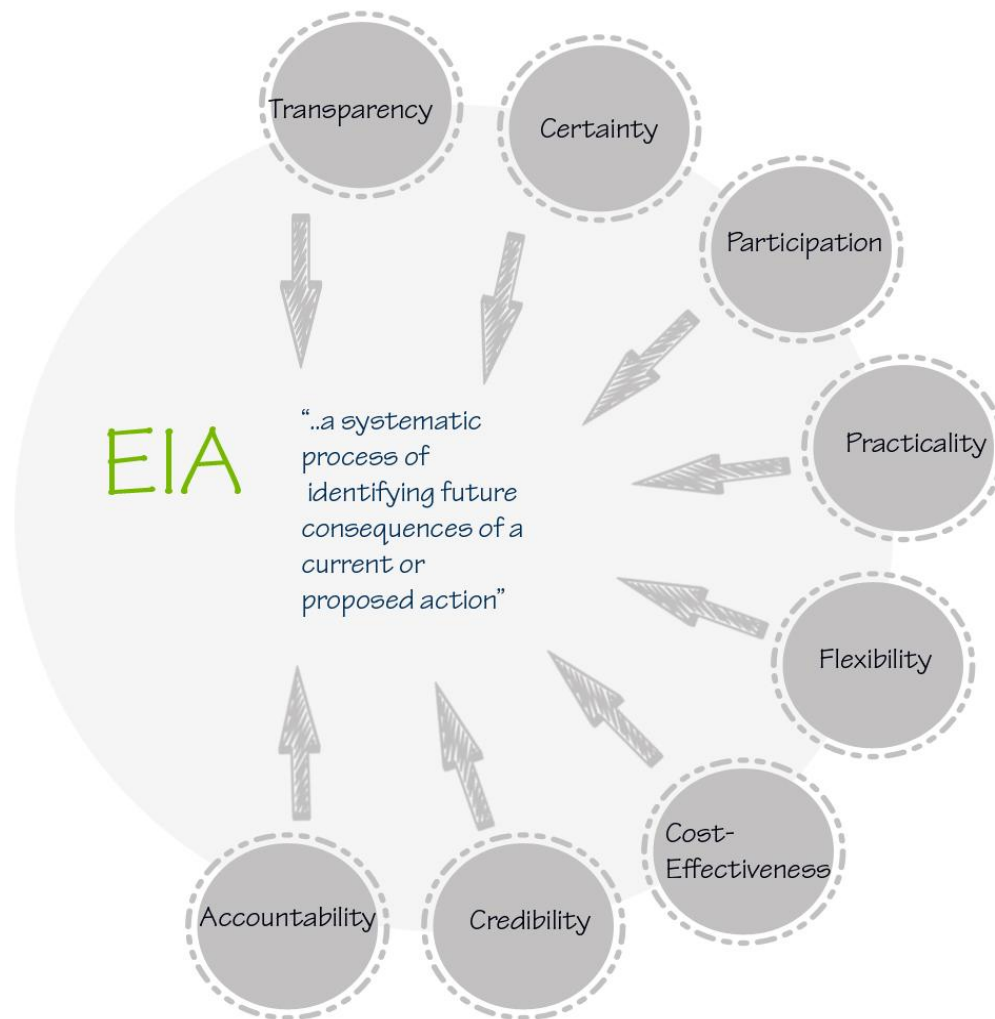
- **Participation:** An appropriate and timely access to the process for all interested parties.
- **Transparency:** All assessment decisions and their basis should be open and accessible.
- **Certainty:** The process and timing of the assessment should be agreed in advanced and followed by all participants.
- **Accountability:** The decision-makers are responsible to all parties for their action and decisions under the assessment process.
- **Credibility:** Assessment is undertaken with professionalism and objectivity.
- **Cost-effectiveness:** The assessment process and its outcomes will ensure environmental protection at the least cost to the society.
- **Flexibility:** The assessment process should be able to adapt to deal efficiently with any proposal and decision making situation.
- **Practicality:** The information and outputs provided by the assessment process are readily usable in decision making and planning.

A S&EIR process is considered as a project management tool for collecting and analysing information on the environmental effects of a project. As such, it is used to:

- Identify potential environmental impacts;
- Examine the significance of environmental implications;
- Assess whether impacts can be mitigated;
- Recommend preventive and corrective mitigating measures;



- Inform decision makers and concerned parties about the environmental implications; and
- Advise whether development should go ahead.



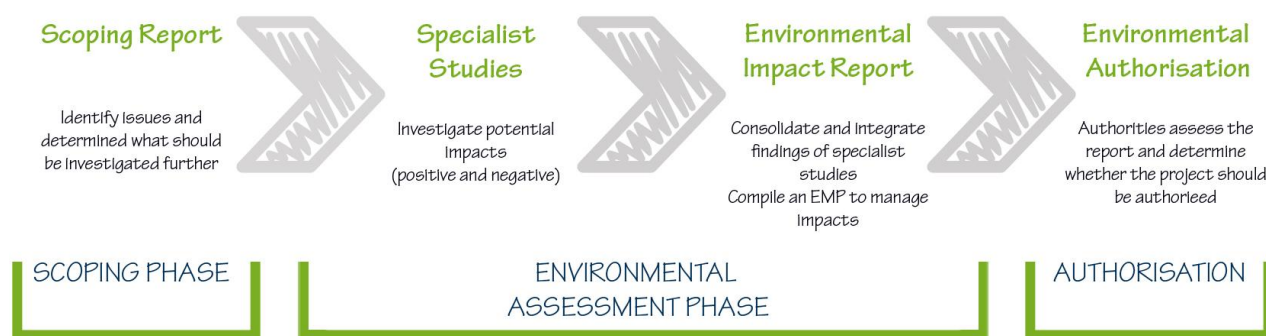
**Figure 10: The eight guiding principles for the EIA process**

A S&EIR process typically has four phases, as illustrated in the Figure below. The Public Participation process forms an integral part of all four phases and is discussed in greater detail in Section C – 4 of this final Scoping Report.



## C-3 S&EIR TECHNICAL PROCESS

This section provides a summary of the technical process that was followed for this S&EIR process.



**Figure 11: Flow diagram of the Scoping and EIR process**

### C-3.1 Pre-application Consultation with the DEA

No pre-consultation meeting was held between SEF and DEA. The EAP conducting the S&EIR process for the applicant, in support of their application for an environmental authorisation, is deemed to have a good understanding of the information requirements of the Department for the proposed development, such that the Department's specific information requirements are deemed to have been met for the scoping phase of this project.

### C-3.2 Application for Authorization

The application form informing the Department of the intent to obtain an Environmental Authorisation was submitted to the DEA on 9 May 2012. The project was subsequently registered and DEA issued the project with reference number DEA Ref: 14/12/16/3/3/2/341. Refer to Appendix 4 for the Application for Authorisation Form and the DEA acknowledgement of receipt of the application.

The Final Scoping Report and Plan of Study for the EIR was submitted to the DEA on 27 August 2013. On 8 November 2012, the DEA accepted the Final Scoping Report and Plan of Study for the EIR.

### C-3.3 Information Gathering

Early in the EIR process, the technical specialists identified the information that would be required for the impact assessment and the relevant data was obtained. In addition, the specialists sourced available information about the receiving environment from reliable sources, I&APs, previous documented studies in the area and previous EIR Reports.

### C-3.4 Specialist Studies

The following specialist studies have been undertaken during the EIR phase:

- Geological and Geo-technical Investigations;
- Ecological Assessment (Flora, Fauna and Avifauna);
- Wetland Delineation and Functional Assessment;
- Phase 1: Cultural Heritage Impact Assessment;
- Agricultural Potential Assessment;
- Floodline Assessment;

- Services Report (civil and electrical); and
- Traffic Impact assessment.

## **C-4 PUBLIC PARTICIPATION PROCESS**

The principles of NEMA govern many aspects of the S&EIR process, including consultation with I&APs. These principles include the provision of sufficient and transparent information to I&APs on an ongoing basis, to allow them to comment; and ensuring the participation of historically disadvantaged individuals, including women, the disabled and the youth.

The principal objective of public participation is thus to inform and enrich decision-making. This is also the key role in the scoping phase of the process.

### **C-4.1 Identification of Interested and Affected Parties**

I&APs representing the following sectors of society have been identified in terms of Regulation 55 of the EIA Regulations R543 of 2010 (see Appendix 5 for a complete preliminary I&AP distribution list):

- Provincial Authorities;
- Local Authorities;
- Ward Councillors;
- Parastatal/ Service Providers;
- Non-governmental Organisations;
- Local forums/ unions; and
- Adjacent Landowners.

### **C-4.2 Public Announcement of the Project**

The Scoping process (Phase 1 of the Public Participation Process) was announced as follows:

- Publication of a media advertisement in English, in the Coastal Weekly on 25 May 2012 (see Appendix 5);
- Two English and two Zulu site notices were erected at visible locations close to the site on 28 May 2012 as follows:
  - At the entrance to the site in close proximity to Ushukela Highway; and
  - On a fence at the entrance to the Dube Trade Port Cargo Terminal.
- Refer to Appendix 5 for the English Site Notice Text and Appendix 5 for the Zulu Site Notice Text. Photographic evidence of the site notices is included in Appendix 5 and
- Distribution of notification letters, comment and registration sheet by fax/post/email to all organs of state, service providers, Non-Governmental Organizations, Ward Councillors and committees on 28 May 2012 (see Appendix 5 for reference to the information package consisting of notification letters, locality map and registration and comment sheet).

### **C-4.3 Public Meeting**

A Public Meeting was held on Wednesday, 20 June 2012 at the Tongaat Town Hall to present the findings of the Draft Scoping Report. Notification of the public meeting and review of the Draft Scoping Report was advertised in the Coastal Weekly on 14 June 2012. Proof of publication of the advert is in Appendix 5.

In addition, registered I&APs were invited via email, post and fax to attend the public meeting and were also notified of the review dates and availability of the Draft Scoping Report for public comment.

There were no members of the public nor registered I&APs at this meeting. Please see attendance registered attached in Appendix 5.

#### **C-4.4 Draft Scoping Report**

All the issues raised were captured in the Draft Scoping Report. A period of 40 days was made available for public comment on the Draft Scoping Report and PoS for EIR. The availability of the Draft Scoping Report was announced as follows:

- Personal letters to all the registered I&APs on the distribution list (refer to Appendix 5 for example of the letter that was sent out);
- An advertisement announcing the availability of the Draft Scoping Report and the public meeting was published in the Coastal Weekly on 14 June 2012.
- The hard copies of the report was posted or hand delivered to all 'organs of state' which included the following:
  - Amafa KwaZulu-Natal;
  - National Department of Agriculture, Forestry and Fisheries (DAFF): Land Use and Soil Management;
  - Provincial DAFF (Forestry Directorate);
  - Provincial Department of Agriculture and Environmental Affairs (KZN DAEA): Land Use and Soil Management;
  - Department of Water Affairs (Water Quality Section);
  - Ezemvelo KZN Wildlife (EKZNW); and
  - eThekweni Municipality.

The Draft Scoping Report and PoS for EIR were distributed for public comment from 14 June 2012 to 26 July 2012 on the SEF website: [www.sefsa.co.za](http://www.sefsa.co.za) and at the Tongaat Library, 1 Victoria Lane, Tongaat.

The I&APs were encouraged to send through their comments via post, e-mail, fax or by contacting the SEF office. Refer to the Comments and Response Report (see Appendix 5) for the comments that were raised upon public review of the Draft Scoping Report and the responses thereof. The actual comments and responses are provided in Appendix 5.

#### **C-4.5 Final Scoping Report**

The Final Scoping Report incorporated comments received from the registered I&APs as well as 'organs of state' upon public review of the Draft Scoping Report. The Final Scoping Report was available to registered I&APs for comment for 21 days i.e. from 27 August to 17 September 2012 at the Tongaat Public Library and at the SEF website: [www.sefsa.co.za](http://www.sefsa.co.za). Notification letters regarding the availability of the Final Scoping Report for public review is provided in Appendix 5. Refer to the Comments and Responses Report for comments that were raised during public review of the Final Scoping Report.

#### **C-4.6 Draft Environmental Impact Report**

The findings of the Impact Assessment Phase were presented in the Draft EIR and EMPr (including the specialist studies conducted).

A period of **40 calendar days (11 December 2013 – 11 February 2014)** was provided to the **State Departments and registered I&APs** for the review and commenting phase of the Draft Environmental Impact Report (EIR). The availability of the Draft EIR was announced by means of personal letters to all the registered I&APs on the distribution list.

In addition, the Draft EIR was distributed for comment as follows:

- Left in a public venue (Tongaat Public Library);
- Hand-delivered/ couriered to the relevant authorities; and
- Posted on SEF's website at <http://www.sefsa.co.za>.

All the comments and concerns raised will be captured in a CRR (Appendix 5). I&APs was sent letters acknowledging their contributions.

#### **C-4.7 Final Environmental Impact Report**

This EIR has been updated with comments and/or concerns raised by I&APs. The CRR will be attached to the Final EIR.

A period of **40 calendar days (3 April 2014 – 19 May 2014)** will be provided to the **State Departments and registered I&APs** for the review and commenting phase of the Final Environmental Impact Report (EIR). The availability of the Final EIR was announced by means of personal letters to all the registered I&APs on the distribution list (Appendix 5).

In addition, the Final EIR was distributed for comment as follows:

- Left in a public venue (Tongaat Public Library);
- Hand-delivered/ couriered to the relevant authorities; and
- Posted on SEF's website at <http://www.sefsa.co.za>.

