DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PROPOSED SUPPORT PRECINCT 2 LOCATED ON THE REMAINDER OF PORTION 11 OF THE FARM LA MERCY NO. 15124, NEAR KING SHAKA INTERNATIONAL AIRPORT/DUBE TRADEPORT, IN KWAZULU-NATAL

Prepared for:

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PURPOSE OF DOCUMENT

A period of **40 calendar days (2 September 2015 – 13 October 2015)** has been provided for public review of the Draft Environmental Impact Report (EIR). All Interested and Affected Parties (I&APs) as well as State Departments have been notified of this review period.

The Draft EIR contains the following information:

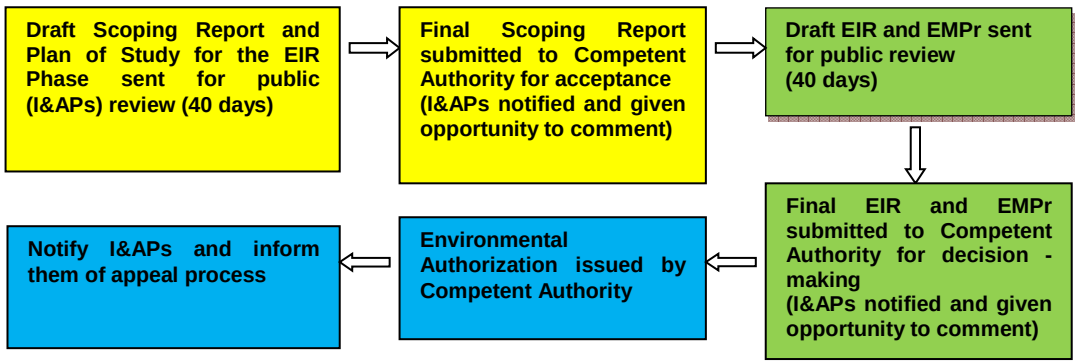
- A description of the project, including project motivation;
- A description of the environment affected by the project;
- The public participation process;
- Discussion of applicable alternatives;
- Assessment of impacts for the construction and operational phases; and
- The EAP's recommendations.

The Draft 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" (seventh tab on the top of the home page). Click on the "register" button and complete the compulsory fields to register as an I&AP. On completion of these fields, you will be registered. Insert your username and password to log in. Click on Scoping and Environmental Impact Assessments, under categories on the right side of the stakeholder engagement page. Please click Draft EIR for the **Proposed Support Precinct 2 Development** 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.

Following the commenting period, the EIR will be updated and submitted to the Department of Environmental Affairs (DEA) for consideration. The flow diagram below highlights the phases in the project where I&APs have the opportunity to participate within the process.



PROJECT SUMMARY	
Project Name	Proposed Support Precinct 2
Farm Name and Portions	Portion 11 of La Mercy Airport No. 15124
Surveyor-General 21 Digit Codes	NOFU00000001512400011
Brief Development Overview	La Mercy Joint Venture (Pty) Ltd (LMJV) proposes to develop the site for the proposed 'Support Precinct 2'. Support Precinct 2 is proposed to be located in the area south-east of the runway. The land is owned by the La Mercy Joint Venture (Dube TradePort Corporation (DTPC) and Airports Company South Africa (ACSA). It is proposed that the proposed development will consist of a Mixed Use development including Business Parks, Hotels, Petrol Filling Station, small-scale retail and open space to complement the adjacent 'conservation area'. Additional infrastructure will include support facilities and roads, parking areas and gate houses.
Development Footprint	The site is approximately 30 hectares (ha), however, the development footprint is approximately 28 hectares including support infrastructure such as access roads.
Road Improvements	The primary access to Support Precinct 2 will be off M65 via a proposed Diamond Interchange. The proposed Interchange will allow for the free flow of traffic along the M65. This allows for no negative impact, in terms of delay and travel time, on any vehicles travelling to the Airport. The Interchange will also accommodate vehicles accessing the proposed Petrol Filling Station from all directional approaches. The existing intersections in the vicinity of the study area were analysed with existing traffic flows and it was found that they operate well in isolation. It is envisaged that the proposed development will generate approximately 1484 vehicles into the precinct in the AM Peak Hour, with approximately 479 vehicles exiting. The PM Peak Hour will have approximately 560 vehicles generated into the development, with approximately 1498 exiting. The proposed Petrol Filling Station will also potentially generate approximately 240 vehicles in total in the AM Peak Hour, with approximately 288 vehicles in total in the PM Peak Hour. This will significantly increase the lane requirement to two lanes on the internal road network. A majority of intersections within the study area operate at acceptable Level of Service (LOS). Where intersections operate at unsatisfactory LOS, mitigation measures are proposed. The Traffic Engineer recommended specific upgrades to the following existing intersections: • R102 and M65; and • M65 and Harvest Avenue. Based on an analysis of the external road network for the existing traffic flows and both the 2020 and 2025 background plus development generated traffic volumes, the upgrade requirements to the external road network are as follows: At the intersection of R102 and M65 , the following is recommended: • There must be a shared through and right turn lane; and • There must be an additional right turn slip lane. At the intersection of M65 and Harvest Avenue, the following is recommended: • There must be upgrade to signalised intersection; and • There must be upgrades to lanes in each direction.
Site Photographs	Appendix 2

Provision of Services:	
Water	Construction Phase: Water will be sourced from the eThekwini Municipality for construction-related activities and this will be supplemented by rainwater harvested from the Support Zone 1 as well as TradeZone 1 development. Operational Phase: 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 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. • In order to cater for fire flows to Support Precinct 2, it is proposed that the existing supply line leading up to the tie-in point for the new internal reticulation system be upgraded from a 160mm Class 12 uPVC pipe to a 400mm Class 12 uPVC pipe. **(i) 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 erf (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: Limited businesses and office parks • Water consumption: 0.4kL/100m² • Floor space ratio of development: As per town planning specifications • Peak factor: 2.4 Refer to the proposed internal and external reticulation system layouts in Figure 3-13 and Figure 3-12 *of* Appendix 6.2 respectively.
Stormwater Attenuation	The designated catchment areas and the run-off were determined separately for each catchment area, which was identified and is presented in Figure 3-9 of the Engineering Services Report in Appendix 6.2. Stormwater run-off from catchment areas 3, 6 and 8 have been proposed to drain into designated attenuation ponds, and the stormwater run-off from Catchment Areas 1, 2, 4, 5, 7, 9 and 10 will drain directly into the veld. Thus the individual stands will act as open field attenuation areas before the runoff gets into the veld. **(i) Retention Facilities** Three attenuation ponds are to be designed to attenuate flows from the new development, as presented in Figure 3-10 of the Services Report in Appendix 6.2. The 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 pre-development run-off, using the 1:50 year flood run-off volumes.

	(ii) Internal Stormwater Drainage The stormwater control philosophy will be to restrict post-development flows into the HIawe 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.
Sewage	Construction Phase: Portable chemical toilets will be provided for construction workers. Operational Phase: **(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. As such, the gravity sewer network drains into three lifting stations located at low points along the perimeter of the development. From the lifting stations, sewerage is pumped via a 3 365m rising main network to the Southern WWTW. **(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, a 160mm nominal diameter pipe has been deemed adequate for the transportation of sewerage from the various areas to the respective sewer lifting stations. Refer to Figure 3-14 in Appendix 6.2. **(iii) Bulk Sewerage Drainage – Outfall Sewer** The closest available facility to discharge the sewerage effluent from the proposed Support Precinct 2 is the Southern WWTW located west of the proposed development. Owing to the topography of the area, the sewerage effluent has to be pumped to the Southern WWTW. This is to be achieved by directing all gravity sewer flow to lifting stations located in the low lying areas of the development. Based on the peak inflows, the rising main network will comprise 110 mm and 200 mm HDPE class 12 pipes. Figure 3-15 presents the proposed rising main layout, and drawing P14093-PD-02-SR-002 in Appendix A of Municipal Engineering Services Layout (Appendix 6.2 of the DEIR) presents the full extent of the rising main.
Electricity	Construction Phase: Diesel Generators will be used. Operational Phase: The design and installation of the bulk electricity supply will be done by eThekwini Electricity. The estimated demand for electricity is 8.8MVA. The following is anticipated regarding reticulation: • 11 kV supplies will be taken from the 132/11 kV major substations and distributed along the main access roads to the Support Precinct 2 development. They will feed into a distributor substation strategically placed close to the entrance of the development. • Substations and miniature substations will be planned and positioned in key locations throughout the development as and when required by the individual stand developments. • 11 kV 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 1 MVA supply will be serviced by a substation (brickwork structure). • Smaller sites will either be equipped with their own mini-sub or supplied by a 400 kV feed from a shared substation (brickwork structure). **Internal Electrical Reticulation and Supply** • Internal reticulation will be performed by eThekwini 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.
Solid Waste	Construction Phase: The Contractor will be responsible for the management and removal of all solid waste (refer to the Environmental Management Programme (EMPr) in Appendix 7. Operational Phase: The development falls within the jurisdiction of eThekwini Municipality, and therefore Durban Solid Waste (DSW) will be responsible for provision of waste collection. **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. **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 50m².
Telecommunication	DTPC currently manage all telecommunication data services in the adjacent area. A data centre currently exists at the TradeZone Cyber port. The current existing DTPC design principles and data network distribution criteria to all sites within the Dube TradePort Aerotropolis will apply. 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.