The Final EIR will be submitted to the DEA and registered I&APs simultaneously for review. Registered I&APs will be advised to submit any additional comments on the Final EIR directly to the DEA for consideration towards an Environmental Authorisation.

## SECTION D: ASSESSMENT CRITERIA

### D-1 IMPACT IDENTIFICATION AND ASSESSMENT

The assessment criteria must clearly identify the environmental impacts of the proposed development. The environmental impacts identified will be quantified and the significance of the impacts assessed according to the criteria set out below. The EAP must make a clear statement, identifying the environmental impacts of the construction, operation and management of the proposed development. As far as possible, the EAP must quantify the suite of potential environmental impacts identified in the study and assess the significance of the impacts according to the criteria set out below. Each impact will be assessed and rated. The assessment of the data must, where possible, be based on accepted scientific techniques, failing which the specialist is to make judgements based on his/ her professional expertise and experience.

#### ***D-1.1.1 Assessment Procedure: Proposed Impact Assessment Methodology***

For the purpose of assessing impacts of the proposed development, during the EIR phase, the project will be divided into two phases from which impacting activities can be identified, namely:

- Construction Phase:** All the construction related activities on site, until the contractor leaves the site.
- Operational Phase:** All activities, including the operation and maintenance of the proposed mine.

The activities arising from each of these phases will be included in the impact assessment tables. This is to identify activities that require certain environmental management actions to mitigate the impacts arising from them. The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure.

<b>Extent</b> The physical and spatial scale of the impact.	Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
	Site	The impact could affect the whole, or a significant portion of the site.
	Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
	National	The impact could have an effect that expands throughout the country (South Africa).
	International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.

<b>Duration</b> The lifetime of the impact, that is measured in relation to the lifetime of the proposed development.	Short Term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
	Short-Medium Term	The impact will be relevant through to the end of a construction phase.
	Medium Term	The impact will last up to the end of the development phases, where after it will be entirely negated.
	Long Term	The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.
	Permanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
<b>Intensity</b> Is the impact destructive or benign, does it destroy the impacted environment, alters its functioning, or slightly alter the environment itself?	Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
	Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.
	High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
<b>Probability</b> The likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.	Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).
	Possible	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.
	Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.
	Highly Likely	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.
	Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100%.

**Mitigation** – The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. These measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

**Determination of Significance – Without Mitigation** – Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance will be rated on the following scale:

No significance: The impact is not substantial and does not require any mitigation action;

Low: The impact is of little importance, but may require limited mitigation;

Medium: The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels; and

High: The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

**Determination of Significance – With Mitigation** – Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation will be rated on the following scale:

*No significance:* The impact will be mitigated to the point where it is regarded as insubstantial; *Low:* The impact will be mitigated to the point where it is of limited importance;

*Low to medium:* The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels;

*Medium:* Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw;

*Medium to high:* The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels; and

*High:* The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

**Assessment Weighting** – Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it will be necessary to weigh and rank all the identified criteria.

**Ranking, Weighting and Scaling** – For each impact under scrutiny, a scaled weighting factor will be attached to each respective impact. The purpose of assigning such weightings serve to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance (Figure below: Weighting description).

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2	Low 2	Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4	High 4	Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

**Figure 12: Description of bio-physical assessment parameters with its respective weighting**

**Identifying the Potential Impacts Without Mitigation Measures (WOM)** – Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1:      Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x  
Weighting Factor

**Identifying the Potential Impacts With Mitigation Measures (WM)** – In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it will be necessary to re-evaluate the impact.

**Mitigation Efficiency (ME)** – The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation effectiveness (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2:      Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency  
Or  
WM = WOM x ME

**Significance Following Mitigation (SFM)** – The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact will, therefore, be seen in its entirety with all considerations taken into account.

### **D-1.1.2      Integration of Specialist's Input**

In order to maintain consistency in the impact assessment, it is suggested that all potential impacts to the environment (or component of the environment under review) should be listed in a table similar to the example shown below (more than one table will be required if impacts require assessment at more than one scale). The assessment parameters used in the table should be applied to all of the impacts and a brief descriptive review of the impacts and their significance will then be provided in the text of the specialist reports and consequently in the EIR. The implications of applying mitigation are reviewed in Section D-1.1.3 below.

**Table 13: Example of an Impact Table**

Impact source(s)		Status	-
Nature of impact			
Reversibility of impact			
Degree of irreplaceable loss of resource			
Affected stakeholders			
Magnitude	Extent		
	Intensity		
	Duration		
	Probability		
Significance	Without mitigation		H
	With mitigation		L
Significance Following Mitigation (SFM)			



### **D-1.1.3 Mitigation Measures**

Mitigation measures will be recommended in order to enhance benefits and minimise negative impacts and they will address the following:

- *Mitigation objectives*: what level of mitigation must be aimed at: For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in a measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make an “educated guess” based on his/ her professional experience;
- *Recommended mitigation measures*: For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided;
- *Effectiveness of mitigation measures*: The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible; and
- *Recommended monitoring and evaluation programme*: The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives. Each environmental impact is to be assessed before and after mitigation measures have been implemented. The management objectives, design standards, etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits. National standards or criteria are examples, which can be stated as mitigation objectives.

Once the above objectives have been stated, feasible management actions, which can be applied as mitigation, must be provided. A duplicate column on the impact assessment tables described above will indicate how the application of the proposed mitigation or management actions has reduced the impact. If the proposed mitigation is to be of any consequence, it should result in a measurable reduction in impacts (or, where relevant, a measurable benefit).

### **D-1.2 Approach to the Assessment of Cumulative Impacts**

Cumulative impacts can arise from one or more activities. A cumulative impact may result in an additive impact i.e. where it adds to the impact which is caused by other similar impacts or an interactive impact i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact. Interactive impacts may be either countervailing (the net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (the net adverse cumulative impact is greater than the sum of the individual impacts).

Possible cumulative impacts of the project are evaluated in Section 6 of the EIR. In addition, various other cumulative impacts e.g. other external impacts that could arise from the project will be further investigated in the EIR phase of the project.

The assessment of cumulative impacts on a study area is complex; especially if many of the impacts occur on a much wider scale than the site being assessed and evaluated. It is often difficult to determine at which point the accumulation of many small impacts reaches the point of an undesired or unintended cumulative impact that should be avoided or mitigated. There are often factors which are uncertain when potential cumulative impacts are identified.

### ***D-1.2.1 Steps in Assessing Cumulative Impacts***

The assessment of cumulative impacts will not be done separately from the assessment of other impacts. Cumulative impacts however, tend to have different time and space dimensions and therefore require specific steps.

Three (3) general steps, which are discussed below, will be recommended to ensure the proper assessment of cumulative impacts.

### ***D-1.2.2 Determining the Extent of Cumulative Impacts***

To initiate the process of assessing cumulative impacts, it is necessary to determine what the extent of potential cumulative impacts will be. This will be done by adopting the following approach:

- Identify potentially significant cumulative impacts associated with the proposed activity;
- Establish the geographic scope of the assessment;
- Identify other activities affecting the environmental resources of the area; and
- Define the goals of the assessment.

### ***D-1.2.3 Describing the Affected Environment***

The following approach is suggested for the compilation of a description of the environment:

- Characterise the identified external environmental resources in terms of their response to change and capacity to withstand stress;
- Characterise the stresses affecting these environmental resources and their relation to regulatory thresholds; and
- Define a baseline condition that provides a measuring point for the environmental resources that will be impacted on.

### ***D-1.2.4 Assessment of Cumulative Impacts***

The general methodology which is used for the assessment of cumulative impacts should be coherent and should comprise of the following:

- An identification of the important cause-and-impact relationships between proposed activity and the environmental resources;
- A determination of the magnitude and significance of cumulative impacts; and
- The modification, or addition, of alternatives to avoid, minimize or mitigate significant cumulative impacts.

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## SECTION E: ALTERNATIVES

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### E-1 IDENTIFICATION OF ALTERNATIVES

The EIA procedures and regulations stipulate that the environmental investigation needs to consider feasible alternatives for any proposed development. Therefore, a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. During the EIR phase of the project, the identified alternatives will be assessed, in terms of environmental acceptability as well as socio-economic feasibility. To define the term alternatives as per Government Notice No. 543 of the NEMA EIA Regulations 2010 means:

*“...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.”*

The alternatives below will be further investigated during the EIR phase of the project:

#### E-1.1 Site/ Location Alternatives

The developer owns the site which is strategically located and in close proximity to the Phase 1 of Dube Trade Port TradeZone and the KSIA. The development of the site would therefore be compatible with the adjacent land uses.

#### E-1.2 Land Use Alternatives

**Alternative 1:** The Preferred Alternative is to develop the ~160ha site into light industrial area, General Aviation and airside/cargo terminal to complement the existing adjacent infrastructure constructed during the Phase 1 KSIA/DTP development, including the MRO and Link Road currently under construction. The remaining area on site would accommodate service roads and supporting services infrastructure.

**Alternative 2:** would make allowance for only one land use on the entire site. As such, instead of the proposed development being divided to accommodate open spaces, various tenant specifications and service roads; the entire site would be developed for heavy industries only.

**Alternative 3:** would make allowance for a layout that would accommodate both light industrial and residential use within TradeZone 2.

#### E-1.3 Development Layout Alternatives

##### **Alternative 1: Developer's Preferred Layout**

This would entail the total infilling of the wetlands and drainage lines on the site to cater for a maximum developable area (refer to Appendix 3).

##### **Alternative 2: Environmentally Preferred Layout**

This would entail the implementation of a buffer width of 30m from the wetlands and drainage lines on site to maintain the ecological processes associated with the water resources on site and minimise the negative

impacts on the downstream hydrological systems. This layout would entail a reduced development footprint that will render to the development unfeasible for the proposed land uses i.e. General Aviation, Residential area for the air force, that are required to integrate with Phase 1 of KSIA/DTP and the greater Master Plan due to space limitations (Refer to Appendix 3).

#### **E-1.4 No Development Alternative**

The 'no-go' or 'do nothing' alternative would be applicable if the proposed development is not approved by the DEA and the status quo of the site will remain. This option assumes that a conservative approach would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the proposed development not be implemented, the study area will not be affected by any construction-related or operational phase impacts. Therefore, the present state of the biophysical, social and economic environment will remain, unaffected.

The site would remain undeveloped and commercial sugar cane farming would continue. The proposed general aviation associated Maintenance Repair Overhaul (MRO) Facility and the new link road between the Cargo Terminal and uShukela Drive (formerly Watson Highway) would however, be underutilized. In addition to servicing the needs of the Cargo Terminal and Trade Zone area, the link road has been designed to accommodate additional traffic from surrounding areas earmarked for development. Against this background, this alternative would have huge implication for the infrastructure investment already made in the area. The no-go alternative will be investigated at the EIA phase.

The site would remain undeveloped and commercial sugar cane farming would continue. The proposed general aviation associated Maintenance Repair Overhaul (MRO) facility and the new link road between the Cargo Terminal and uShukela Drive (formerly Watson Highway) would however, be underutilized. In addition to servicing the needs of the Cargo Terminal and Trade Zone area, the link road has been designed to accommodate additional traffic from surrounding areas earmarked for development. Against this background, this alternative would have huge implication for the infrastructure investment already made in the area.

The airport is anticipated to provide opportunities for new trade, a logistics gateway, additional cargo freight, direct international flights and an increased number of passengers in the long-term. Should the Trade Zone 2 development not take place, there would be no infrastructure to support the expansion of the airport to meet its provincial goals of growth in the economy. The investment made in Phase 1 of the KSIA/DTP development will not be fully utilized and supported. The province would stagnate in growth of the airport due to the lack of adequate infrastructure.

Failure to construct the Trade Zone 2 development will not unlock opportunities for economic and employment opportunities in the Greater La Mercy area and will not contribute to the Dube Aerotropolis<sup>6</sup> development plans.

The DTP has been identified as a key development node in the north, and this is evident in the eThekweni Municipality's IDP, as well as the northern spatial development plan, and the Tongaat/DTP LAP. In the absence of the Trade Zone 2 development, there would be stifled growth, not only in the northern region of the Municipality but also in the Southern African region, since the airport's international status will be undermined.

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<sup>6</sup> KSIA is a core piece of infrastructure with access to sea, road and rail linkages, within one of Southern Africa's strongest regional economies.

DTP development strategy will guide the development of the entire Airport City and create significant opportunities for all businesses in surrounding area ([www.thdev.co.za/developments/aerotropolis/overview](http://www.thdev.co.za/developments/aerotropolis/overview)).

An Aerotropolis is a new layout of urban form comprising of aviation intensive businesses and related enterprises extending up to 25 kilometres outward from major airports (<http://en.wikipedia.org/wiki/Aerotropolis>).

In the absence of the proposed TradeZone 2 development, there would be no need for additional services infrastructure such as the proposed 2.2Ml reservoir to provide water to the proposed development. In addition, there would not be the need for the construction of additional bulk sewer pipelines to the Tongaat Waste Water Treatment Works (WWTW) to cater for the increased demand in sewerage requirements. The present status quo in terms of stormwater run-off would prevail and there would be no need for the construction of attenuation ponds. There would not be any pressure on the eThekweni Municipality to collect waste that would have been generated at the Trade Zone 2 development, if it were constructed and became fully operational.

The anticipated road upgrades that are envisaged by Traffic Engineer would not be required, should the Trade Zone 2 development not go-ahead.

There would not be any destruction of additional habitats, as there would not be any infilling of wetlands and drainage lines associated with the Trade Zone 2 development site. With the implementation of on-site rehabilitation measures to re-instate the wetlands and drainage lines, there would be increased biodiversity on the site. There would be potential biodiversity benefits from secured wetland offsets and rehabilitation of the Hlawe River as a result of the Hlawe River Pipeline Project.