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 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
Ms. Gerda Bothma	SEF	Project Manager
Ms. Natasha Lalie	SEF	Environmental Manager

Ms Gerda Bothma

Gerda Bothma has a BSc. Honours Degree in Microbiology. She is a Senior Environmental Scientist with over 16 years' experience in the field of environmental and waste management in South Africa. Her experience includes the undertaking of environmental impact assessments, the compilation of environmental management plans, the development of integrated waste management plans, peer reviewing of environmental impact assessments and assistance with the development of management frameworks as well as auditing and monitoring of landfill sites according to environmental principles and construction sites according to conditions set by the environmental authority. She furthermore has experience in dealing with projects which involve NEC3 Contracts. A former Assistant Director of the Gauteng Directorate of Environment she has extensive knowledge and experience in performance monitoring of general and hazardous waste landfill sites as well as the reviewing of environmental impact assessments and mining applications.

Ms Natasha Lalie

Natasha has a MSc. Environment and Society and has been an Environmental Assessment Practitioner (EAP) for almost twelve 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.

Table 2: Contact Details of Environmental Assessment Practitioner

Name	Contact Details
Ms. Gerda Bothma	Strategic Environmental Focus (Pty) Ltd Postal Address: PO Box 227, Pavilion, 3611 Tel: 031 266 1277 Fax: 031 266 6880 Email: gerda@sefsa.co.za

EXECUTIVE SUMMARY

1 INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by La Mercy Joint Venture (Pty) Ltd, herein referred to a LMJV, to undertaken an environmental application process for the proposed Support Precinct 2 Development.

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 22 April 2014. Approval to proceed to the EIR phase was received on 5 May 2014.

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

2 BRIEF PROJECT DESCRIPTION

The proposed Support Precinct 2 Development will occur on the remainder of Portion 11 of the Farm La Mercy No. 15124.

The site occurs approximately 40km north of the Durban Central Business District (CDB) within the eThekwini Municipality. The site is strategically located adjacent southeast of the King Shaka International Airport (KSIA). The GPS points of the centre of the site are approximately 29° 38’ 04.87” south and 31° 06’ 35.16” east. Refer to the locality map in Figure 1.

The site is approximately 30ha in extent and falls within Ward No. 58 of the eThekwini Municipality in KZN.

The current land use zoning of the site is ‘undetermined’, but it is currently fallow after discontinuation of sugarcane cultivation. Support Precinct 2 is proposed to be located in the area south-east of the runway. The land is owned by the La Mercy Joint Venture (DTPC and ACSA). It is proposed that the proposed development will consist of a Mixed Use development including Business Parks, Hotels, Petrol Filling Station, limited retail facilities and open space to complement the adjacent conservation area. Additional infrastructure will include bulk infrastructure, support facilities and roads, parking areas and gate houses.

The proposed land uses and service infrastructure do not encroach into the newly delineated ‘conservation area’. The proposed internal road that is required to connect the two development nodes within the development site previously traversed the original ‘conservation area’, however ACSA/DTPC/La Mercy JV have recently undertaken a process of review and amendment of the original ‘conservation area’ delineated during the EIA process for the Phase 1 construction of KSIA/DTP. In-principle approval of the newly delineated conservation area by the Advisory Forum, comprising Ezemvelo KZN Wildlife (EKZNW), eThekwini Municipality (Biodiversity Planning Division), KwaZulu-Natal Department of Environmental Affairs (DEDTEA), Department of Water and Sanitation (DWS), and Department of Environmental Affairs (DEA), has been obtained. Final approval of the newly delineated conservation area by DEA is pending.

The Support Precinct which is one of the zones that makes up the Dube TradePort development, will house the facilities that are associated with an airport without having a direct relationship or dependency to the processing of cargo, or passengers aircrafts.

Support Precinct 2 will comprise an international and regional business precinct given its good connectivity and visibility from the N2 freeway as well as its proximity to the airport access roads. Due to the sites location, which lies adjacent to an open space system, a portion of the site will be considered for rehabilitation and open space system. The intention of the development is to undertake development in a sustainable manner to deliver a world class product, services and businesses, in order to ultimately develop an "Aerotropolis city" of note.

Access to the proposed development will be off M65 via a proposed Diamond Interchange. The proposed Interchange will allow for the free flow of traffic flows along M65. This allows for no negative impact, in terms of delay and travel time, on any vehicles travelling to the Airport. The Interchange will also accommodate vehicles accessing the proposed Petrol Filling Station from all directional approaches.

3 KEY IMPACTS

The following key impacts were identified during the Scoping Phase and were further investigated and assessed within this Environmental Impact Report (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 soil contamination during the operational phase;
- Disturbance of estuarine wetlands;
- Loss of hydrological functioning of downstream wetlands and riparian habitats;
- 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);
- Loss of wetland ecosystem and habitat through infill;
- Impact on geological formations as a result of the proposed development;
- Destruction of existing flora within the study area; and
- Increased faunal mortalities and changes in faunal community dynamics.

Socio-Economic Impacts:

- Increased dust and noise generation during the construction phase;
- Increase in atmospheric pollution during the operational phase;
- Impact of noise caused by airport noise on the proposed development during the operational activity;
- Change in the visual character of the area;
- Potential impacts on heritage and cultural resources;
- Impact on safety and security;
- Impacts on localised traffic; and
- Job creation during the construction and operational phases of the proposed project.

Cumulative Impacts:

- Cumulative impacts of the proposed development and other projects within the KSIA/DTP Precinct;
- Increased traffic associated with additional road users especially heavy-duty vehicles;
- Impact on the surrounding conservation areas and ecological linkages/corridors; and
- Cumulative loss of wetlands on a regional and local level.

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 applicant owns the site which is strategically located and in close proximity to the Phase 1 of Dube TradePort TradeZone, Support Precinct 1 and the KSIA. This development node was identified during the EIA for the entire KSIA and as such, is being proposed for development by the applicant.

The proposed land uses do not occur within the 'conservation area' that forms part of the mitigation measures for Phase 1 of the KSIA/DTP development.

Land Use Alternatives:
Alternative 1: The Preferred Alternative is to develop the site for mixed land uses that incorporates an office park, hotels, filling station, limited retail/commercial and an open space area that complements the adjacent 'conservation areas' as part of the KSIA Phase 1 Mitigation Strategy.

The remaining area on site would accommodate internal roads through the development and supporting services infrastructure, such as internal water, sewer, stormwater lines and stormwater attenuation ponds.

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, office parks, hotel, filling station, internal roads and services infrastructure, the entire site would be developed for agricultural land use practises.

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

Development Layout Alternatives

Layout Alternative 1: Preferred Layout
As far as possible, the preferred layout has been re-aligned to ensure that the proposed hard structures and infrastructure avoids encroachment into the riparian areas and the wetlands. The vegetation community, *Acacia-Erythrina* wooded areas is associated with the riparian and wetland areas and is of high conservation importance. As far as possible, this vegetation community will be retained as part of the proposed development.

Buffers at a minimum of 30m from the outer edge of the wetlands are required in line with the guidelines by EKZNW, 2010. However, there will be various landuses occuring within the 30m wetland buffer. To mitigate the loss of wetland, as a result of the construction of the internal road through the site and construction within the 30m wetland buffers, a Wetland Rehabilitation Plan will be compiled and included in the Final EIR for public review and comment.

An internal road that links the two development nodes goes through the wetland on the northern portion of the site. To mitigate the impact on the wetland, a Water Management Plan, an Erosion and sediment control programme and a Stormwater Management Plan must be implemented during the construction and operational phases of the development.

Sediment barriers (e.g. silt fences/sandbags/hay bales) must be installed immediately downstream of active work areas (including soil stockpiles) as necessary to trap any excessive sediments generated during

construction. Any erosion gullies/channels created during construction should be filled immediately to ensure silt does not drain into the wetland.

Once operational, maintenance measures such as the clearing of debris from culverts and the monitoring and stabilising of any head cut or gulley erosion that forms must take place regularly.

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.

However, rehabilitation of the site, erosion control and eradication of alien invasive plants will have a positive impact on the site and will complement the surrounding Durban Metropolitan Open Space System (D'MOSS) should the no-go alternative be adopted.

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 Support Precinct 2 development not take place, there would be no support for 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.

Failure to construct the Support Precinct 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[1] development plans. The Phase 1 EIA and ROD already identified Support Precinct 2 for future development to complete the DTP/KSIA development.

The DTP has been identified as a key development node in the north, and this is evident in the eThekwini Municipality's Integrated Development Plan (IDP), as well as the Northern Spatial Development Plan (NSDP), and the Tongaat/DTP Local Area Plan (LAP. In the absence of the Support Precinct 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 Support Precinct 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 and upgrades to a 400mm Class 12 uPVC pipe as well as the Regional Waste Water Treatment Works to cater for the increased demand in sewerage treatment 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 eThekwini Municipality to collect waste that would have been generated at the Support Precinct 2 development, if it were constructed and became fully operational, meaning lost revenue for the eThekwini Municipality.

[1] KSIA is a core piece of infrastructure with access to sea, road and rail linkages, within one of Southern Africa's strongest regional economies.
DTPC 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).
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).

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

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 will be incorporated into the Final Environmental Impact Report which will then be submitted to the DEA for consideration.

Two layout alternatives have been presented in the Draft EIR i.e. the preferred layout and the no-go alternative.

a) Alternative Layout 1: Preferred Layout

- Refer to Alternative Layout 1 in Figure 14 and Appendix 3.1.
- This layout takes cognisance of the wetlands on site, by realigning the proposed landuses and services infrastructure such that there is minimal infilling of the wetlands.
- However, there will be construction of an internal road through a wetland in the northern portion of the site to connect the two development nodes.

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

- Should any plant species of Conservation Importance (CI) 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 CI species be relocated to 'Froggy Pond' downstream of the site. Similarly, if the Pickersgill Reed Frog is found on site, it should be relocated to 'Froggy Pond';
- 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. Extensive commercial agricultural land uses are deemed unviable for the site, due to unsuitable soil, land and climate conditions on the site, as well as low sugar cane yields in the past eight years;
- The developer must provide high standard traffic warnings and traffic calming measures where construction activities interfere with traffic;
- A groundwater monitoring system must be installed for the proposed on-site filling station. A Risk Assessment must be undertaken during the detailed design of the proposed filling station;
- 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 may 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' surrounding the site 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' should form part of the Environmental Awareness Programme and ToolBox talks that the construction crew must be inducted on;
- The proposed development is in line with the local policies and guidelines such as the eThekwini Municipality's IDP, Northern Spatial Development Plan (NSDP), as well as the Tongaat/DTP (LAP). The proposed development will also contribute to local economic development and provide various employment opportunities to the local people within the eThekwini Municipality;
- From a geotechnical perspective, the site is stable in its natural state and suitable for the intended development provided that cognisance is taken of the dip of the shale bedrock and the recommendations by the Geotechnical Engineer are adhered to; and
- 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 site has been identified as a key development node in the north, and this is evident in the eThekwini Municipality's IDP, as well as the Northern Spatial Development Plan, and the Tongaat/DTP LAP. Should the proposed development not proceed with Alternative Layout 1, 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 Support Precinct 2 development forms part of the Aerotropolis Plan - 2013 and should the development not be approved, it would undermine future growth of the region, employment opportunities and the economy. Therefore, the proposed development's key role in the Dube Aerotropolis[2] development plans must be considered in the DEA's Environmental Decision. In addition, the proposed development was already indicated and identified as key element of the DTP/KSIA development during the Phase 1 EIA process.

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 EMPr during the construction phase. Environmental Audit Reports must be compiled and made available for inspection;
- Incorporation and implementation of the site-wide Ecological and Wetland Rehabilitation Plan prepared by GroundTruth as part of the Phase 1 KSIA Rehabilitation and Restoration Plan.

[2] 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).
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

AA	Advise Against
ACSA	Airports Company South Africa
BA	Basic Assessment
BLEVE	Boiling Liquid Expanding Vapour Explosions
BRU	Bio Resource Unit
CBD	Central Business District
CRR	Comments and Responses Report
CI	Conservation Importance
DAA	Do Not Advise Against
DEA	Department of Environmental Affairs
DAFF	Department of Agriculture, Forestry and Fisheries
DEC	Declining
DMOSS	Durban Metropolitan Open Space System
DWS	Department of Water and Sanitation
DTPC	Dube TradePort Corporation
DTP	Dube TradePort
DSW	Durban Solid Waste
DNSDP	Draft Northern Spatial Development Plan
DNL	Day Night Average Sound Level
EAP	Environmental Assessment Practitioner
EA	Environmental Authorisation
ECO	Environmental Control Officer
ETA	Ethekwini Transport Authority

EIA	Environmental Impact Assessment
EIR	Environmental Impact Reporting
EMPr	Environmental Management Programme
ERM	Environmental Resource Management
ESP	Exchangeable Sodium Percentage
EKZNW	Ezemvelo KZN Wildlife
FEPA	Freshwater Ecosystem Priority Area
GLA	Gross Leasable Area
GDP	Gross Domestic Product
GN	Government Notice
ha	Hectares
HIA	Heritage Impact Assessment
HGM	Hydro geomorphic Unit
HSE	Health Safety Executive
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IUCN	World Conservation Union
KSIA	King Shaka International Airport
KZN DEDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
KZN DoT	KwaZulu-Natal Department of Transport
LAP	Local Area Plan
LMJV	La Mercy Joint Venture (Pty) Ltd
LOS	Level of Service

LIA	Late Iron Age
MAP	Mean Annual Precipitation
MSA	Middle Stone Age
ME	Mitigation Efficiency
mm	Millimetres
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NT	Near Threatened
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NEMPAA	National Environmental Management Protected Areas Act
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NMPR	Northern Municipal Planning Region
NUDC	North Urban Development Corridor
NSBA	Northern Spatial Biodiversity Act
NSDP	Northern Spatial Development Plan
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PGDS	Provincial Growth and Development Strategy
PSEDS	Provincial Spatial Economic Development Strategy
PES	Present Ecological State
PoS	Plan of Study
QDGC	Quarter Degree Grid Cell
SAHRA	South African Heritage Resources Agency
SEF	Strategic Environmental Focus (Pty) Ltd
SFM	Significance Following Mitigation
S&EIR	Scoping and Environmental Impact Reporting

SDF	Spatial Development Framework
SANRAL	South African National Roads Agency Limited
SAHRA	South African Heritage Resources Agency
SUDS	Sustainable Urban Drainage System
TIA	Traffic Impact Assessment
TSP	Threatened Species Programme
VIA	Visual Impact Assessment
VU	Vulnerable Species
WULA	Water Use License Application
WOM	Without Mitigation Measures
WM	With Mitigation Measures
WF	Weighting Factor
WWTW	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 La Mercy Joint Venture (Pty) Ltd (LMJV) (Project Applicant) to conduct the Scoping and Environmental Impact Reporting (S&EIR) process for the proposed construction of the proposed Support Precinct 2 development on the remainder of Portion 11 of La Mercy Airport No. 15124 near La Mercy within the eThekwini 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 eThekwini Municipality. The site is strategically located between the N2 and the King Shaka Airport. The primary access to Support Precinct 2 will be off M65 via the proposed Diamond Interchange. The GPS points of the centre of the site are approximately 29°38'04.87" south and 31°06'35.16" east. Refer to the locality map in Appendix 1 and Figure 1.

The uMdloti River occurs adjacent to the southern boundary of the site. The site is approximately 30ha in extent and falls within Ward 58 of the eThekwini Municipality in KZN (refer to the Locality Map in Appendix 1). La Mercy, Verulam, uMdloti, Ballito and Tongaat are the nearest towns to the site. The site is presently unutilised and fallow, after discontinuation of agricultural activities i.e. sugar cane cultivation. The site occurs adjacent to the D'MOSS and adjacent to the areas set aside for conservation as per the Phase 1 Build EIA and ROD for the KSIA/DTP. The site for development does not occur within the D'MOSS and areas set aside for 'conservation' as per the previous EIA for KSIA/DTP (refer to the Locality Map in Appendix 1). The different land cover types that make up the conservation area are illustrated on the Locality Map.

This development node was identified during the EIA for the entire King Shaka International Airport (KSIA) and as such, is being proposed for development by the applicant.

The proposed land uses and service infrastructure do not encroach into the newly delineated 'conservation area'. The proposed internal road that is required to connect the two development nodes within the development site previously traversed the original 'conservation area', however ACSA/DTPC/La Mercy JV have recently undertaken a process of review and amendment of the original 'conservation area' delineated during the EIA process for the Phase 1 construction of KSIA/DTP. In-principle approval of the newly delineated conservation area by the Advisory Forum, comprising Ezemvelo KZN Wildlife (EKZNW), eThekwini Municipality (Biodiversity Planning Division), KwaZulu-Natal Department of Environmental Affairs (DEDTEA), Department of Water and Sanitation (DWS), and Department of Environmental Affairs (DEA), has been obtained. Final approval of the newly delineated conservation area by DEA is pending.

Please find the development site in relation to the original 'conservation areas' in Appendix 1: Locality Map.

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.

Table 3: Surrounding Land Use Table

Direction	Land Use	Distance (m)
North	King Shaka International Airport (KSIA)	Adjacent to site

	Dube Boulevard/M65	Adjacent to site
North-east	Agricultural land	Adjacent to site
North-west	Agricultural land	Adjacent to site
	R102	2.4km
South	uMdloti River	Adjacent to the site
South east	Agricultural land	Adjacent to the site
South-west	Mount Moreland Residential	1km
East	N2	Adjacent to the site
West	Agricultural land	Adjacent to the site