## E-2 COMPARATIVE ASSESSMENT

Advantages are marked with a (✓) while disadvantages are marked with (X) under the subsequent headings.

### E-2.1 Layout Alternatives

Layout Alternative 1 (Developer's Preferred Layout) – Infilling of the watercourse on site	Layout Alternative 2 (Environmentally preferred layout) – 30m buffer around watercourses
<p>(X) The total infilling of the wetlands and drainage lines on site will lead to a loss of wetlands on site. This is in contravention to the KSIA Appeal Decision that wetlands on site must be rehabilitated and maintained.</p> <p>(X) The infilling of the wetlands and drainage lines on site will lead to a cumulative net loss of wetlands within the KSIA/DTP Precinct through damage, destruction and pollution of the water resources.</p> <p>(X) There will be a loss of hydrological function caused by altered flow patterns, increase in hard surfaces within the Tongati River Catchment, and negative impacts on the downstream wetland and riparian systems through change in flow due to decreased sub-surface flow and an increase in flood peaks.</p> <p>(X) The destruction of the drainage lines and wetland areas will not support floral and faunal movement within the landscape, thereby impacting on localised biodiversity. The decline in habitat availability and species composition and diversity could result in a decline in the local aquatic biota of the Hlawe River and cause a further decline of the aquatic biota in the Tongati River Catchment as a result of declining water quality.</p> <p>(X) There could be a decline in water quality downstream of the site. A further decline in surface water quality in terms of both sedimentation and pollutants can be expected.</p>	<p>(✓) The adoption of a 30m buffer around the wetlands will ensure that construction and operational activities are restricted to reduce the impact of adjacent land uses on the ecologically sensitive areas of the site.</p> <p>(✓) The rehabilitation of the disturbed drainage lines and wetlands on site will provide a suitable habitat for the sensitive floral and faunal species.</p> <p>(✓) Removal of alien plant species within the wetlands and the 30m buffer will improve the ecological integrity of the site.</p> <p>(✓) The 30m buffer will promote the continuity of ecological corridors.</p> <p>(X) The development footprint will be greatly reduced if the wetlands and the 30m buffer are implemented. While protecting the wetlands, there would be insufficient space for development of the TradeZone 2 landuses such as general aviation, light industrial and airside/cargo terminal. Therefore, there would be no impetus for the expansion of the KSIA/DTP, as there would not be integration between TradeZone 1 and 2.</p>

<p>✗ Increased erosion risks due to increased flood peaks and concentrated surface water runoff.</p> <p>✗ Increase in alien and invasive plant species on-site and downstream.</p> <p>✓ The adoption of the wetland offset could achieve the no-net-loss functional area target, as well as provide leeway for any potential risk of failure of certain interventions.</p> <p>✓ Mitigation through the rehabilitation of wetlands at the candidate wetland offset site north of the study area is proposed by the developer.</p> <p>✓ Successful rehabilitation of the wetlands offsite could ecologically counterbalance the wetlands removed as a result of the proposed development.</p> <p>✓ Rehabilitation of the wetlands within the candidate offset site may potentially yield a gain of 49.4ha-eq, this after a conservative estimate of the post-rehabilitation ecological state of the candidate wetlands.</p> <p>✓ The candidate site is considered appropriate and suitable for achieving both the wetland functioning target offset and the biodiversity target offset for the proposed development.</p>	
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## E-2.2 Land Use Alternatives

Alternative 1	Alternative 2	Alternative 3
<b>Light Industrial Area comprising aviation-related industries</b>	<b>Only one land use- heavy industries</b>	<b>Light industry and residential land uses</b>
<p>✓ This is in line with the local policies (<i>Draft NSDP</i>) for development of the DTP area, for land uses such as logistics, business, industry and service opportunities for the region and surrounding local areas.</p> <p>✓ Cargo terminal, light industrial and aviation-related land-uses will complement the existing adjacent infrastructure constructed during the Phase 1 KSIA/DTP development, including the MRO and Link Road currently under construction.</p> <p>✓ The proposed land uses will utilise and mutually support the international/national logistics infrastructure of Phase 1.</p>	<p>✗ The Tongaat-DTP LAP: NUDC encourages mixed-use development to enforce the new airport node as an internationally competitive 'Aerotropolis.'</p> <p>✗ According to the Draft NSDP, non-noxious industry that accommodates manufacturing are recommended for the DTP/KSIA precinct.</p>	<p>✗ The site is located within the noise contours for the 2035 development footprint of the airport and subject to noise levels exceeding of 55dB DNL (<i>Day Night Average Sound Level</i>). Permanent residential development would be impacted by noise of the aircrafts.</p> <p>✓ For the light industrial land uses, mitigation measures that incorporate noise reduction principles in the design of the buildings within the study area are recommended.</p> <p>✗ The Tongaat-DTP LAP: NUDC encourages mixed-use development to enforce the new airport node as an internationally competitive 'Aerotropolis.'</p>

## SECTION F: ASSESSMENT OF IMPACTS

### F-1 IDENTIFIED IMPACTS

The following issues were identified in the Plan of Study and were investigated as assessed for the proposed development, should the developer's preferred layout alternative be approved (as discussed in Section E above):

#### Biophysical Impacts

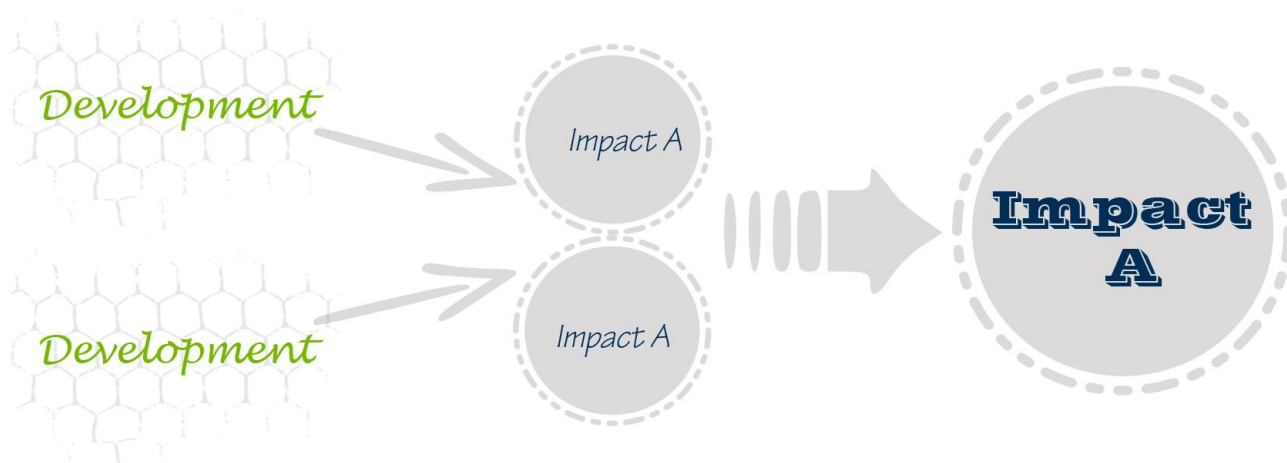
- Potential impacts on surface water resources that occur in close proximity (various non-perennial tributaries traverse the site);
- Potential impacts of increased surface water run-off (viz. increased soil erosion) associated with the establishment of hard surfaces and vegetation clearing (mainly during the construction phase);
- Potential impacts on ground- and surface-water quality, and soils due to hydrocarbon spillages from vehicles during the construction phase of the development;
- Loss of wetland ecosystem and habitat through infill;
- Destruction of existing flora within the study area; and
- Faunal displacement, mainly during the construction phase of the project.

#### Socio-Economic Impacts

- Increased dust and noise generation during the construction phase;
- Change in the visual character of the area;
- Impact on loss of agricultural land;
- Potential impacts on heritage resources;
- Impacts on localised traffic; and
- Job creation during the construction and operational phases of the proposed project.

### F-2 IDENTIFIED CUMULATIVE IMPACTS

Cumulative impacts, as illustrated below, occur as a result from the combined effect of incremental changes caused by other activities together with the particular project. In other words, several developments with insignificant impacts individually may, when viewed together, have a significant cumulative adverse impact on the environment (see Figure below).



**Figure 13: The identification of Cumulative Impacts**

The following cumulative impacts have been identified in terms of the proposed development and warrant

further investigation during the assessment phase:

- Increased loss of viable and high potential agricultural land;
- Economic impact of the proposed development;
- Cumulative impact of the proposed development and other developments within the KSIA/DTP Precinct;
- Increased traffic associated with additional road users; and
- Cumulative loss of wetlands on a regional and local level.



## F-3 IMPACT ASSESSMENT: CONSTRUCTION PHASE

### F-3.1 Biophysical Environment

#### F-3.1.1 *Soil erosion and silting of the wetlands, riparian areas and drainage lines*

##### **Source and nature of the impact**

By clearing the vegetation for preparing the site for construction and the introducing of hard surfaces, such as the construction of the internal roads, laydown areas and contractor's camps, the stormwater run-off from the site will increase in volume and velocity. This may lead to an increased amount of soil erosion resulting in increased volumes of silt entering the wetlands and watercourse system which could impact on functionality. Rainfall and inadequate drainage systems could lead to erosion gullies forming resulting in land degradation and sedimentation of rivers. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soil.

**Table 14: Soil erosion and silting of the wetland, riparian areas and drainage lines**

Impact source(s)	Increased surface area of hard surfaces as a result of construction activities and vehicles	Status	-
Nature of impact	Increased soil erosion and silting of the wetlands, riparian areas and drainage lines		
Reversibility of impact	The impact is reversible through the implementation of adequate stormwater management measures		
Degree of irreplaceable loss of resource	Medium		
Affected stakeholders	Surrounding and downstream land owners		
Magnitude	<i>Extent</i>	Regional -3	
	<i>Intensity</i>	High – 5	
	<i>Duration</i>	Medium Term – 3	
	<i>Probability</i>	Highly Likely - 4	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+3+4) \times 4 = 60$ Medium to High	M - H
	<i>With mitigation</i>	$WOM \times ME = WM$ $60 \times 0.4 = 24$ Low - Medium	L - M

##### **Mitigation measures**

- An ecologically-sound stormwater management plan must be implemented during construction and appropriate water diversion systems put in place.
- The general level of management required is that of controlling all runoff emanating from such a site in excess of that which would have occurred if the site was in its natural or original state. Such stormwater management may well be the provision of soak pits, structures such as attenuation ponds or tanks (with controlled outlets where necessary), all to ensure that the rate of runoff is reduced to pre-development states and that runoff is not concentrated onto adjacent neighbouring sites or other infrastructure, be it road drainage or valley lines, streams, etc
- Erosion must not be allowed to develop on a large scale before effecting repairs.
- Appropriate mitigation measures (in consultation with the ECO) must be implemented at areas susceptible to erosion (either by wind or rain) to decrease and/or cease erosion.
- Existing roads and tracks must be used where feasible, rather than creating new routes through vegetated areas.
- Vegetation and soil must be retained in position for as long as possible, and removed immediately ahead of construction / earthworks in that area (DWAF, 2005).
- Runoff from roads must be managed to avoid erosion and pollution problems.

- During the construction and operational phases, measures must be put in place to control the flow of surface water so that it does not impact on the vegetation, i.e., energy dissipaters and canal flow designs must be used to prevent scouring and erosion.
- Stormwater management must be implemented into the construction of internal/access roads such as culverts over the riparian and drainage line crossings. Routes through drainage lines and riparian zones must be avoided wherever possible. Where access through drainage lines and riparian zones is unavoidable, only one road is permitted, constructed perpendicular to the drainage line.
- All areas susceptible to erosion must be protected and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.
- Areas exposed to erosion due to construction should be vegetated with species naturally occurring in the area.
- Surface water or stormwater must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being in place.
- Erosion berms should be installed to prevent gully formation and siltation of the drainage lines/watercourse. The following points should serve to guide the placement of erosion berms:
  - Where the track has a slope of less than 2%, berms should be installed every 50m.
  - Where the track slopes between 2% and 10%, berms should be installed every 25m.
  - Where the track slopes between 10% and 15%, berms should be installed every 20m.
  - Where the track has a slope greater than 15%, berms should be installed every 10m.
  - Vegetation clearing should be kept to a minimum and phased where practical.
- Sheet run-off from paved surfaces and internal/access roads needs to be curtailed.
- Run-off from paved surfaces should be slowed down by the strategic placement of berms.
- As much vegetation growth as possible should be promoted within the proposed development area in order to protect soils. In this regard special mention is made of the need to use indigenous vegetation species to maintain a high level of biodiversity.
- All areas of disturbed and compacted soil need to be ripped and reprofiled before rehabilitation.
- Concurrent rehabilitation must take place throughout the construction phase.

### ***Significance of the impact***

Due to the nature of the impact (as described above), the significance of this impact without mitigation, is regarded to be medium to high. Implementation of the mitigation measures will decrease the significance of the impact to low-medium.

### ***F-3.1.2 Surface and ground water contamination***

#### ***Source and nature of the impact***

Hydrocarbons (oil, petrol and diesel) and other chemicals/ liquids will be required during the construction phase. Spills and/or leakages could occur from construction vehicles and/or equipment. These spills could contaminate the surface and ground water should they occur simultaneously with a heavy rainfall event. Uncontrolled dumping of waste material on site will lead to pollution of the natural environment as well as faunal injury and mortality.