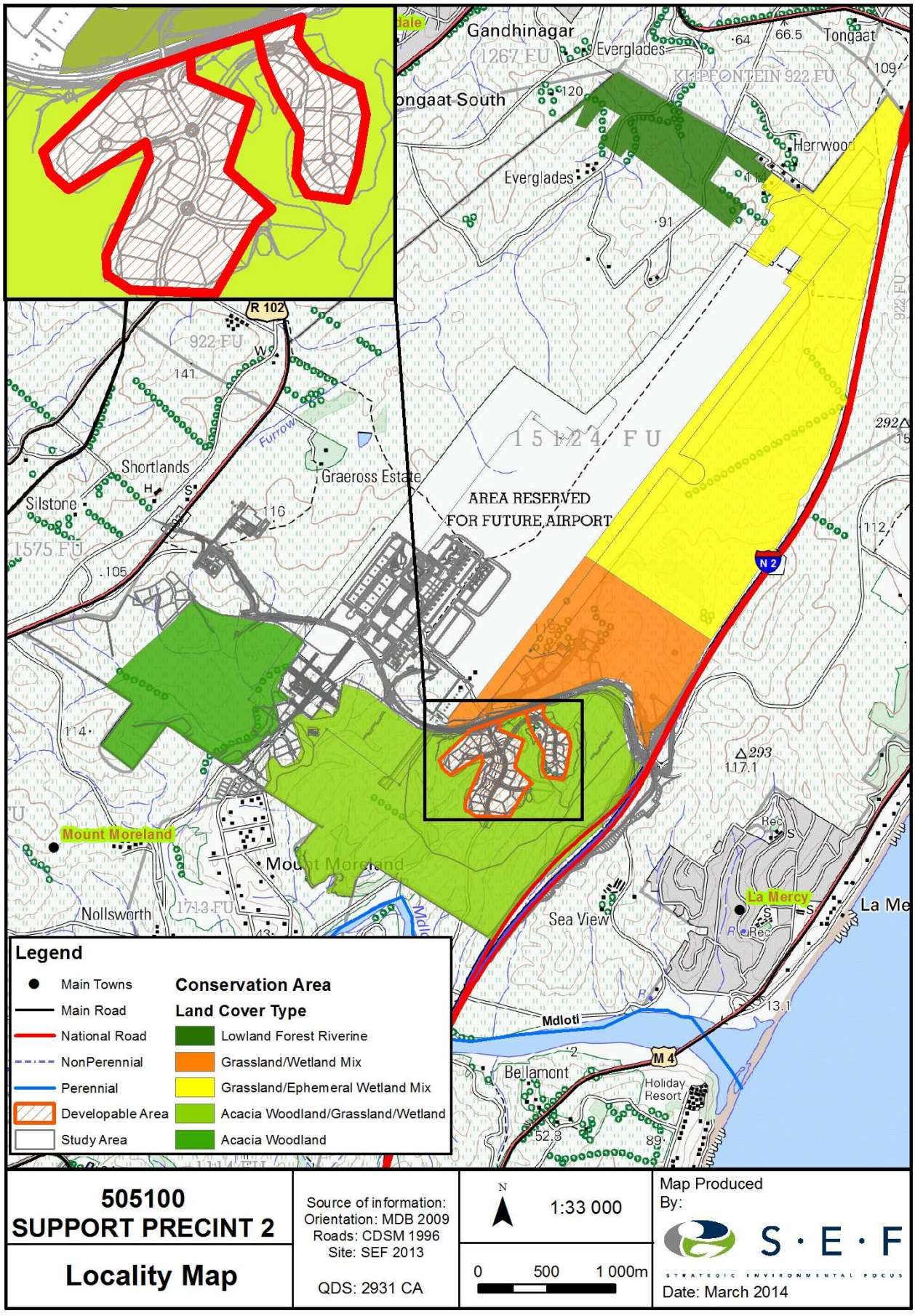


Figure 1: Locality Map of the site

A-1.3 Details of the Project

A-1.3.1 Proposed Support Precinct 2

The current land use zoning of the site is 'undetermined', and is currently fallow subsequent to past agricultural activities on site i.e. sugarcane cultivation. Support Precinct 2 is proposed to be located in the area south-east of the runway. The land is owned by the La Mercy Joint Venture Pty (DTPC and ACSA). It is proposed that the development will consist of Mixed Use development including Business Parks, Hotels, Petrol Filling Station, retail facilities and open space to complement the adjacent 'conservation area'. Additional infrastructure will include support facilities, bulk infrastructure and roads, parking areas and gate houses. Refer to the Site Layout Plan in Appendix 3.1.

A-1.3.2 Traffic Impact Assessment

SMEC SA (Pty) Ltd was appointed to conduct the Traffic Impact Assessment (TIA) for the proposed development. Refer to the TIA in Appendix 6.1. The objective of the TIA is to determine the impact of the development on the existing traffic in the study area. The study takes into consideration the external road network in the immediate vicinity of the proposed Support Precinct 2 study area. The study area is situated towards the south-eastern corner and will serve as a direct interface between M65 (Mdloti Street) and the N2 Highway. The development is deemed to generate more than 150 peak hour trips and, as a result, a full Traffic Impact Assessment was undertaken.

The TIA findings indicate that the road that will be affected directly by the development is the M65 (Mdloti Street) and as such, all intersections along this road.

The primary access to Support Precinct 2 will be off the M65 via a proposed Diamond Interchange. The proposed Interchange will allow for the free flow of traffic flows along Mdloti Street. This allows for no negative impact, in terms of delay and travel time, on any vehicles travelling to the Airport. The Interchange will also accommodate vehicles accessing the proposed Petrol Filling Station from all directional approaches.

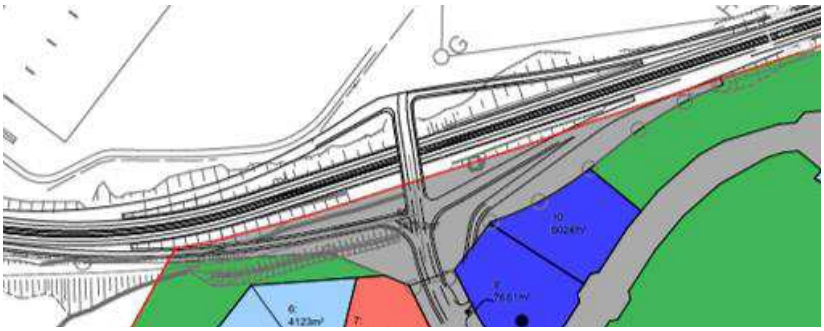


Figure 2: Primary Access – Proposed Interchange

The TIA revealed the following:

- The existing intersections were analysed with existing traffic flows and it was found that they operate well in isolation.
- It is envisaged that the proposed development will generate 1484 vehicles into the precinct in the AM Peak Hour, with 479 vehicles exiting.
- The PM Peak Hour will have 560 vehicles generated into the development, with 1498 exiting.
- The proposed Petrol Filling Station will also potentially generate approximately 240 vehicles in total in the AM Peak Hour, with 288 vehicles in total in the PM Peak Hour. This will significantly increase the lane requirement to two lanes on the internal road network.

- A majority of intersections within the study area operate at acceptable LOS. Where intersections operate at unsatisfactory LOS, mitigation measures are proposed.

Recommendations

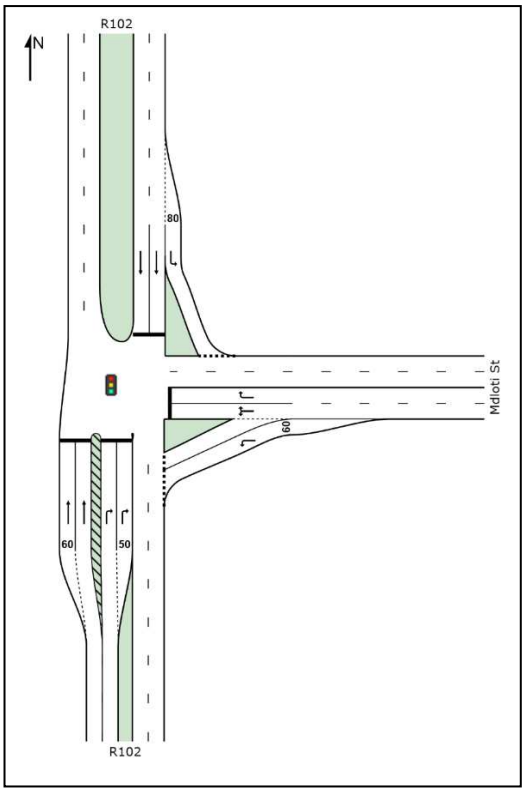
It is recommended that the proposed Support Precinct 2 Development be approved in terms of the expected traffic impact of the development. The technical details for a number of specific upgrades to existing intersections have been confirmed and include the following intersections:-

- R102 and M65; and
- M65 and Harvest Avenue.

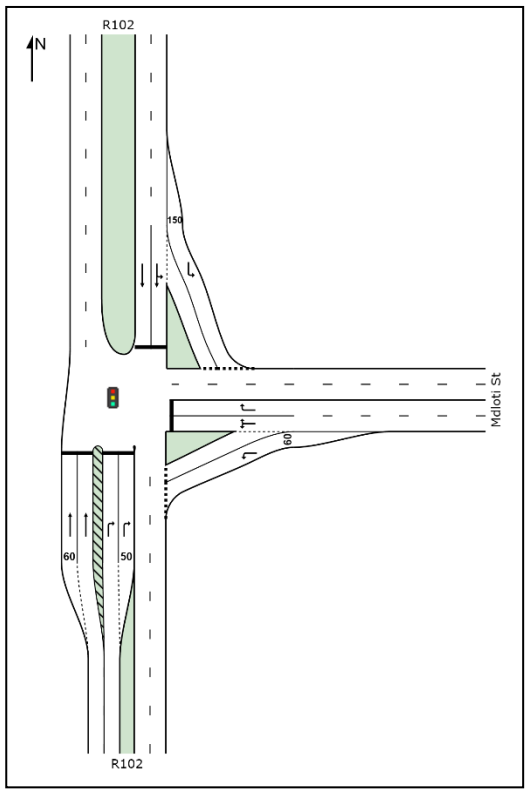
The External Road Network

The external road network was analysed for the existing traffic flows and both the 2020 and 2025 background plus development generated traffic volumes. The upgrade requirements for the external road network are listed below.

Intersection of R102 and M65

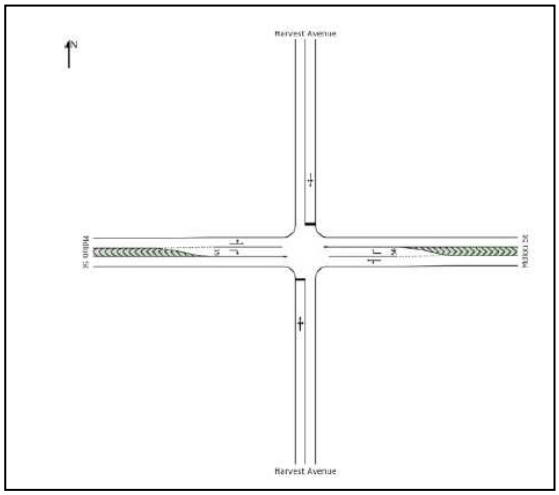


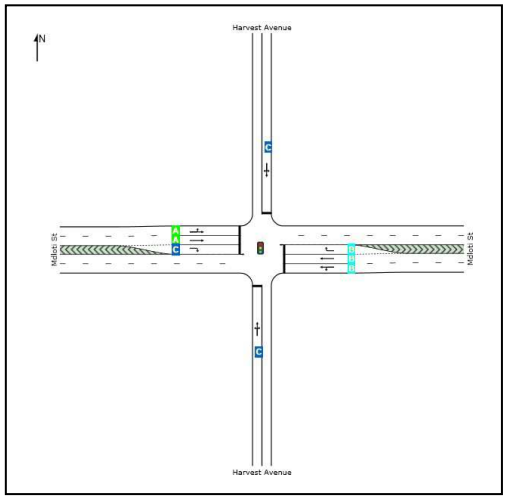
Existing Intersection Layout
R102 Southbound:



Required/Proposed Intersection Layout
- Shared through and right turn lane
- Additional right turn slip lane

Intersection of M65/Mdloti Street and Harvest Avenue





Existing Intersection Layout
M65/Mdloti Street

Required/Proposed Intersection Layout
- Upgrade to Signalised Intersection
- Upgrades to lanes in each directions

Internal Road Network

The proposed internal road network has been reviewed, assessed and analysed in SIDRA. The proposed lane requirements are provided below. It should be noted that provision is to be made for public transport lay-bys as well as non-motorised transport, with emphasis on sidewalks.

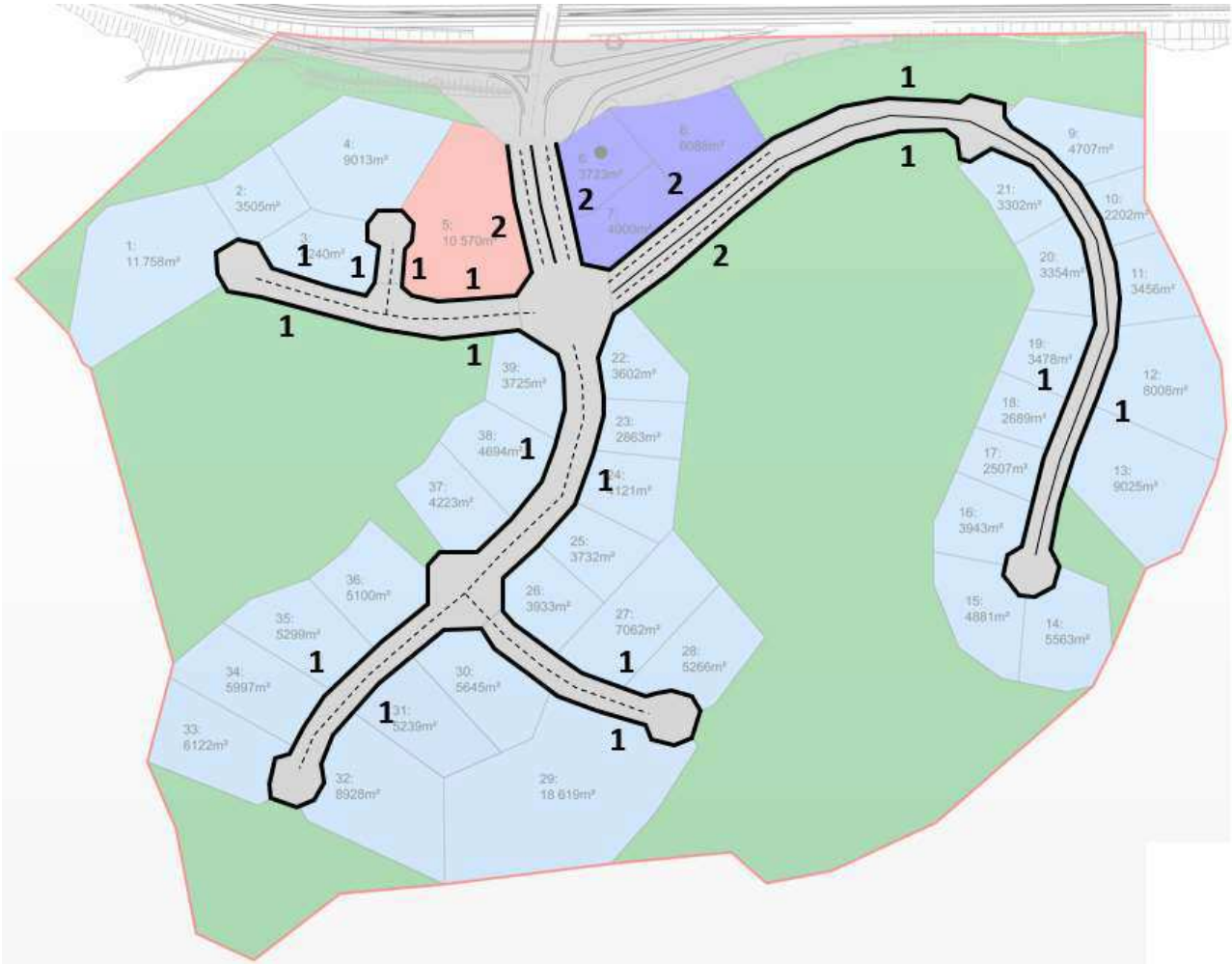


Figure 3: Proposed Internal Road Network

A-1.3.3 Proposed Bulk Services

Delta Built Environment Consultants (Delta BEC) were appointed by LMJV to compile the Engineering Services Report for Civil and Electrical Infrastructure (refer to this report in Appendix 6.2).

a) Electricity Supply

(i) Status Quo

The design and installation of the bulk electricity supply will be done by eThekwini Electricity. The estimated demand for electricity is 8.8MVA.

The following is anticipated regarding reticulation:

- 11 kV supplies will be taken from the 132/11 kV major substations and distributed along the main access roads to the Support Precinct 2 development. They will feed into a distributor substation strategically placed close to the entrance of the development.
- Substations and miniature substations will be planned and positioned in key locations throughout the development as and when required by the individual stand developments.
- 11 kV 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 1 MVA supply will be serviced by a substation (brickwork structure).
- Smaller sites will either be equipped with their own mini-sub or supplied by a 400 kV feed from a shared substation (brickwork structure).

(ii) Internal Electrical Reticulation and Supply

- Internal reticulation will be performed by eThekwini 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 TradePort Cyber port.

(ii) Design Criteria

The current existing DTPC design principles and data network distribution criteria to all sites within the Dube TradePort 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

(ii) 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 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.
- In order to cater for fire flows to Support Precinct 2, it is proposed that the existing supply line leading up to the tie-in point for the new internal reticulation system be upgraded from a 160mm Class 12 uPVC pipe to a 400mm Class 12 uPVC pipe.

(iii) 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 erf 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 erf (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: Limited businesses and office parks
- Water consumption: 0.4kL/100m²
- Floor space ratio of development: As per town planning specifications
- Peak factor: 2.4

Refer to the proposed internal and external reticulation system layouts in Figure 3-13 and 3-12 of Appendix 6.2 respectively and the water layout in Drawing No. P14093-PD-02-WR-001 in Appendix 6.2.

d) Sewage Treatment

(iv) 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.

As such, the gravity sewer network drains into three lifting stations located at low points along the perimeter of the development. From the lifting stations, sewerage is pumped via a 3 365 m rising main network to the Southern WWTW.

(v) Internal sewer pipe sizing

Based on the demands calculated for each stand in the development area, the stipulated minimum slope and the pipe type, a 160mm nominal diameter pipe has been deemed adequate for the transportation of sewerage from the various areas to the respective sewer lifting stations. Refer to Figure 3-14 of Appendix 6.2 for the sewer internal reticulation layout. Refer to Drawing No P14093-PD-02-SR-001 of Appendix 6.2 for the illustration of the reticulation and sewer lifting stations.

(vi) Bulk Sewerage Drainage – Outfall Sewer

The closest available facility to discharge the sewerage effluent from the proposed Support Precinct 2 is the Southern WWTW located west of the proposed development.

Owing to the topography of the area, the sewerage effluent has to be pumped to the Southern WWTW. This is to be achieved by directing all gravity sewer flow to lifting stations located in the low lying areas of the development. Refer to Figure 3-15 and Drawing No. P14093-PD-02-SR-002 of Appendix 6.2 for the proposed rising main layout.

Based on the peak inflows, the rising main network will comprise 110 mm and 200 mm HDPE class 12 pipes.

e) Stormwater Management

The proposed Support Precinct 2 development area is located in the Tongaati River catchment, which consists mainly of wetland systems that drain into the Hlawe River which in turn, drains into the Tongaati River.

(iii) Background

The designated catchment areas and the run-off were determined separately for each catchment area which was identified and is presented in Figure 3-9 of the Services Report in Appendix 6.2.

Stormwater run-off from catchment areas 3, 6 and 8 have been proposed to drain into designated attenuation ponds, and the stormwater run-off from Catchment Areas 1, 2, 4, 5, 7, 9 and 10 will drain directly into the veld. Thus the individual stands will act as open field attenuation areas before the runoff gets into the veld.