**Table 15: Surface and ground water contamination**

Impact source(s)	Hydrocarbon and other chemical spillages	Status	-
Nature of impact	Contamination of surface and ground water during heavy rainfall events		
Reversibility of impact	The impact is reversible by containing and clearing spills as and when they occur by means of an appropriate spill kit.		
Degree of irreplaceable loss of resource	Low		
Affected stakeholders	Surrounding and downstream land owners		

Magnitude	<i>Extent</i>	Regional – 3	
	<i>Intensity</i>	High – 5	
	<i>Duration</i>	Long Term – 4	
	<i>Probability</i>	Likely – 3	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+4+3) \times 4 = 60$ Medium to high	M - H
	<i>With mitigation</i>	$WOM \times ME = WM$ $60 \times 0.4 = 24$ Low to medium	L - M

### Mitigation measures

- Hazardous waste should be stored in compliance with regional, national and local legislation.
- Tenants that intend to store hazardous waste on site, must obtain a Waste Management License (WML) through the relevant Environmental Application Process, if required.
- Water passing through vehicle bays and workshops must pass through oil traps to ensure that all hazardous material is removed.
- The stormwater attenuation facilities must be designed to filter / trap any contaminants prior to water seeping into the ground or drainage lines.
- Construction should preferably take place during the dry season.
- All construction vehicles should be kept in good working condition.
- All construction vehicles should be parked in demarcated areas when not in use and drip trays should be placed under vehicles to collect any spillages/ leaks.
- If hydrocarbon spills occur these should be cleaned using SUNSORB (or similar product) and the contaminated soils removed from site and dispose of at an appropriate registered landfill site.

### Significance of the impact

The significance of this impact is regarded as medium to high without mitigation, however, if spillages are effectively mitigated to reduce the likelihood of surface and/or ground water contamination, the significance will be reduced to low to medium.

### F-3.1.3 Destruction of natural vegetation and faunal habitat

#### Source and nature of the impact

The clearing of vegetation and stripping of topsoil in specific areas during the construction phase is inevitable. These areas may include construction of the access road, internal roads, clearing of the site for construction, laydown areas, contractor's yards and the development footprint. Destruction of the natural vegetation and faunal habitat will result in the possible mortality of plants and animals.

**Table 16: Destruction of natural vegetation and faunal habitat**

Impact source(s)	Vegetation clearance for construction activities and the development footprint		Status	-
Nature of impact	Floral species may be lost and fauna may be displaced due to the removal of vegetation.			
Reversibility of impact	The impact is reversible should indigenous vegetation be planted as soon as site preparation is completed.			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Surrounding and downstream land owners			
Magnitude	<i>Extent</i>	Regional -3		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Long term – 4		
	<i>Probability</i>	Likely – 3		

Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+4+3) \times 4 = 52$ Medium	M
	<i>With mitigation</i>	$WOM \times ME = WM$ $52 \times 0.4 = 20.8$ Medium	L - M

### **Mitigation measures**

- If any plants of conservation concern or plant species that are provincially protected will be destroyed or damaged during construction activities, these should be removed by a qualified botanist and replanted in a suitable area within the same property or the conservation area just north of the study site;
- The KZN Department of Agriculture, Forestry and Fisheries (DAFF) must be contacted for the relocation and removal of the provincially protected plant species;
- Construction activities through areas containing natural vegetation (such as riparian areas and bush clumps) should commence during the winter months to decrease impacts on breeding faunal species;
- An independent Environmental Control Officer (ECO) should be appointed to oversee all construction activities;
- No open fires should be allowed in areas containing natural vegetation, especially during the dry season; and
- Office areas and associated roads should be landscaped with indigenous plant species that will be beneficial to faunal species such as bats and birds.
- Any faunal species located on the site which cannot relocate themselves (e.g. burrowing mammals), should be moved in an ecologically acceptable manner to a more suitable location. This should be undertaken by a faunal relocation expert.
- Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.
- All areas affected by construction should be rehabilitated upon completion of the construction phase of the development. Areas should be reseeded with indigenous grasses as required.
- Use of construction vehicles in the riparian areas should be ceased.
- No dirty water run-off must be permitted to reach the riparian areas, wetlands and drainage lines.
- No fires whatsoever should be lit within the subject property.
- Construction workers may not tamper or remove natural vegetation from the surrounding areas and neither may anyone collect seeds from the plants.

### **Significance of the impact**

Due to the large scale removal of vegetation to make space for the development, this impact is regarded as medium without mitigation. Implementation of mitigation measures will decrease the significance of the impact to low to medium.

### **F-3.1.4 Introduction and spread of alien invasive vegetation**

#### **Source and nature of the impact**

During construction, vegetation will be removed and soil disturbed. The seeds of alien invasive species that occur on and in the vicinity of the construction area could spread into the disturbed areas. In addition, the construction vehicles and equipment were likely used on various other sites and could introduce alien invasive plant seeds or indigenous plants not belonging to this vegetation type to the construction site.

**Table 17: Potential increase in alien invasive vegetation**

Impact source(s)	Increase in alien invasive vegetation	Status	-
Nature of impact	Loss of biodiversity and faunal displacement		
Reversibility of impact	The impact is irreversible as the loss of natural vegetation will result in a loss of faunal habitat.		
Degree of irreplaceable loss of resource	High		
Affected stakeholders	Surrounding land owners		
Magnitude	<i>Extent</i>	Site -2	
	<i>Intensity</i>	High - 5	
	<i>Duration</i>	Long Term - 4	
	<i>Probability</i>	Definite - 5	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+5+4+5) \times 4 = 64$ Medium to high	M-H
	<i>With mitigation</i>	$WOM \times ME = WM$ $64 \times 0.4 = 25.6$ Low to Medium	L - M

**Mitigation measures**

- During construction, the construction area and immediate surroundings should be monitored regularly for emergent invasive vegetation.
- Sufficient budget must be available by the subcontractor to ensure that alien plant clearing and rehabilitation takes place during and post construction.
- Surrounding natural vegetation should not be disturbed in order to minimize chances of invasion by alien vegetation.
- All alien seedlings and saplings must be removed as they become evident for the duration of construction and operational phase.
- Manual / mechanical removal is preferred to chemical control.
- All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction site. This should be verified by the ECO.
- An alien invasive eradication and monitoring plan must be compiled and implemented during the construction phase whereby all emergent invasive species are removed during construction.

**Significance of the impact**

The significance of this impact is regarded as medium to high without mitigation, however, if the spread of alien plant species are effectively mitigated the significance will be reduced to low to medium.

**F-3.1.5 Interference with fauna and faunal behavioral patterns****Source and nature of the impact**

The presence of the construction site may result in negative faunal interactions that could be associated with construction personnel including poaching, trapping and hunting of faunal species, as well as possible collisions of fauna with construction vehicles. Construction will also result in high levels of noise, vibrations and the operation of floodlights should construction continue in the night. This will disturb the fauna utilising the surrounding vegetation, especially nocturnal species, and could result in a localised decrease in biodiversity as faunal species move away from the disturbance into the surrounding areas. Food and rubbish can attract wildlife to the area, increasing risk of negative interactions.

**Table 18: Interference with fauna and faunal behaviour patterns**

Impact source(s)	Construction-related activities and conduct of construction personnel		Status	-
Nature of impact	Interference with faunal behaviour patterns			
Reversibility of impact	The impact is reversible if mitigated to a large extent			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Surrounding land owners			
Magnitude	Extent	Site -2		
	Intensity	High - 5		
	Duration	Long term – 4		
	Probability	Highly likely – 4		
Significance	Without mitigation	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+5+4+4) \times 4 = 60$ Medium		M-H
	With mitigation	$WOM \times ME = WM$ $60 \times 0.6 = 24$ Low to Medium		L - M

**Mitigation measures**

- Construction should commence in the winter months in order to minimise the impacts on the breeding activities of the terrestrial floral and faunal species.
- As far as possible, construction should be limited to the daylight hours in order to minimise the need for lights.
- An education programme should be compiled for all contractors, subcontractors and workers to ensure compliance to all aspects of the EMP as well as educating personnel in the safe and proper conduct within areas of natural habitat.
- No wild animal may under any circumstance be handled, removed or be interfered with by construction workers;
- No wild animal may be fed on site.
- No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of.
- No domesticated animals must be allowed on site.
- All food should be securely stored away to prevent attraction of faunal species and all rubbish should be disposed of away from the site. Bins located around the infrastructure should have tightly fitting lids to prevent faunal species raiding the bins and thereby becoming habituated to humans.
- To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be adhered to.

**Significance of the impact**

The significance of this impact is regarded as medium to high without mitigation, however, if the spread of alien plant species are effectively mitigated the significance will be reduced to low to medium.

**F-3.1.6 Loss of hydrological function impacting on downstream riparian habitat****Source and description of the impact:**

During construction, wetlands and drainage lines will be severely impacted on, which may result in a change in the hydrological function of the system, impacting on riparian habitat outside of the study area boundaries.

**Table 19: Loss of hydrological function impacting on downstream riparian habitat**

Impact source(s)	Construction activities altering the hydrological functioning of the riparian systems.		Status	-
Nature of impact	Loss of functionality of the downstream riparian habitat			
Reversibility of impact	The impact is not reversible			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Surrounding land owners and downstream users			
Magnitude	<i>Extent</i>	Regional -3		
	<i>Intensity</i>	High – 5		
	<i>Duration</i>	Permanent – 5		
	<i>Probability</i>	Definite – 5		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+5+5) \times 4 = 72$ Medium to high		M - H
	<i>With mitigation</i>	$WOM \times ME = WM$ $72 \times 0.4 = 28.8$ Low to Medium		L - M

**Mitigation measures**

- A sound stormwater management plan has been developed to ensure that the hydrological function of the affected drainage lines remain intact (refer to the Services Report in Appendix 6); and
- Erosion into drainage lines located outside the study area should be prevented.

**Significance of the impact:**

The significance of the impact without mitigation is regarded to be medium to high. Implementation of the mitigation measures will decrease the significance of the impact from low to medium.

**F-3.1.7 Loss of wetlands and their eco-services****Source and description of the impact:**

Should the developer's preferred layout be adopted, construction activities such as site establishment, vegetation clearance, excavation and infilling of the wetlands for construction of the internal roads, buildings and associated infrastructure within the wetlands will result in the degradation / loss of the wetlands and the eco-services that they provide. The loss of wetlands will be permanent and irreversible. During the construction and operational phases of the TradeZone 2 development, a number of impacts can be expected on the downstream wetlands.

A number of impacts can be expected on the downstream wetlands and the impacts are discussed below:

Change in wetland hydrology due to:

- Increase in flood peaks due to the additional hardened surfaces upstream;
- Potential change in channel morphology due to increased flood peaks;
- A decrease in water input due to the removal of upstream soil storativity due to the covering of the soil surface by an impervious layer (i.e. the TradeZone 2 development). This will affect the ratio of subsurface to surface water inputs constituting the current hydrological regime of the upstream wetland system;
- Change in water distribution due to upstream impeding features, for example road culverts and erosion protection measures;
- Change in water distribution patterns due to infilling within the upstream wetlands.



Change in wetland geomorphology due to:

- Increase in erosion risks due to the increase in flood peaks and concentrated surface water runoff; and
- Increase in sediment load due to exposed surfaces, soil stockpiles etc.

Decline in water quality due to:

- Increase in sedimentation especially during the construction phase. This was evident in the wetlands downstream of the current construction activities for the Link Road. An increase in sedimentation will also impact on the Geomorphological and hydrological wetland drivers.
- Potential contamination by pollutants, for example accidental spills of hydrocarbons (oils, diesel etc) or leakage of such substances from construction machinery. Increased flows described above are expected to be accompanied by an increase in diffuse point pollution from petroleum and other pollutant runoff (Coke, 2006). These impacts may occur during both the construction and operation phases of the project and may enter the wetland directly through surface water runoff or indirectly through subsurface movement.

Negative impact on biotic factors.

- Loss of corridors through further habitat fragmentation was identified by INR (2011) as an impact for the Link Road and applies on an even greater scale for the proposed TradeZone 2 development. The existing remaining portions of wooded vegetation (primarily riparian vegetation along the tributaries of the Hlawe River) provides suitable habitat for a range of species to utilize as movement corridors. These habitats are already largely fragmented (due to the infrastructure). The proposed TradeZone 2 development area will further fragment these habitats by acting as a barrier for species migration.
- Loss of species of conservation concern. The loss of the wetlands within the area may result in a direct loss of these species or an indirect loss due to secondary impacts. Frogs are thin skinned animals and highly sensitive to contamination of their environment.
- Reduced water quality, as described above, could likely result in local declines in both diversity and abundance of frogs.
- Increase in alien and invasive plant species. Increased activity and vehicle traffic during construction and operation of the proposed TradeZone development could introduce additional alien plants. Vegetation disturbances to the general area could also prevent the recovery of vegetation and provide opportunities for increased infestations of alien plants downstream. Infestation of the Brazilian Red Pepper (*Schinus terebinthifolius* Raddi) – Category 1, was already evident in areas previously disturbed.
- The replacement of vegetation, although already disturbed, with infrastructure.