(iv) Retention Facilities

Three attenuation ponds are to be designed to attenuate flows from the new development, as presented in Figure 3-10 of the Services Report in Appendix 6.2.

The 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 pre-development run-off, using the 1:50 year flood run-off volumes.

(v) Internal Stormwater Drainage

The stormwater control philosophy will be to restrict post-development flows into the HIawe 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.

A-1.3.4 Details of the Construction Phase

Subject to receiving Environmental Authorisation (EA) from the DEA, the construction of Support Precinct 2 development will commence in beginning of 2017. 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 eThekwini Municipality and rainwater harvested from the Support Precinct 1 and 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 bunded 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-1.3.5 Bulk Earthworks

The current topography of the proposed site is very uneven and due to this, cut and fill operations will need to take place. The proposed earthwork quantities will be substantial and are critical to the final placement of the relevant services. There are already services in place in the area where earthworks are planned and care should be taken to protect or relocate these services.

The design criteria for the bulk earthworks listed below was utilised in the design of the platforms:

- Fill side slopes = 1:2
- Cut side slopes = 1:2
- Fill material density = 93% of Modified AASHTO density in layers not more than 200 mm in thickness.

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 provided slope of the platforms will contribute to the management and channelling of stormwater flow to a specified attenuation area so as not to disturb the environment.

a) 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 available for fill 142 824 m^3
- Total fill of 252 793 m^3
- Fill shortfall volume 109 968 m^3
- Top soiling volume of 29 153 m^3

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

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 29 April 2013. The project was subsequently registered and DEA issued the project with reference number DEA Ref: 14/12/16/3/3/2/549. Refer to Appendix 4.1 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 22 April 2014 and was accepted by the DEA in a letter dated 5 June 2014 (*refer to Appendix 4.3 for the acceptance and approval 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 Government Notice (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 Support Precinct 2 development, 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	9	The construction of facilities or-infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water: i. with an internal diameter of 0,36 meters or more; or ii. with a peak throughput of 120 litres per second or more, excluding where: a. such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or where such construction will occur within urban areas but further than 32meters from a watercourse, measured from the edge of the watercourse.	As part of the proposed development, supporting infrastructure for the bulk transportation of water, stormwater and/or sewage will be required.
	11	The construction of: (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (vii) marinas; (viii) jetties exceeding 50 square metres in size; (ix) slipways exceeding 50 square metres in size; (x) buildings exceeding 50 square metres in size; or (xi) infrastructure or structures covering 50 square metres or more 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.	The site proposed for development has watercourses running through it and the proposed land uses and service infrastructure occurs within the watercourse or 32m from the edge of the watercourse.
	13	**The construction of facilities or infrastructure for the storage**, or for **the storage and handling, of a dangerous good**, where such storage occurs in containers with a combined **capacity of 80** but not exceeding 500 cubic metres.	The proposed petrol filling station is proposed as part of Support Precinct 2.

	18	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 (i) a watercourse; (ii) the sea; (iii) the seashore; (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 but excluding where such infilling, depositing, dredging, excavation, removal or moving (a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (i) occurs behind the development setback line.	An internal road through the development site to connect the two development nodes occurs through a wetland on site.
	22	**The construction of a road, outside urban areas,** **i. with a reserve wider than 13.5 meters; or** ii. where no reserve exists where the road is wider than 8 meters, or iii. for which an environmental authorization was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	A proposed diamond interchange off M65/Mdloti Street will provide access to the site.
GN No. 546 of 18 June 2010	6	**The construction of resorts, lodges or other tourism accommodation facilities that sleep 15 people or more.** **(a)** In KZN (ii) outside urban areas in areas on the watercourse side of the development setback line or within 100m from the edge of a watercourse where no setback lien has been determined.	A boutique hotel is proposed to be constructed.
	19	**The widening of a road by more than 4 meters or the lengthening of a road by more than 1 kilometer.** **(**a) In KZN, outside urban areas in, (ii) areas on the watercourse side of the development setback line or within 100m from the edge of a watercourse where no such setback line has been determined.	Roads will be constructed to provide access to the proposed site. The site for development occurs 100m from the edge of a watercourse.
GN No. 545 of 18 June 2010	15	**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**; 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 development footprint for the proposed 'Support Precinct 2' is approximately 28 hectares (ha) in extent, including access and internal roads. It is anticipated that the proposed development will consist of a Mixed Use development including Business Parks, Hotels, Petrol Filling Station and open space. Additional infrastructure will include support facilities and roads, parking areas and gate houses.

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 is 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.

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

(c) impeding or diverting the flow of water in a watercourse;
(i) altering the bed, banks, course or characteristics of a watercourse.

Accordingly, a Water Use Licence Application (WULA) must be lodged with the Department of Water and Sanitation (DWS) for the proposed Support Precinct 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. As such, cognisance of the requirements of the Act needs to be taken with the development of the waste management and disposal plan.

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.

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 to 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 0f 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 a catalyst for economic development and labour-intensive growth throughout the province.

The Dube TradePort has been recognised in the PGDS as an air logistics platform to promote access to global trade and tourist nodes. This opens the way for attracting increasing numbers of foreign tourists to fly directly to the Province using the King Shaka International Airport, but more importantly, it opens up new opportunities for the production and export of high-value perishable products and manufactured goods. The PGDS regards the Dube TradePort area as a Special Investment Area. The PGDS states that, 'the massive infrastructure investments in the Dube TradePort Aerotropolis will need to be optimised to fulfil its logistics promise'.

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 eThekwini and Umhlatuze. 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 eThekwini – 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) eThekwini Municipality Integrated Development Plan (IDP)

eThekwini 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).

Some of the key spatial planning issues that are contained within the IDP document and are applicable to Dube TradePort are as follows,

- A need for strategic economic growth and investment;
- A need to protect key environmental assets and services; and
- A need to manage development growth.

b) eThekwini Spatial Development Framework (SDF: 2012/13)

The eThekwini Municipality's SDF is a critical and integral component of the IDP. It is a strategic framework that shows how the implementation of the IDP should occur in space and guides the overall spatial distribution of current and desirable land uses within a municipality in order to give effect to the vision, goals and objectives of the municipal IDP. The eThekwini IDP recognises the Port of Durban, Dube TradePort and Cato Ridge as economic investment areas which require major investment for some of the key strategic focus areas of the municipality SDF.

c) Draft Northern Spatial Development Plan (NSDP)

According to the eThekwini Municipality's Draft Northern Spatial Development Plan (NSDP), dated June 2009, Tongaat and KSIA/Dube TradePort 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:

(i) Dube TradePort (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.

(ii) 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.

(iii) Opportunity Areas

The establishment of the KSIA/Dube TradePort 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
- **Tongaat Town**
  Consolidate manufacturing and services
- **Tongaat North/uShukela Highway**
  New logistics and business park

Table 4: Tongaat and Dube TradePort Local Area (Urban)

Role in the Metro	• International/national logistics infrastructure and support precinct • National, provincial and local Gateway • Industrial Expansion Zone • Specialised and Intensive Agriculture • Mixed density and mixed income residential expansion (Tongaat) • Conservation of environmental assets • Consolidation, protection and enhancement of the environment resource assets base located in the mid reaches of the Tongati catchment • Consolidation of agricultural and rural hinterland in support of UDL management, protection of rural lifestyles • Hinterland water based metropolitan level recreation related to environmental assets and the Dudley Pringle Dam
Development Spines and Nodes	• Establish R102 Metropolitan Development Corridor between Verulam Town Centre and Tongaat • Establish KSIA/DTP as primary logistics installation and intermodal transportation node • Consolidate and enhance Tongaat Town centre as sub metropolitan service node and public transportation terminal • Establish new services and industrial/logistics node at Inyaninga as support to R102 metropolitan development corridor and DTP logistics park

Movement System	• N2, R102 and M4 provide regional access and linkage system • Bypass systems east or west to Tongaat Town Centre to be established in accordance with demands on the R102 road network system; • Establish R102 interchange and access via N2/Dube TradePort link road; • New spine between M41 and M27/Dube TradePort to facilitate movement and alleviate congestion on M4
Land Use and Density	• Consolidate existing formal settlements through renewal and densification along the metropolitan spine (R102) • Establish new mixed density residential areas in undeveloped zones • Upgrade informal settlements • Establish new mixed use high density housing developments along the R102 development spine (minimum 50du -70du/ha) subject to noise constraints • Establish new industrial opportunity areas at Inyaninga, North-west of Dube TradePort, on northern boundary at Frasers • Protect and enhance sustainability of high yielding agricultural areas through promotion of intensive agriculture
Open Space/Environment	• Consolidate and protect environmental assets surrounding the Dube TradePort • Protect, manage and enhance open space and riverine systems within urban settlements to provide ecological services delivery and “break” in continuous urban settlement • Protect, conserve and enhance open space asset footprint contained in the uMdloti and Tongati catchments • Establish local recreational opportunities associated with the open space asset base and Dudley Pringle Dam
Service Levels	• Upgrade and/or consolidate capacity of waterborne sanitation to accommodate proposed increased densities • Proposed expansion of residential and industrial areas • Investigate electricity capacity with respect to proposed increase in density, expansion of residential and industrial areas and development of agricultural areas • Investigate water supply capacity with respect to proposed increase in density, expansion of residential and industrial areas and development of agricultural areas • Investigate capacity of telecommunication capacity with respect to increase in density and proposed expansion of urban areas • Investigate capacity of water supply, electricity and telecommunications commensurate with proposed agricultural and industrial development

d) Tongaat-DTP Local Area Plans: North Urban Development Corridor

(i) 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 eThekwini 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.