**Table 20: Loss of wetlands and their eco-services**

Impact source(s)	Construction activities and levelling of the site for construction of the TradeZone 2 development	Status	-
Nature of impact	Loss of functionality of the downstream wetlands Change in wetland hydrology Change in wetland geomorphology Decline in water quality Negative impact on biotic factors		
Reversibility of impact	The impact is not reversible		
Degree of irreplaceable loss of resource	High		
Affected stakeholders	Surrounding land owners and downstream users		



Magnitude	<i>Extent</i>	Regional -3	
	<i>Intensity</i>	High – 5	
	<i>Duration</i>	Permanent – 5	
	<i>Probability</i>	Definite – 5	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+5+5) \times 5 = 90$ Medium	H
	<i>With mitigation</i>	$WOM \times ME = WM$ $90 \times 0.6 = 54$ Medium	M

### Mitigation measures

- An off-site (north of the study area) wetland offset has been considered as mitigation for this project.
- In total, the wetlands within the study site represent 30.0 hectare equivalents of functional wetland area. To ensure a no-net-loss of wetland functional area from the local landscape, a gain of 30 ha-eq of wetland ecological integrity needs to be obtained through the successful rehabilitation of the candidate wetlands (*offset site*).
- Although it has been assumed that all wetlands within the project footprint will be lost, there may be areas within the footprint that are not covered by infrastructure. It is important to ensure that the vegetation within these areas is re-instated with indigenous vegetation (grasses and indigenous trees) as soon as practically possible once construction ceases, so as to stabilize erosion-prone areas.
- Although it is assumed that all wetlands will be lost within the development footprint, it is advisable to maintain biodiversity corridors with the wetland habitat (particularly the riparian fringes) acting as the link to the Hlawe River system.
- Biomonitoring programmes have been implemented for aquatic systems in the KSIA area. Such programmes must be continued and expanded to include sites that will monitor the impacts of the proposed TradeZone 2 development area.
- Permits for the translocation of faunal species must be obtained from EKZNW should species of conservation importance be found on the site. Capture operations must be supervised by a competent Herpetologist (frog and reptile specialist) and used to raise an understanding of the status of Herpetofauna in the area.
- Development of the proposed TradeZone 2 development area will cause most of the wetlands to be filled over and will extend the area of runoff. New erosion control measures will thus be needed, particularly where high runoff rates are likely to occur. The size and spacing of these structures should be based on sound hydrological and engineering concepts. In addition, the following measures should be implemented to reduce the risks of increased sedimentation in the downstream wetlands:
- Install sediment barriers (e.g. silt fences/sandbags/hay bales) immediately downstream of active work areas (including soil stockpiles) as necessary to trap any excessive sediments generated during construction. Excessive sediment was found within the wetlands of HGM Unit 2 due to erosion of the adjacent soil stockpiles.
- Any erosion gullies/channels created during construction should be filled immediately to ensure silt does not drain into the wetland.
- Both fauna and flora rescue plan required should any flora and fauna of conservation value be found on site.
- A Storm Water Management Plan in Appendix 6, is to be implemented by an appropriately qualified hydrologist. It is important that the plan takes into consideration the maintenance of flow volume and rate of the current wetland systems and tries to maintain these as far as possible.
- It is critical that a Water Management Plan be compiled post receipt of the EA and is implemented during the construction and operational phases of the proposed project to prevent contributing further to the problems facing the Hlawe and Tongaati River systems and introducing new problems. Aspects to be included in the plan, but not limited to, include:

- Monthly water quality monitoring of downstream wetlands, including the Hlawe River, during the construction phase and the first twelve months of the operational phase (as per the WUL requirements or other developments in the catchment).
  - After the first year of operation the ongoing monitoring schedule will be defined in consultation with DWA.
  - Ensure that a Water Use Licence (WUL) is obtained for all aspects of the project impacting on watercourses and wetlands.
  - Ensure that all water, including, storm water runoff, entering the wetland meets the DWA WUL requirements and that the flow is dissipated to mimic the natural situation as far as possible to prevent erosion downstream.
  - Ensure that clean and dirty water are separated and that the clean water re-enters the wetland systems in a dissipated flow.
  - The proper storage and handling of hazardous substances (hydrocarbons and chemicals) needs to be administered.
  - Operation and storage of machinery and construction-related equipment within wetland areas must be limited as far as possible.
  - Ensure that appropriate solid waste disposal facilities are provided on-site during construction and adequate signage is provided.
  - Spillages should be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil from the construction site must be removed and rehabilitated timeously and appropriately.
  - Spill Contingency Plans should be drawn up by the individual business owners taking residence on site.
  - Routinely check machinery for oil or fuel leaks before construction begins.
  - Clear and completely remove from site all general waste, construction plant equipment, surplus rock, and other foreign materials once construction has been completed.
- Once operational, it is important to ensure that the following maintenance measures are implemented:
    - Ensure culverts are cleared of debris on a regular basis; and
    - Monitor and stabilise any head cut or gulley erosion that forms.

***Significance of the impact:***

The significance of the impact without mitigation is regarded to be high. Implementation of the mitigation measures to reduce the negative impact on the downstream wetlands and the implementation of rehabilitation of wetlands at the candidate (offset site) will decrease the significance of the impact to medium.

## F-3.2 Socio-economic Environment

### F-3.2.1 Increase in ambient dust levels

#### Source and nature of the impact

Construction activities, such as transportation vehicles travelling on exposed surfaces, earthworks as well as wind, will result in elevated ambient dust levels within the area. Increased dust levels may adversely affect persons working and/or residing in the nearby area.

**Table 21: Increase in ambient dust levels**

Impact source(s)	Transportation vehicles travelling over exposed surfaces, earthworks and the wind		Status	-
Nature of impact	Increased levels of ambient dust			
Reversibility of impact	The impact is irreversible but can be mitigated to a large extent			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Surrounding land owners			
Magnitude	Extent	Site - 2		
	Intensity	Medium – 3		
	Duration	Short Term – 1		
	Probability	Likely – 3		
Significance	Without mitigation	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+3+1+3) \times 4 = 36$ Low to Medium		L - M
	With mitigation	$WOM \times ME = WM$ $36 \times 0.4 = 14.4$ Low		L

#### Mitigation Measures

- Appropriate dust suppression methods must be applied.
- Exposed soil stockpiles shall be covered, kept damp or protected using organic binding agents or alternative techniques that are not water intensive.
- The clearing of vegetation must be kept to a minimum and only where required.
- Avoid unnecessary movement of construction vehicles.
- Vehicles travelling on unsurfaced roads must travel at a speed that creates minimal dust entrainment.
- Refer to further mitigation measures in the EMPr.

#### Significance of the impact

The significance of this impact, without mitigation, is regarded to be low to medium. Implementation of the mitigation measures will decrease the significance of the impact to low.

### F-3.2.2 Increase in ambient noise levels

#### Source and nature of the impact

Construction activities and movement of construction vehicles will increase the ambient noise levels within the area during the construction phase. This may impact on the people located at the adjacent properties, as well as sensitive faunal species within the study area.

**Table 22: Increase in ambient noise levels**

Impact source(s)	Construction activities		Status	-
Nature of impact	Increased level of ambient noise			
Reversibility of impact	The impact is irreversible but can be mitigated to a large extent			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Surrounding land owners			
Magnitude	Extent	Site - 2		
	Intensity	Low – 1		
	Duration	Short term – 1		
	Probability	Likely – 3		
Significance	Without mitigation	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+1+1+3) \times 3 = 21$ Low to Medium		L-M
	With mitigation	$WOM \times ME = WM$ $21 \times 0.6 = 12.6$ Low		L

**Mitigation measures**

- Construction times must be restricted to working hours (06:00 – 18:00).
- All construction equipment or machinery should be switched off when not in use.
- Construction equipment must be kept in good working condition.

**Significance of the impact**

Due to the limited number of noise receptors (adjacent landowners) the impact associated with increased ambient noise levels during the construction phase is predicted to be of a low to medium significance, however the implementation of mitigation measures will reduce the significance of the impact to low.

**F-3.2.3 Change of visual character****Source and nature of the impact**

The construction activities and camps will alter the current visual character of the area, from one of open sugar cane fields to a construction site associated with people, vehicles and equipment. There are a limited number of visual receptors (adjacent landowners) and employees of TradeZone 1 in the area, however, most of them will have a direct view of the construction activities.

**Table 23: Change of visual character of the area**

Impact source(s)	Construction activities and placement of construction equipment		Status	-
Nature of impact	Visual character of the area will be altered by construction activities and equipment			
Reversibility of impact	The impact is irreversible but will be less visually intrusive if appropriate mitigation measures are adopted			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	Surrounding land owners			
Magnitude	Extent	Regional -3		
	Intensity	Medium – 3		
	Duration	Short to Medium term – 2		
	Probability	Highly likely – 4		
Significance	Without mitigation	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+2+4) \times 4 = 48$ Medium		M

	<i>With mitigation</i>	$WOM \times ME = WM$ $48 \times 0.6 = 28.80$ Low to Medium	L - M
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**Mitigation measures**

- The construction area must at all times be neat and tidy.
- All litter must be collected and removed (daily) and disposed of appropriately.
- Equipment and construction vehicles must be stored or parked in designated areas.
- The construction camp must be screened with shade cloth.
- If construction is necessary during night-time, light sources should be directed inwards and downwards to prevent obtrusive lighting and light pollution.
- Dust suppression techniques should be implemented especially on windy days. Exposed soil stockpiles shall be covered, kept damp or protected using organic binding agents or alternative techniques that are not water intensive.

**Significance of the impact**

The visual impact associated with construction activities during the construction phase is predicted to be of a medium significance; however the implementation of mitigation measures will reduce the significance of the impact to a low-medium.

**F-3.2.4 Impact on traffic patterns within the area****Source and nature of the impact**

Due to construction activities and associated machinery movement, the traffic patterns of the surrounding roads network will be affected. Peak hour ranges from 07h00 to 08h00.

**Table 24: Change in traffic patterns of the area**

Impact source(s)	Construction activities and vehicle movement		Status	-
Nature of impact	Traffic patterns of the surrounding area will be affected			
Reversibility of impact	The impact is irreversible but will be less intrusive if appropriate mitigation measures are adopted			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Surrounding land owners and road users			
Magnitude	<i>Extent</i>	Regional -3		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Medium Term - 3		
	<i>Probability</i>	Definite - 5		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+3+3+5) \times 5 = 70$ Medium - High	M – H	
	<i>With mitigation</i>	$WOM \times ME = WM$ $70 \times 0.6 = 42$ Medium	M	

**Mitigation measures**

- Avoid movement of construction vehicles and machinery on main access roads during peak times (7:00 – 9:00) & (16:00 – 18:00).
- If the above is unavoidable – implement traffic control measures such as points men at busy intersections.

**Significance of the impact**

The impact that construction related traffic would have on this the current traffic patterns is predicted to be of a

medium to high significance without mitigation measures, however, this impact can be reduced to a medium significance if appropriate measures are adopted.

### **F-3.2.5 Impacts on heritage resources**

#### **Source and nature of the impact**

##### **1. A Collapsed House (possibly over 60 years old)**

The HIA investigation revealed the presence of a house ruin (which could be older than 60 years). This structure is protected by the National Heritage Resources Act (NHRA) and if a decision to demolish it is taken, a Phase II assessment by a Built Heritage Specialist and a Permit Application lodged with KwaZulu-Natal Provincial Heritage Resources Authority (Amafa) will be required.

**Table 25: Impacts on heritage resources**

Impact source(s)	Construction of the proposed DTP TradeZone 2 development		Status	-
Nature of impact	Impacts on the heritage resource (as listed above)			
Reversibility of impact	The impact is irreversible			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Families associated with the collapsed house and surrounding landowners			
Magnitude	<i>Extent</i>	Site – 2		
	<i>Intensity</i>	Medium – 3		
	<i>Duration</i>	Long-term - 4		
	<i>Probability</i>	Highly likely - 4		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(2+3+4+4) \times 3 = 39$ Low to Medium		L-M
	<i>With mitigation</i>	$WOM \times ME = WM$ $39 \times 0.4 = 15.6$ Low		L

#### **Mitigation measures**

The old collapsed house could be older than 60 years and could therefore be protected by the NHRA and if a decision to demolish is taken, a Phase II assessment by a Built Heritage Specialist and a Permit Application lodged with KwaZulu-Natal Provincial Heritage Resources Authority (Amafa) will be required.

Construction activities should be limited to the proposed development boundary. If the size of the footprint is increased at a later stage, a heritage specialist should be involved in order to assess how the increase in the size of the footprint will affect heritage resources.

If it is believed that the heritage resources identified outside the study area will be affected by the development, permit applications must be lodged with Amafa.

Should any archaeological artefact be exposed during foundation excavation, the construction in the vicinity of the findings must be stopped. Under no circumstances shall any artefact be destroyed. Such an archaeological site must be marked and fenced off, and Amafa must be contacted.

Upon receipt of such notification, the Environmental Control Officer (ECO) must arrange for the excavation to be examined by an Archaeologist. Under no circumstances must archaeological artefacts be removed, destroyed or interfered.

Any archaeological sites exposed during demolition or construction activities must not be disturbed prior to authorisation by Amafa.

### ***Significance of the impact***

The impact associated with construction of the proposed DTP TradeZone 2 development on the destruction of heritage resources during the construction phase is predicted to be of a low to medium significance without mitigation measures, however, this impact can be reduced to a low significance if appropriate measures are adopted.

#### ***F-3.2.6 Temporary job creation***

Construction is anticipated to take place over five years. Temporary employment opportunities will be created during the construction phase, via construction related activities such as:

- Construction of roads and structures that comprise the Trade Zone 2 development and services infrastructure; and
- Fencing of the site boundary area.

Skilled labour in the construction industry is available in the NUDC area, but would require upskilling and development of more specialised skills. Due to the high percentage of unemployment in the area, sufficient unskilled labour is available for the project and the community in which the labour resides in close proximity to the development site.

The project will be used from the start to train people and transfer skills as far as possible. The tender specifications for any construction work on the project will include a compulsory utilisation of a certain percentage of local labour and the compulsory training of local labour.

In light of the above, the project will positively impact on the surrounding community and local economy due to possible skills development and income generation. This impact is predicted to have a **medium positive significance**.