(ii) 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.

The NUDC 'expansion' strategy recommends the consolidation of the new airport and tradeport installations into a world class "Aerotropolis" through the identification of land for logistics, industrial and business development which will form a major new development node in the northern sub-metropolitan area of the municipality. This will reinforce 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.

e) Durban Metropolitan Open Space System (DMOSS)

The proposed development site occurs adjacent to the conservation areas as per the previous EIA for the KSIA/DTP and D'MOSS. The development footprint of the site for the proposed Support Precinct 2 development does not occur within the conservation areas. This development node was identified during the EIA for the entire King Shaka International Airport (KSIA) and as such, is being proposed for development by the applicant (Dube TradePort Corporation). Refer to Figure 1: Locality Map for an illustration of the development site in relation to the original delineated conservation areas.

D'MOSS is a system of open spaces, some 74 000 ha of land and water, that incorporates areas of high biodiversity value linked together in a viable network of open spaces. D'MOSS is mapped by the Biodiversity Planning Branch of the Environmental Planning and Climate Protection Department (EPCPD) in consultation with relevant experts. D'MOSS thus provides a unique opportunity to conserve many of South Africa's threatened ecosystems. If protected and managed, D'MOSS will assist the province and the country in meeting biodiversity conservation targets.

Apart from contributing to the attainment of provincial and national biodiversity conservation targets, D'MOSS provides a range of ecosystem goods and services to all residents of Durban, including the formation of soil, erosion control, water supply and regulation, climate regulation, cultural and recreational opportunities, raw materials for craft and building, food production, pollination, nutrient cycling and waste treatment.

Increased flood events can be moderated by ensuring that wetlands and floodplains are protected and where necessary rehabilitated. Predicted increased temperatures can also be alleviated by D'MOSS as vegetated areas help to reduce temperatures.

f) Aerotropolis Plan (2013)

Of key significance is a plan prepared by Iyer Urban Design Studio, March 2013 for Tongaat Hulett Developments and Dube TradePort. The Aerotropolis Plan illustrates the potential development around the Dube TradePort and the northern corridor. A significant portion of land has been identified for Mixed use/ Office and Business Park types of uses with Industrial and logistic uses proposed around the KSIA. The plan reflects the significant impact the Dube TradePort has on the future development in the north. This long term visionary plan demonstrates Dube TradePort's catalytic role in stimulating local economic activity and development opportunity in the north. The major role-players. i.e. Tongaat Hulett Developments, eThekwini Municipality and Dube TradePort have all invested interests in ensuring that this occurs within a mutually agreed development framework.

A-3 DETAILS OF THE APPLICANT

The details of the project applicant are:

Name of Applicant	Postal Address	Relevant Numbers
La Mercy Joint Venture (Pty) Ltd Contact Person: Mr Hamish Erskine	P.O Box 57757 King Shaka Airport 4407	Tel: (032) 841 0000 Fax: (032) 814 0100

A-4 NEED AND DESIRABILITY OF THE PROJECT

The DTP incorporating the KSIA not only provides for an increased number of passengers and direct international flights, but also as, 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. The proposed development will significantly contribute to this existing platform that has been created, by attracting investment that will support the Dube TradePort, as well as the broader region.

The proposal is to develop, in support of the KSIA, business parks, offices and retail opportunities within Support Precinct 2, in line with the 'airport City' concept. An opportunity also exists for companies dependent on air travel to maximise business efficiency through close proximity to air connectivity. This, in turn will also support the airport as well as future air route development, allowing for the economic growth and benefits to the wider region as a result.

The importance of the Dube TradePort (DTP) project as a potential major contributor to the local and provincial economy has been stressed through both the provincial growth and development plan, as well as eThekwini Integrated Development Plan (IDP). Indeed, the project is highlighted in the City's IDP as a node for further investment. The DTP precinct is also governed by a development framework plan indicating how the precinct will develop over time, and this development proposal is entirely in line with this plan.

The wider region is also likely to benefit from increased job opportunities, economic activity, and consumer choice (with respect to retail development).

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.

Support Precinct 2 will cater for a different offering and targets a more eco-office development within a natural setting. The type of uses envisaged are similar to the La Lucia Ridge Office Park Estate, which targets more corporate offices, and has a small component of retail, i.e. The Square and generally is a low scale/density development and not high rise. In this way, it can naturally blend in with the surrounding context and not be visually obtrusive. The Hotel use should be targeted at a more Boutique type of Hotel, catering for business people who would like the convenience of being located close to their business and the airport.

Support Precinct 2 will house the facilities that are associated with an airport without having a direct relationship or dependency to the processing of cargo, or passenger aircrafts. Support Precinct 2 is a commercial orientated real estate development. Typical facilities that will be accommodated are as follows:

- Hotel;
- Retail Facilities;
- Petrol Filling Station; and
- Office Parks

Support Precinct 2 has been divided into six (6) precincts, namely Support Precincts. The study area lies within Support Precinct 2, which is situated to the southeast of the Airport Precinct and to the south of the N2 Interchange Access Road. The Precinct will comprise an international and regional business precinct that requires good access to the passenger terminal and accessibility from the airport access road linking from the N2 Interchange. The Master Plan document indicates that Support Precinct 2 must be developed into a business precinct that will contain primarily office parks with a small commercial and support service node including hotels that will be focused around a mixed use node and associated public environment.

The Aerotropolis will serve as a new hub of international trade and business. The intention is to develop logistic, industrial, Business aviation and support uses within proximity to the KSIA. There is a strong demand for brand consciousness and quality of environment in contemporary business park and logistics developments in proximity to the airport. Dube City is likely to become the Airport City around which support uses and activities are located.

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[3] development plans.

[3] 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).
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).

SECTION B:THE RECEIVING ENVIRONMENT

In order to, with any level of confidence, assess the potential impacts of the proposed development on the receiving environment, one need 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

Moore Spence Jones (Pty) Ltd conducted the Geotechnical Assessment of the site (refer to Appendix 6.3). The following findings are extracted from the Geotechnical Assessment:

a) Geology and Sub-soil Conditions

Published geological maps at a scale of 1:250 000, sheet 2930 Durban indicate the site to be underlain by a mantle of colluvial and residual soils that grade into weathered sandstone with subordinate shale of the Vryheid Formation, Ecca Group. These sediments have been intruded by Karoo dolerite. The results of the field investigation indicate that the majority of the site is underlain by sandstone bedrock, with subordinate shales in the central portion of the site and a dolerite intrusion in the north western corner of the site. The inferred geology of the site is shown in Appendix 1 of the Geotechnical Report. Geologically, the site for the proposed development is underlain by a mantle of transported and residual soils overlying weathered sandstone and shale bedrock of the Vryheid Formation, Ecca Group. These sediments have been intruded by Karoo dolerites.

b) Transported Materials

The transported or colluvial soils occur from the ground surface down to depths of between 0.20 and 1.25 metres below existing ground level. This layer comprises dry to slightly moist dark brown to dark greyish brown loose to medium dense or firm to stiff clayey sand to silty and sandy clay.

c) Residual Sandstone Soils

The residual soils developed from the complete in situ weathering of sandstone bedrock comprise slightly moist dark brown to dark greyish brown mottled orange brown medium dense to dense sandy clayey gravel with gravel components comprising ferruginised nodules. Residual soils occur down to depths between 0.66 and greater than 3.8 metres, to an average depth of 2.0 metres, below existing ground level. Sandstone bedrock was not exposed in any of the inspection pits as abrupt refusal occurred on the surface of the bedrock.

d) Residual Shale Soils

The residual soils developed from the complete in situ weathering of shale bedrock comprise slightly moist to moist dark orange brown to light yellowish brown mottled orange brown and grey firm to stiff sandy clayey frequently containing gravel and boulders of weathered shale bedrock. Residual soils extend down to depths of between about 0.80 and greater than 3.4 metres, to an average depth of about 1.70 metres, below existing ground level. The shale bedrock comprises dark greyish brown to light brown and orange brown mottled black completely to moderately weathered laminated and closely to medium jointed very soft to soft rock strength improving with depth.

e) Residual Dolerite Soils

The residual soils developed from the complete in situ weathering of dolerite bedrock comprise slightly moist to moist red to orange brown streaked red stiff/dense sandy clay to clayey sand. The residual dolerite extends

down to depths in excess of 3.5 metres below existing ground level. No dolerite bedrock was exposed during the investigation due to the thickness of residual soils, but it must be accepted that medium to large boulders could be present in the dolerite formation.

f) Soil Consistency

The results of the DPL tests indicate that the sandy soils are generally very loose to depths of between 1.2 and 2.7 metres below existing ground level, becoming medium dense to depths of between 2.7 and 5.7 metres. Below these depths the sandy soils are dense. Where clayey soils are present, they are generally soft to depths of between 0.6 and 2.7 metres below existing ground level, becoming firm to depths of between 2.7 and 3.9 metres. Below these depths the clayey soils are stiff.

g) Discontinuities and Slope Stability

The general regional dip of the Ecca Group sediments is between 5 and 15 degrees, usually in a seaward direction - an easterly to south-easterly direction. However, the presence of dolerite intrusions in the general area tends to alter the local dip of these sediments resulting in a wide range of dip angles and directions.

The strength of the rock mass is decreased by the presence of bedding planes and other discontinuities in the form of joints. These discontinuities provide a path for groundwater resulting in increased weathering along bedding planes and joints; this is confirmed by ferruginised nodules occurring in the joints of the bedrock.