## F-4 IMPACT ASSESSMENT: OPERATIONAL PHASE

### F-4.1 Biophysical Environment

#### F-4.1.1 Surface and ground water contamination

##### Source and nature of the impact

Due to the nature of the development (commercial) hydrocarbons (oil, petrol and diesel) and other chemicals/liquids will be required during the operational phase and will be stored at a fuel storage facility in bunded areas at the General Aviation land use area. Although unlikely, spills and/or leakages could occur and enter the stormwater management system and thus potentially contaminate surrounding surface and ground water resources.

**Table 26: Surface and ground water contamination**

Impact source(s)	Hydrocarbon and other chemical spillages		Status	-
Nature of impact	Contamination of surface and ground water during heavy rainfall events			
Reversibility of impact	The impact is reversible by containing and clearing spills as and when they occur by means of an appropriate spill kit			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Surrounding and downstream land owners			
Magnitude	Extent	Regional -3		
	Intensity	High – 5		
	Duration	Permanent - 5		
	Probability	Definite – 5		
Significance	Without mitigation	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+5+5) \times 2 = 36$ Low to medium		L - M
	With mitigation	$WOM \times ME = WM$ $36 \times 0.4 = 14.4$ Low		L

##### Mitigation measures

- The stormwater attenuation facilities must be designed to filter / trap any contaminants prior to water seeping into the ground or adjacent drainage lines.
- If a hydrocarbon spillage occurs these should be cleaned using SUNSORB (or similar product) and the contaminated soils/ materials removed from site and dispose of at an appropriate registered landfill site.
- All spilled hazardous substances must be contained in impermeable containers for removal to a licensed hazardous waste site, (this includes contaminated soils, and drenched spill kit material).
- The fuel storage areas at the General Aviation area must be clearly demarcated and restricted to designated staff only. The fuel storage area must be adequately bunded to ensure that no contamination of underground water and catchment areas occurs.
- The transport, handling and storage of hazardous substances must comply with all the provisions of the Hazardous Substances Act, 1973 (Act No. 15 of 1973), associated regulations as well as SANS 10228 and SANS 10089 codes.
- A Contingency Plan must be put into place in case of leakages or spillages which are not detected and then lead to the contamination of underground water. Leak detectors on pressure systems must be included.
- Monitoring of volumes of the tanks must take place on a daily basis to detect unexplained losses due to leakages.
- In the event of a spill, hazardous material may be generated. Such material must be disposed of at



a suitably licensed waste disposal facility, with chain of custody documentation supplied as proof of end recipient.

- Hazardous and flammable substances must be stored and used in compliance with the applicable regulations and safety instructions and banded at 110% of the volume.

### **Significance of the impact**

The significance of this impact is regarded as low to medium to low without mitigation, however, if spillages are effectively mitigated and stormwater attenuation facilities maintained, the significance will be reduced to low.

## **F-4.1.2 Soil contamination**

### **Source and nature of the impact**

The use of hazardous materials such as synthetic herbicides and pesticides to control weeds and pests in the planted area could contaminate ground water and soil in the study area and immediate surrounds. Herbicides and pesticides often contain glyphosphate which is very poisonous to various faunal species including tadpoles and frogs. These herbicides are often used in alien plant control.

The release of grey water into the environment, especially for irrigation should be carefully controlled to prevent contamination of the environment by detergents and soaps. Hazardous materials used during aviation activities have the potential to contaminate soils, watercourses and ground water.

**Table 27: Soil contamination**

Impact source(s)	Use of pesticides and herbicides containing hazardous materials Release of grey water into the environment Spillage of hazardous material caused by Aviation-related activities	Status	-
Nature of impact	Contamination of the soil, surface and groundwater resources		
Reversibility of impact	The impact is irreversible if hazardous materials area used.		
Degree of irreplaceable loss of resource	Low		
Affected stakeholders	Surrounding and downstream land owners		
Magnitude	<i>Extent</i>	Regional -3	
	<i>Intensity</i>	High – 5	
	<i>Duration</i>	Permanent - 5	
	<i>Probability</i>	Highly likely – 4	
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+5+4) \times 2 = 34$ Medium - Low	M-L
	<i>With mitigation</i>	$WOM \times ME = WM$ $34 \times 0.4 = 13.6$ Low	L

### **Mitigation measures**

- Where possible mechanical removal of unwanted plant species is favoured over chemical control.
- Should chemical control be required, only biodegradable agents should be permitted.
- The use of ecologically acceptable biological control agents is favoured over chemical pest control.
- The use of indigenous plant species for the project will minimise the need for pest control.
- Spillages should be dealt with as soon as possible.
- Hazardous waste should be stored in compliance with regional, national and local legislation.
- Water passing through vehicle bays and workshops must pass through oil traps to ensure that all hazardous material is removed.

### **Recommendations for use of grey water**

The use of grey water can drastically reduce the amount of white water required by the project and the following is recommended:

- Water from hand basins, showers and washing machines should be captured and redirected to flush toilets.
- If grey water from basins, showers or washing machines are to be used for irrigation, all detergents used must be 100% biodegradable to prevent negative impacts on the environment.
- Rainwater can be captured by fitting tanks to roof gutters and the water can be used for either irrigation or flushing of toilets.
- Grey water should be used immediately to prevent contamination.

### ***Significance of the impact***

The significance of this impact is regarded as medium to low without mitigation, however, if the use of pesticides and herbicides and grey water are effectively mitigated the significance will be reduced to low.

## **F-4.2 Socio-economic Environment**

### ***F-4.2.1 Increase in ambient noise levels***

#### ***Source and nature of the impact***

Industrial development and associated aviation-related activities are compatible land-uses that will complement the adjacent KSIA and DTP. The proposed Trade Zone 2 will occur within the sensitive noise zones of 55dB for 2010, 2015 and 2035 noise contours of the KSIA. The site is presently impacted by noise generated from aircraft flights. It is anticipated that the activities at the proposed Trade Zone 2 development site in relation to the present noise levels at the KSIA/DTP precinct will not result in a significant increase in the ambient noise levels of the area. The impact of increase in ambient noise levels at the site is therefore **not significant**.

However, in view of the close proximity of the proposed development to the airport, it is recommended that the design of the buildings within the study area incorporate noise reduction principles to minimize noise impacts on the occupants.

### ***F-4.2.2 Permanent change of visual character***

#### ***Source and nature of the impact***

The existing KSIA/DTP development is notably an extensive feature in the landscape and the land uses of the proposed development may blend in or be compatible with these adjacent land uses. There are no residential areas in close proximity to the site and therefore, the proposed development will not be visually obtrusive. The impact of change in visual character of the site is therefore **not significant**.

### ***F-4.2.3 Permanent job creation***

Permanent jobs will be created during the operational phase of the project. A number of additional direct job opportunities will be created. The number of employment opportunities is also directly linked to the diversity of activities (cleaning, security, maintenance, business development). Local labour will be sourced for the operational phase to upskill the local community and assist in alleviating poverty.

This will positively impact on the surrounding community and local economy due to possible skills development and income generation. This impact is predicted to have a **high positive significance**.

#### ***F-4.2.4 Possible positive impacts associated with the development***

##### ***a) Eradication of alien invasive species within the study area and surrounding areas***

The study area and surrounding areas are heavily infested with alien invasive species, especially *Bombusa balcooa* (Indian Bamboo) which can grow at a rate of over 10m a year. These plants have a very high impact on the drainage lines within the area, consuming large amounts of water and out-competing indigenous species. It is recommended that all alien invasive vegetation should be cleared from the study area as well as immediate surroundings and thereby improves local biodiversity. An alien species eradication programme, tailored for the area should be developed by a suitably qualified botanist or ecologist.

##### ***b) Development of a biodiversity strategy***

The study area contains areas which have been degraded due to agriculture (sugarcane) and other impacts from humans (including extensive invasion by alien vegetation). Through the establishment of a sound biodiversity strategy for the development which can be initialized before construction commences, negative impacts can be greatly reduced while biodiversity is increased. Principles of the biodiversity strategy should include:

- Effective use of grey water to reduce footprint;
- Species management plans for Rare, Threatened or Protected species recorded on site;
- Propagation of indigenous and endemic trees, shrubs, succulents and grass which can be used for landscaping and rehabilitation;
- Erection of bat and owl nesting boxes to encourage these species to reside in the area resulting in environmentally friendly insect and rodent control.

### **F-5 CUMULATIVE IMPACTS**

Cumulative impacts are those impacts that are created as a result of the combination of the impacts of the proposed project, with impacts of other projects or operations, to cause related impacts. These impacts occur when the incremental impact of the project, combined with the effects of other past, present and reasonably foreseeable future projects, are cumulatively considerable. The assessment of cumulative impacts on a site-specific basis is however complex – especially if many of the impacts occur on a much wider scale than the site being assessed and evaluated.

#### ***F-5.1.1 Increase traffic during the operational phase***

##### ***Source and nature of the impact***

A total of 3 501 private vehicle trips per hour will be generated by the proposed DTP development in the AM and PM peak hours. During the AM peak hour, 2 503 vehicles per hour (veh/h) will enter the development while 997 veh/h will exit the development when it reaches 100% completion. The converse of these volumes is also applicable to the PM peak hour.

The trip distribution is anticipated to be as follows:

- 84% of DTP Trade Zone 2 development traffic will access the development from the south.
- 60% of development traffic will access the Trade Zone 2 through R102.
- The other 24% of development traffic will travel on the N2 Freeway and access the Trade Zone 2 through the Tongaat interchange and uShukela Drive.
- The remaining 16% of the development traffic will originate from the Tongaat, N2 north and Westbrook areas.

The above trip distribution is the same as for the uShukela Precinct Planning (a proposed mixed-use development adjacent north of the KSIA/DTP precinct, undertaken by Tongaat-Hulett Developments and DTPC).

**Table 28: Increase of traffic during the operational phase**

Impact source(s)	The proposed DTP Trade Zone 2 development in conjunction with other proposed projects (such as uShukela Precinct) within the NUDC		Status	-
Nature of impact	Cumulative increase of traffic volumes			
Reversibility of impact	The impact is irreversible but can be mitigated through the upgrade of existing intersections			
Degree of irreplaceable loss of resource	N/A			
Affected stakeholders	Surrounding land owners and road users			
Magnitude	<i>Extent</i>	Regional -3		
	<i>Intensity</i>	High – 5		
	<i>Duration</i>	Long-term – 4		
	<i>Probability</i>	Definite – 5		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+5+4) \times 5 = 85$ High		H
	<i>With mitigation</i>	$WOM \times ME = WM$ $85 \times 0.4 = 34$ Low - Medium		L-M

**Mitigation measures**

A Traffic Impact Study for the proposed development was conducted by Aurecon (refer to Appendix 6). To accommodate the anticipated traffic calculated by the study on the surrounding road network, the following mitigation measures are proposed through intersection improvements:

- The link capacity of the R102 and uShukela Drive be increased by providing dual lanes per direction on each link. This should be implemented by ETA/ KZNDOT within 5 years as the existing traffic condition is not favourable.
- The existing uShukela Drive / Tongaat off-ramp eastern intersection should be converted into a traffic signal controlled intersection in order to reduce delays experienced by the right turning traffic from uShukela Drive west approach towards Durban, it is recommend that a protected signal phase be provided.
- The existing uShukela Drive / Tongaat off-ramp western intersection should be converted into a traffic signal controlled intersection in order to reduce delays experienced by the right turning traffic from off-ramp approach towards Westbrook. It is further recommended that a left slip lane towards Tongaat should be provided.
- The new proposed DTP Spine road intersection on uShukela Drive should be signalised. Exclusive turning lanes should be provided as recommended in Chapter 11 of the TIA.
- The existing intersection of uShukela Drive and R102 should be upgraded as per Chapter 11 of the TIA.
- The proposed Brake Drive Link road is required to intersect with the main DTP Spine Road (*will be subject to a separate Environmental Application*). It is further recommended that the intersection of R102 and Brake Drive should be upgraded. Refer to Chapter 11 of the TIA for thorough details.
- The TIA should be submitted to the eThekweni Municipality, KZN DOT and SANRAL for approval.

**Significance of the impact**

The cumulative impact of an increase in traffic volumes caused by the proposed development, in conjunction with other proposed projects in the area, would be high. This impact, however, can be mitigated to have a low-medium impact through the upgrading of existing intersections and the construction of an access road from Brake Drive to link up with the DTP Spine Road (*currently under construction*).

### ***F-5.1.2 Cumulative net loss of wetlands on site and total loss of wetland habitat in the KSIA/DTP development precinct***

#### ***Source and nature of the impact***

The KSIA and associated developments (proposed and current) are encroaching on the Hlawe River catchment. Although this river catchment is already heavily impacted on, the loss of further wetlands within the catchment will only compound this impact. The Hlawe River drains into the Tongaati River approximately 3.5km from the proposed TradeZone 2 development area. Although there are no Freshwater Ecosystem Priority Area (FEPA) wetland systems on site, downstream of the confluence with the Tongaati River there are a number of FEPA wetland systems. These systems have been identified by the country as Ecosystem Priority Areas. In accordance with the FEPA Implementation Manual (Driver et al, 2011) land-use practices or activities that will lead to deterioration in the current condition of a wetland FEPA are not acceptable. The loss of the majority of the Hlawe River Catchment could therefore impact on the current condition of these downstream priority areas. Aspects that may be impacted on include:

- A change in wetland hydrology. The cumulative increase in hardened surfaces within the Tongaati Catchment, due to the KSIA and associated developments, will result in a change in flow due to a decrease in sub-surface flow and an increase in flood peaks,
- A decline in water quality. A further decline in surface water quality in terms of both sedimentation and pollutants be expected
- A decline in habitat availability and species composition and diversity, in the aquatic biota of the Hlawe River, caused by industrial and agricultural practices. The proposed development of the TradeZone 2 development and additional developments within the greater KSIA project boundary could add a cumulative impact and cause further decline of the aquatic biota in the Tongaati River Catchment as a result of declining water quality.

**Table 29: Loss of wetlands through infilling**

Impact source(s)	Loss of wetlands through infilling		Status	-
Nature of impact	Cumulative loss of wetlands through developments on a regional and local level			
Reversibility of impact	The impact is irreversible			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Surrounding land owners and road users			
Magnitude	<i>Extent</i>	Regional -3		
	<i>Intensity</i>	High – 5		
	<i>Duration</i>	Permanent – 5		
	<i>Probability</i>	Definite - 5		
Significance	<i>Without mitigation</i>	$(Extent + Intensity + Duration + Probability) \times WF$ $(3+5+5+4) \times 5 = 90$ High		H
	<i>With mitigation</i>	$WOM \times ME = WM$ $90 \times 0.6 = 54$ Medium		M

#### ***Mitigation measures***

- Offsite mitigation: the identification of suitable wetland habitat outside the boundaries of the development, and the implementation of rehabilitation measures that result in an appropriate gain in hectare equivalents. This will compensate for the functional wetland area lost to the development;
- An offsite wetland offset has been investigated for this project. The candidate offset site occurs north of the study area and within the same catchment area as the study site i.e. Tongati River Catchment. This is aimed at counterbalancing the wetlands to be removed through the activities associated with the proposed development.

- The following rehabilitation objectives are proposed for the wetlands at the offset site:
  - To restore the natural hydrology to the wetland habitat. This may be achieved by deactivating the drainage networks;
  - To increase the retention time of water within the wetlands;
  - To distribute point-source discharge evenly across wetlands;
  - To remove all confined flow within the systems;
  - To re-establish a mosaic of natural wetland communities according to the various zones of saturation. An additional aim would be to establish woody hygrophilous communities within a herbaceous matrix, stratifying the structure of the vegetation; and
  - To deactivate and stabilise all actively eroding surfaces.
- The following wetland rehabilitation strategy is proposed:
  - Use spreader canals and berms to direct the water across the width of the wetlands below the confinements of flow such as pipes and culverts;
  - Bulldoze and shape all drain networks and ridge-and-furrow areas to restore the natural microtopography;
  - Raise the water table within incised central channels by using gabion weirs to re-establish a new base-level. Gabions will trap sediment and water upstream, facilitating in-channel vegetation growth while allowing water to move through the obstruction to the downstream reaches;
  - Stabilise headcuts using concrete or gabion structures;
  - Larger drains may also be deactivated using earthen plugs;
  - Implement an alien plant eradication programme;
  - Establish riparian woody vegetation along the major channels;
  - Once the soil has become saturated, implement an active re-vegetation programme.
  - Certain hydrophytes will recolonize the wetland naturally, but many wetland plants are clonal, and populations would need to be transplanted from nearby intact wetlands to re-establish colonies.
  - Include a rehabilitated buffer around the wetland to re-establish the ecotone between aquatic and terrestrial habitat, and to absorb some of the continuing impacts from the surrounding land use. Examples of these would be sediment trapping, establishing ecological connectivity, and trapping phosphates and nitrates.
- It should be noted that long-term wetland rehabilitation entails the management of the catchment to ensure that the hydrological regime remains compatible with maintaining the wetlands in their desired state. This places constraints on future land use. Future developments within the offset site should be carefully planned around the core objective of maintaining the wetland in their post-rehabilitation state.
- The wetland functioning offset target is 30ha-eq, based on the priority objective of securing a no-net-loss of wetland functioning from the landscape;
- The risk-of-failure multiplier is 1.5, which increases the target to 45ha-eq;
- The temporal multiplier is also 1.5, increasing the target to 67.5ha-eq;
- In the Wetland Ecologist's opinion (WCS) applying the temporal multiplier is unnecessary given the low biodiversity value of the wetlands in the proposed development site;
- The proposed offset site contains approximately 154ha of wetland habitat;
- It is considered to appropriately fulfil all of the important requirements for an offset site;
- Rehabilitation of the wetlands within the site may potentially improve the integrity of the wetlands to the extent that the number of hectare equivalents may be increased to 103.6ha. This is a potential gain of 49.4ha-eq, this after a conservative estimate of the post-rehabilitation ecological state of the candidate wetlands;
- This will appropriately achieve the no-net-loss functional area target, as well as provide leeway for any potential risk of failure of certain interventions;
- The biodiversity component of the offset, using the threat-status multiplier, was not included in this study because the method of calculation of the multiplier is in the process of being formulated. This

should be reviewed once this is available;

- The candidate site is considered appropriate and suitable for achieving both the wetland functioning target offset and the biodiversity target offset for the proposed development.

### **Significance of the impact**

The cumulative net loss of wetlands within the proposed KSIA/DTP Precinct is high. Through the implementation of mitigation measures such as the rehabilitation of the wetlands at the candidate offset set, the impact will be medium.

### **F-5.1.3 Cumulative impacts of proposed development and other developments in the KSIA/DTP Development Precinct**

#### **Source and nature of the impact**

The Dube Aerotropolis aims to unlock a new layout of urban form comprising of aviation intensive businesses and related enterprises extending up to 25 kilometres outward from the airport. There are various other developments proposed that will support future expansion of the airport to meet both national and international standards. Land uses such as telecommunications, retail outlets, entertainment complexes and exhibition centers, business parks, logistics parks, industrial land uses, distribution centers, information technology complexes and wholesale merchandise marts may be located around the airport and along the transportation corridors radiating from them.

With the increased demand placed on development within the DTP/KSIA precinct, there would be increased demand placed on the existing municipal services to provide both civil and electrical services for the developments in the pipeline and the proposed development.

Environmentally sensitive habitats such as water resources and important biodiversity corridors/conservation areas may be impacted by construction activity within the KSIA/DTP Development Precinct.

**Table 30: Impact of proposed development and other developments in the KSIA/DTP Development Precinct**

Impact source(s)	Proposed development and other developments in the KSIA/DTP Precinct	Status	-
Nature of impact	Cumulative loss of wetlands through developments on a regional and local level Increased demand on municipal infrastructure Decreased biodiversity through loss of habitats		
Reversibility of impact	The impact is irreversible but can be mitigated through environmentally sensitive planning		
Degree of irreplaceable loss of resource	N/A		
Affected stakeholders	eThekweni Municipality Surrounding land owners Environmental activists		
Magnitude	<i>Extent</i>	Regional -3	
	<i>Intensity</i>	High – 5	
	<i>Duration</i>	Permanent – 5	
	<i>Probability</i>	Definite - 5	
Significance	<i>Without mitigation</i>	(Extent + Intensity + Duration + Probability) x WF (3+5+5+5) x 5 = 90 High	H
	<i>With mitigation</i>	WOM x ME = WM 90 x 0.4 = 36 Low - Medium	L-M

**Mitigation measures**

- Environmentally-sensitive planning must take precedence, where avoidance of destruction of conservation areas and water resources are considered to minimise the impact on biodiversity;
- The following service infrastructure would be required to be constructed:
  - In order to provide water to the proposed development, a second reservoir, 2.2MI in size is proposed near the Inyaninga Reservoir to make up for the shortfall in storage available.
  - The temporary Northern Waste Water Treatment Works is reaching its maximum functional capacity and therefore, proposed Hlawe sewerline linking the DTP/KSIA development into the Tongaat Waste Water Treatment Works must be finalised and approved.
  - A long-term solution to provide for the water and sewerage needs for the KSIA/DTP Precinct (*as a whole*) is required and the principles of sustainable development must be taken into consideration in the planning of such infrastructure such as the Umdloti Regional Waste Water Treatment Works currently under consideration by eThekweni Water and Sanitation.

**Significance of the impact**

The cumulative impact of the construction of the Trade Zone 2 development, in conjunction with other proposed projects in the area, would be high. This impact, however, can be mitigated to have a low-medium impact through the implementation of sustainable development principles that take the 'conservation areas' and environmentally sensitive habitats into consideration.

**F-5.1.4 Increased loss of viable and high potential agricultural land****Source and nature of the impact**

The current land use is predominantly sugarcane production. The agricultural potential of the site is medium to high depending the soil depth and slope. The sugar cane yield potential is 40 tons per hectare for the shallow and sandy soils and approximately 60 tons per hectare for the structured soils on lower slopes. This is also due to the increased water availability to the crop on lower slopes. The Swartland soils (and other pedocutanic soils on the site) are prone to erosion. Production of sugarcane takes place on large areas with slopes in excess of 10 %. These sloped areas pose significant risks in terms of tillage and crop production induced erosion. The erosion pressures on the site are evident in the massive erosion effects observed in the stream and drainage channels. Crop production on duplex soils on steep slopes exacerbates erosion risks. This is a particularly relevant risk for the north eastern section of the site. The drainage features are eroded and show signs of high energy pulses of water moving through the landscape. This is a function of high levels of runoff.

The current land use in the form of dryland sugarcane production is the optimal use for the land. Although other crops can be produced on the red structured soils their production potential will be limited on the shallower and duplex soils (dominating the specific site). Irrigated land uses are not advised for most of the site as the slopes are such that distinct erosion is predicted. The duplex and shallow soils are prone to erosion and cultivation of these soils should only continue in the presence of a dedicated land management plan in terms of erosion control and mitigation.

The impacts of road construction activities on agricultural production on the site are large as a significant portion of the land has already been altered. In addition, these activities isolate areas that formed a unit in the past leading to detrimental impacts on site management and hampered sugarcane production. **Due to the existing impacts on the site, the further impacts from additional development will be relatively small. In terms of agricultural activities and current land use, the impacts of the land use change is considered to be negligible on the surrounding areas.**



### ***F-5.1.5 Increase in economic growth***

The DTP Trade Zone 2 development will expand on the business, freight and passenger logistics facility that was constructed at Phase 1. The proposed development will create a highly competitive operating environment that will be geared to attract a wide range of investors, operators, users and tenants.

Phase 1 of the KSIA/DTP serves as a trade and logistics gateway for Southern Africa. It is therefore important to ensure this foundation and the associated significant investment that has been made is fully utilized and supported. The proposed TradeZone 2 development will significantly contribute and complement this existing infrastructure that has been created. Furthermore, the development will also utilize and support the New Spine Road (*Link Road*) that is currently under construction as well as the proposed Maintenance Repair and Overhaul (MRO) facility for large aircrafts, currently under review by the DEA.

The greater La Mercy region, where the KSIA is located has, for some time, been identified for light industrial, new housing, economic and employment opportunities. The proposed development proposal aims to unlock these opportunities and in so doing contribute to the Dube Aerotropolis<sup>7</sup> development plans. Local labour will be required for the construction of the proposed TradeZone 2 development. Skills transfer and capacity building will be the spin-offs for this development. With the added revenue that the proposed development will generate during the operational phase, through the proposed light industrial land uses and cargo terminal activities, there would be contribution towards Local Economic Development (LED) of the region.

The existing KSIA/DTP development is seen as a key economic generator in the province and the future growth of the precinct is foreseen. Additional infrastructure in the form of the proposed Trade Zone 2 development is therefore required to support the growth needs of the KSIA/DTP Phase 1 development.

Since the proposed development is earmarked to support the KSIA/DTP Development Precinct, this will impact have a **positive impact of high significance** on the economy of the province, through an increase of employment opportunities, skills transfer, capacity building and business development.

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<sup>7</sup> KSIA is a core piece of infrastructure with access to sea, road and rail linkages, within one of Southern Africa's strongest regional economies.

DTP development strategy will guide the development of the entire Airport City and create significant opportunities for all businesses in surrounding area ([www.thdev.co.za/developments/aerotropolis/overview](http://www.thdev.co.za/developments/aerotropolis/overview)).

An Aerotropolis is a new layout of urban form comprising of aviation intensive businesses and related enterprises extending up to 25 kilometres outward from major airports (<http://en.wikipedia.org/wiki/Aerotropolis>).

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## SECTION G: CONCLUSIONS AND RECOMMENDATIONS

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In accordance with the EIA Regulations (GN No. 543), this section provides a summary of the key findings of the EIA and a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives. This section also provides a reasoned opinion as to whether the activity should or should not be authorised and conditions that should be made in respect of that authorisation, as necessary.

### G-1 SUMMARY OF THE KEY FINDINGS OF THE EIA

It is the opinion of the EAP that should the project proceed, impacts on the surrounding natural areas can be minimised through the careful adherence to suggested mitigation measures. It is also recommended that the possible impacts on the 'conservation areas' and downstream hydrological systems are monitored throughout the duration of the project.

The new DTP incorporating the KSIA not only provides for an increased number of passengers and direct international flights, but critically, a new trade and logistics gateway for Southern Africa. It is therefore important to ensure this foundation and the associated significant investment that has been made is fully utilized and supported. For this reason, the proposed Trade Zone 2 development will significantly contribute and complement this existing infrastructure that has been created. Furthermore, the development will also utilize and support the much needed new link road that is currently under construction as well as the proposed Maintenance Repair and Overhaul (MRO) facility for large aircrafts, currently under review by the DEA.

The greater La Mercy region, where the KSIA is located has, for some time, been identified for light industrial, new housing, economic and employment opportunities. The proposed development proposal aims to unlock these opportunities and in so doing contribute to the Dube Aerotropolis<sup>8</sup> development plans. There is a substantial amount of existing and/or new service infrastructure proposed for this area and this development would therefore contribute towards the effective use of this infrastructure's capacity.

The proposed development will contribute towards job creation, economic growth, poverty reduction, community development, skills development and capacity building.

Should the Developer's Preferred Layout be implemented, there will be total infilling of all the wetlands on the site for the proposed development. To mitigate this impact, the proponent intends to rehabilitate wetlands at a candidate offsite site and these wetlands have been identified as National Ecosystem Priority Area and critical in terms of eZemvelo Conservation Plan. A candidate site has been identified that occurs north of the study area, within the same catchment as the study site i.e. Tongati River Catchment. In total, the wetlands within the study site represent 30.0 hectare equivalents of functional wetland area. To ensure a no-net-loss of wetland functional area from the local landscape, a gain of 30 ha-eq of wetland ecological integrity needs to be obtained through the successful rehabilitation of the candidate wetlands. Through successful wetland rehabilitation, the ecological integrity of the wetlands of the candidate site will be improved. This could potentially yield a gain of 49.4ha-eq.

The findings of the specialist studies undertaken together with the broader environmental assessment conclude that there are no fatal flaws that should prevent the project from proceeding. However, the following

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<sup>8</sup> KSIA is a core piece of infrastructure with access to sea, road and rail linkages, within one of Southern Africa's strongest regional economies.

DTP development strategy will guide the development of the entire Airport City and create significant opportunities for all businesses in surrounding area ([www.thdev.co.za/developments/aerotropolis/overview](http://www.thdev.co.za/developments/aerotropolis/overview)).

An Aerotropolis is a new layout of urban form comprising of aviation intensive businesses and related enterprises extending up to 25 kilometres outward from major airports (<http://en.wikipedia.org/wiki/Aerotropolis>).

key impacts have been identified which will require the application of site and activity specific mitigation measures. These mitigation measures are included within the EMP to ensure that they receive the necessary attention.

**Table 31: Summary of the significance of identified impacts without and with mitigation measures**

Impact	Significance	
	Without Mitigation	With Mitigation
Construction Phase		
<b>Biophysical Environment</b>		
Soil erosion and silting of the wetlands, riparian areas and drainage lines	Medium to high	Low to Medium
Surface and ground water contamination	Medium to High	Low to Medium
Destruction of natural vegetation and faunal habitat	Medium	Low to Medium
Interference with flora and fauna behavioural patterns	Medium to High	Low to Medium
Introduction of spread of alien and invasive vegetation	Medium to High	Low to Medium
Loss of hydrological functionality impacting on downstream habitats	Medium to High	Low to Medium
Impact on loss of wetlands	High	Medium
<b>Socio Economic Environment</b>		
Increase in ambient dust levels	Low to Medium	Low
Increase in ambient noise levels	Low to Medium	Low
Change of visual character	Medium	Low - Medium
Impact on traffic patterns within the area	Medium to High	Medium
Impacts on heritage resources	Low to Medium	Low
Temporary employment opportunities	Medium Positive	
Operational Phase		
<b>Biophysical Environment</b>		
Surface and ground water contamination	Low to Medium	Low
Soil contamination	Low to Medium	Low
<b>Socio Economic Environment</b>		
Increase in ambient noise levels	Not significant	
Permanent change of visual character	Not significant	
Permanent employment opportunities	High Positive	
Cumulative Impacts		
Increase traffic within the surrounding area	High	Low to Medium
Net loss of wetlands	High	Medium
Impact of Trade Zone 2 and other developments in the KSIA/DTP Precinct	High	Low to Medium
Loss of High Agricultural Potential Land	Not significant	
Increase in economic growth	High positive	

The DTP has been identified as a key development node in the north, and this is evident in the eThekweni Municipality's IDP, as well as the northern spatial development plan, as well as the Tongaat/DTP LAP. Furthermore, a development framework plan for the expansion of the site has been prepared and approved by the local authority. The further development of Trade Zone 2 is in line with this plan. The KSIA/DTP Development Precinct is a stimulator of economic growth in the Province and the expansion of the Airport is required to meet its future goals.

The negative impacts identified are not considered highly significant and with appropriate mitigation can be reduced to low or medium-low significance. The positive impacts are considerable in that the proposed

development will stimulate the local economy and provide additional employment opportunities greatly needed within the eThekweni Municipal area.

## G-2 EAP'S RECOMMENDATIONS

Two layout alternatives have been presented in the Final EIR i.e. The Environmentally Preferred Layout and The Developer's Preferred Layout.

### 3) Environmentally Preferred Alternative:

- The Environmentally Preferred Layout allows for non-encroachment of infrastructure in the wetlands, drainage lines and their associated 30m buffer area. The watercourses on site must be rehabilitated to allow for the increased biodiversity on the site. This would also ensure that the hydrological flow patterns downstream of the site is not altered and the water courses are not polluted. This measure would be in line with the conditions of the KSIA Appeal Decision for the broader KSIA/DTP Development Precinct.
- This alternative is similar to the no-go alternative as there would be a reduced development footprint that would render the proposed TradeZone 2 development unviable for development, as there would be insufficient space for landuses such as General Aviation, Cargo Terminal and light industrial development.

### 4) Developer's Preferred Alternative:

- Should the Developer's preferred layout be approved, then all the wetlands on site will be infilled / lost to through development activities such as platforming and the construction of infrastructure on the site. This is however, in line with the original KSIA application as it was indicated that any rehabilitation of on-site wetlands will be temporary until such time as the Phase 2 of the development is implemented.
- To mitigate the loss of wetlands, the proponent intends to rehabilitate wetlands at a candidate offsite site. A candidate site has been identified that occurs north of the study area, within the same catchment as the study site i.e. Tongati River Catchment. In total, the wetlands within the study site represent 30.0 hectare equivalents of functional wetland area. To ensure a no-net-loss of wetland functional area from the local landscape, a gain of 30 ha-eq of wetland ecological integrity needs to be obtained through the successful rehabilitation of the candidate wetlands. Through successful wetland rehabilitation, the ecological integrity of the wetlands of the candidate site will be improved. This could potentially yield a gain of 49.4ha-eq.

Should the developer's preferred layout be adopted, the following recommendations are suggested:

- The offset site must be agreed by Ezemvelo KwaZulu-Natal Wildlife and eThekweni Environmental Planning and Climate Protection Department, with the Rehabilitation and Management Plans approved by both entities.
- The offset area must be set aside in perpetuity (no development may be located within the designated offset site) and safeguarded from both direct and indirect impacts from the surrounding area.
- The proposed offset area may not overlap with other offset/rehabilitation areas.
- Any proposed wetland rehabilitation plans or offset plans are not in conflict with the Environmental Management and Rehabilitation Plan (dated March 2012) for the remaining DTP/KSIA airport site.
- Should the Provincially Protected Plants be removed, relocated or destroyed as a result of the proposed development, a permit from the Provincial Department of Agriculture, Forestry and Fisheries (DAFF) must be sought and approved. It is recommended that the Provincially Protected Plants be relocated to the 'conservation area' adjacent to the northern boundary of the site.
- In view of the close proximity of the proposed development to the airport, it is recommended that the design of the buildings within the study area incorporate noise reduction principles to minimize noise impacts on the occupants. Therefore, residential development is not recommended as an alternative

for the proposed development. Industrial development and associated aviation-related activities are compatible land-uses that will complement the adjacent KSIA and DTP.

- There are requirements for additional services infrastructure to be constructed that fall outside of the site boundary of the Trade Zone 2 development site. It is therefore suggested that the following proposed services infrastructure be finalised and approved the DEA:
  - Proposed 2.2Ml reservoir;
  - Tongaat/Hlawe Bulk sewer pipelines;
  - Stormwater attenuation ponds
- The long-term plan to construct a Link Road from Brake Drive to the New Spine Road must form part of a separate Environmental Application.
- The developer must provide high standard traffic warnings and traffic calming measures where construction activities interfere with traffic.
- The fuel storage areas at the General Aviation area must be clearly demarcated and restricted to designated staff only. The fuel storage area must be adequately bunded to ensure that no contamination of underground water and catchment areas occurs.
- The transport, handling and storage of hazardous substances must comply with all the provisions of the Hazardous Substances Act, 1973 (Act No. 15 of 1973), associated regulations as well as SANS 10228 and SANS 10089 codes.
- A Contingency Plan must be put into place in case of leakages or spillages which are not detected and then lead to the contamination of underground water. Leak detectors on pressure systems must be included.
- Monitoring of volumes of the tanks must take place on a daily basis to detect unexplained losses due to leakages.
- In the event of a spill, hazardous material may be generated. Such material must be disposed of at a suitably licensed waste disposal facility, with chain of custody documentation supplied as proof of end recipient.
- Hazardous and flammable substances must be stored and used in compliance with the applicable regulations and safety instructions.
- The 'conservation area' to the north of the site boundary must be clearly demarcated and there must be no encroachment of construction crew into this area. Stockpiles, construction vehicles and equipment, construction rubble etc, must not occur within the 'conservation area'. Prior to construction, the importance of the 'conservation area' and must be included in the Environmental Awareness Programme that the construction crew must be inducted on,
- The proposed development is in line with the local policies and guidelines such as the eThekweni Municipality's IDP, Northern Spatial Development Plan (NSDP), as well as the Tongaat/DTP Local Area Plan (LAP). Furthermore, a development framework plan for the expansion of the site has been prepared and approved by the local authority. The further development of the Trade Zone is in line with this plan.
- The proposed development will also contribute to local economic development and provide various employment opportunities to the local people with the eThekweni Municipality.
- In terms of agricultural activities and current land use, the impacts of the land use change is considered to be negligible on the surrounding areas.
- The site is generally stable and suitable for development, provided the recommendations as given in the Geotechnical Report are adhered to. It is recommended that a Geotechnical Engineer be appointed to inspect and approve all cut slopes, and cut and fill heights greater than 2m.
- Surface Water quality monitoring is being undertaken at 17 sites within the DTP on a quarterly basis (every 3 months) over a 12 month period, this must continue.
- Ground water monitoring is currently being undertaken on a continual basis. This is a requirement from the existing KSIA RoD which is being complied with and will continue.

Having presented the two layout alternatives, the DEA is requested to approve the layout alternative that is

based on the principles of sustainable development.

The applicant motivated for the Preferred Alternative by mitigating the infill of wetlands through the rehabilitation of wetlands at a candidate offset site. These wetlands have been identified as a National Ecosystem Priority Area and critical in terms of Ezemvelo Conservation Plan. Rehabilitation of the wetlands within the site may potentially improve the integrity of the wetlands to the extent that the number of hectare equivalents may be increased to 103.6ha. This is a potential gain of 49.4ha-eq, after a conservative estimate of the post-rehabilitation ecological state of the candidate wetlands.

This will appropriately achieve the no-net-loss functional area target, as well as provide leeway for any potential risk of failure of certain interventions.

The candidate site is considered appropriate and suitable for achieving both the wetland functioning target offset and the biodiversity target offset for the proposed development.

The DTP has been identified as a key development node in the north, and this is evident in the eThekweni Municipality's IDP, as well as the northern spatial development plan, and the Tongaat/DTP LAP. Should the proposed development not proceed with the Developer's Preferred Layout, there would be stifled growth, not only in the northern region of the Municipality but also in the Southern African region, since the airport's international status will be undermined. The Trade Zone 2 development forms part of the Greater KSIA/DTP Master Plan for growth of the Province, employment opportunities and the economy and the proposed infrastructure at TradeZone 2 would provide support to Phase 1 of the KSIA/DTP development. The proposed development's key role in the Dube Aerotropolis<sup>9</sup> development plans must be considered in the DEA's Environmental Decision.

A variety of mitigation measures have been identified that will serve to mitigate the scale, intensity, duration or significance of the impacts that have a low to medium, medium to high and high significance rating. These include guidelines to be applied during the construction and operational phases of the project. The EMPr (Appendix 7) contains more detailed mitigation measures.

To ensure that identified negative impacts are minimised and positive impacts enhanced, the following clauses are recommended as conditions of the Environmental Authorisation:

- The EMPr is a legally binding document and the mitigation measures stipulated within the document and EIR must be implemented.
- An independent Environmental Control Officer (ECO) must be appointed to manage the implementation of the EMP during the construction phase. Environmental Audit Reports must be compiled and made available for inspection.
- All recommendations made in the Specialist reports must be adhered to.
- A revised Stormwater and Drainage Management Plan report which incorporates the flood-line report and previous Storm water Report for the KSIA / Dube Tradeport precinct (the original iLembe Stormwater report) must be prepared as annexure to the original Report and the final EMPr for the project to provide the alignment between the reports and data. This revised report must be approved by the EThekweni Municipality
- The Wetland Rehabilitation Plan for TradeZone 2 offset sites must be site specific and not identical to the site wide rehabilitation plan. The rehabilitation plan must be developed post authorisation but prior

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<sup>9</sup> KSIA is a core piece of infrastructure with access to sea, road and rail linkages, within one of Southern Africa's strongest regional economies.

DTP development strategy will guide the development of the entire Airport City and create significant opportunities for all businesses in surrounding area ([www.thdev.co.za/developments/aerotropolis/overview](http://www.thdev.co.za/developments/aerotropolis/overview)).

An Aerotropolis is a new layout of urban form comprising of aviation intensive businesses and related enterprises extending up to 25 kilometres outward from major airports (<http://en.wikipedia.org/wiki/Aerotropolis>).

to commencement of construction of TradeZone 2. This must be done in consultation with the authorities,

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## **SECTION I: APPENDICES**

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**Appendix 1:** Locality Map

**Appendix 2:** Photograph plate

**Appendix 3:** Site Development Plans and other Layout Plans

**Appendix 4:** Authority Correspondence

**Appendix 5:** Public Participation

**Appendix 6:** Specialist Studies

**Appendix 7:** Environmental Management Programme