Thus the sediments of the Ecca Group are susceptible to slope instability in cut banks where the bedding daylights in the bank and the rock is closely jointed. The presence of dolerite intrusions may also have a marked effect on slope stability. The dolerite intruding the shale is often deeply weathered and a good aquifer. Seepage is often associated with the weathered dolerite particularly along the lower contact. The stability of shale slopes is reduced by contact metamorphism and shattering of the shale adjacent to the intrusion, by opening pathways for seepage and weathering.

h) Groundwater

Groundwater seepage was encountered in seven of the inspection pits excavated during the investigation. Seepage occurred at depths of between 1.55 metres and 4.23 metres below existing ground level. Seepage was generally observed in areas underlain by shale bedrock, immediately above the soil/rock interface, but seepage was also encountered where the bedrock is dolerite and sandstone. During periods of prolonged rainfall, particularly during the summer season, a marked increase in the occurrence and magnitude of groundwater seepage flow can be anticipated. Perched groundwater flows above the soil bedrock interface are likely to become more prolific in the rainy months. Thus, any platform or road cuttings that are taken below this horizon are likely to experience groundwater seepage problems during the wet season.

i) General Stability of the Site

No areas of potential natural ground instability, comprising slip scars, tension cracks or hummocky land forms with associated seepage zones were noted during the course of the geotechnical investigation. However, the sediments of the Ecca Group are susceptible to slope instability in cut banks where the bedding daylights in the bank and the rock is closely jointed. This may occur on easterly to south easterly facing slopes.

The presence of dolerite intrusions may also have a marked effect on slope stability. The dolerite intruding the shale is deeply weathered and a good aquifer. Seepage is often associated with the weathered dolerite particularly along the lower contact. The stability of shale slopes is reduced by contact metamorphism and shattering of the shale adjacent to the intrusion, by opening pathways for seepage and weathering. It is concluded therefore that the site is stable in its natural state and suitable for the intended development provided that cognisance is taken of the dip of the shale bedrock and the recommendations by the Geotechnical Engineer.

j) Conclusion

Based on the geotechnical investigation, there does not appear to be insurmountable geotechnical obstacles that would render the site flawed, and not suited to the type of development intended.

It is considered that conditions prevailing at the site are generally favourable for the proposed development, provided the guidelines and recommendations given in the Geotechnical Report are adhered to. The recommendations with regard to earthworks, drainage, subgrade treatment beneath roads, paved and parking areas, foundations and lateral support are included in the Environmental Management Programme (EMPr) in Appendix 7.

B-1.2 Geohydrological Assessment

A Geohydrological Assessment was undertaken by Geohydrological and Spatial Solutions International (Pty) Ltd (GEOSS). Refer to Appendix 6.4.

According to the 1:500 000 scale groundwater map of Durban (2928) the area does host an intergranular and fractured aquifer (*i.e. the bedrock constitutes an aquifer*) with an average borehole yield of 0.1 ℓ/s to 0.5 ℓ/s. This aquifer has 'marginal' groundwater quality, as indicated by electrical conductivity, in the range of 150 – 370 mS/m. The groundwater, which may possibly exist beneath Support Precinct 2, has a 'very low' vulnerability to surface based contamination.

No existing Department of Water and Sanitation (DWS) boreholes exist within 1 km of Support Precinct 2. There are no DTPC boreholes within Support Precinct 2; however there are two boreholes (D6 and S11) within a 1 km radius of Support Precinct 2. The drill logs of these two boreholes indicate that, up to at least 12 m, the geology comprises of shale. This is a very impermeable rock type. Neither of these two boreholes could be sampled. Previous analysis of water from the boreholes showed no signs of contamination at all. No groundwater use occurs within the study area.

There are stream lines and drainage channels on Support Precinct 2. Four surface water samples were collected and submitted for full SANS241:2011 analysis. The salinity level of the flowing water was slightly elevated, however the salinity level of the two samples from standing water had significantly higher salinity levels.

The Geohydrologist recommends, from a groundwater perspective, that the planned future development can proceed. It is possible that shallow groundwater does contribute to the base flow of the stream flows. The quantities have not been confirmed. The stream lines and riparian zones are intact (*although the landscape has been significantly modified for sugar cane farming*) and for this reason future development plans need to ensure the streams and riparian zones remain intact. It is also suggested that the riparian zones be widened just to ensure that if there is a groundwater contribution to river base flow, that this contribution is impacted as little as possible.

Should the proposed petrol filling station be approved, a groundwater monitoring network needs to be installed and a groundwater monitoring protocol put in place.

B-1.3 Soils and Agricultural Potential

Jeffares and Green Engineering and Environmental Consulting was appointed to conduct the Agricultural Potential Assessment for the development site (refer to the Agricultural Assessment in Appendix 6.5). The assessment was done to establish the viability of adopting the site for agricultural use as an alternative to the proposed development.

The following information is extracted from the Agricultural Potential Assessment:

The site for Support Precinct 2 falls within BioResource Unit (BRU) Ya14. This Ya14 BRU is found in BioResource Group 1 (BRG subgroup 1.3) which is defined as 'Moist Coastal Forest, Thorn and Palm Veld'. The vegetation consists of bushed grassland and bushland thicket. Indicator species are *Syzygium cordatum* (Water Berry) and *Strelitzia nicolae* (Natal Wild Banana). The soils are predominantly Katspruit, Milkwood and Mispah soil forms. These have poor soil water characteristics and a moderate to low potential in good seasons. Good seasons include well distributed rainfall and sufficient incoming solar radiation.

The agricultural potential of this property has been assessed and, only if management and irrigation were installed, could it be deemed to have moderate to good potential. If improvements were not made, under current production costs for both irrigated and dryland production costs and sugarcane prices, losses could be incurred. As there has been no production in this area for the past few years, yields from the adjoining properties owned by Tongaat Hulett were used. Over the last eight years, the yields there have on average been between 48.6 to 61.0 t/ha/annum. This property was previously owned and farmed by Tongaat Hulett. Yields simulated by Canesim tend toward 70 t/ha/annum, thus verifying the fact that yields over most of the past eight years have been below this simulated yield.

The soils on the Estate are predominantly Mispah and Milkwood and to a lesser extent Clovelly, Hutton, Katspruit and Tukulu. In general, the site is considered to have shallow soils, with numerous outcrops of rock and not suitable for cultivation. This tends to lower yields on this site when compared to adjoining lands.

Land capability on these properties varies between Class III, IV and VI due to the limitations that exist, and, with respect to agricultural land categories, these properties fall within Category D (Ref KZN Agricultural Report N/A/2012/11; Determination of Land Capability Classification Booklet No. 528). The road infrastructure to, and from the site is good. The in-field road network is very good. The site is close to local and export markets, the Dube TradePort and to the KSIA.

An intensive soil survey was undertaken during which soils were classified to form and family level according to the reference, "Soil Classification - A Taxonomic System for South Africa" (MacVicar et al., 1991). In addition, soil properties that form an integral part of determining the land capability (Smith, 2006) and suitability (Camp, 1995) were also noted and quantified during the soil assessment. Furthermore, laboratory analyses were performed on soil samples from selected points within the proposed development site in order to determine soil fertility, salinity, sodicity and texture characteristics.

An assessment of the development site's soil, land and climate properties indicated that several limitations exist that will inhibit the cultivation of annual irrigated crops and, consequently, impede the agricultural and financial viability of such a venture. The site was therefore deemed unsuitable for the cultivation of annual irrigated crops. Common limitations that were observed on site are inadequate effective soil depth and excessive surface slope. An assessment of more resilient alternatives such as perennial pastures, sugarcane and timber was also undertaken. The results indicated that due to the inherent limitations present on site, less than 25 % of the total site area was suitable for the cultivation of perennial pastures, sugarcane and timber.

The fertility results indicated that there are no major limitations regarding the chemical content of the study site soils and that fertility status could be corrected, if the land is adopted for agricultural use. The salinity and sodicity status of the soil is not limiting as the Sodium Adsorption Ratio (SAR) and Exchangeable Sodium Percentage (ESP) values of the soils were below their respective thresholds. However, as previously mentioned, there are factors present on site that create unsuitable conditions for extensive agriculture.

Having considered the cropping and land use options on the site, together with the inherent limitations (*i.e. poor soil and land properties and moderate to poor crop yields*), including the need for development in the

growth corridor that has been identified by the Province and the eThekwini Municipality, the development of this zone for a Support Facility of the Dube TradePort will:

- Fulfil the planned expansion of the Northern Node of the eThekwini Municipality;
- Provide infill development in this node;
- Comply with Provincial and Municipal strategic planning;
- Comply with local planning;
- Make effective and efficient use of existing infrastructure and resources; and
- Create positive employment and socio-economic benefits.

DAFF recognise the need for development in growth corridors and would like to ensure that it is appropriately managed. Together with the LMJV, they are working toward understanding the agricultural potential in the western and northern corridors, especially next to the international airport. Finally, removing this zone from extensive agricultural production will have no impact on food security in the region and, with the introduction of the already constructed (AgriZone 1) and future (AgriZone 2) growth houses and intensive agricultural production, significantly improve such (Jeffares and Green, 2014).

B-1.4 Topography and Hydrology

B-1.4.1 Topography

An undulating topography characterizes the site, moderate to gentle, weakly drained low-lying plains within wetlands define substantial portions of the site.

B-1.4.2 Hydrology

a) Floodline Determination Assessment

SRK Consulting (SA) (Pty) Ltd (SRK) was appointed by the La Mercy JV Property Investments (Pty) LTD (LMJV) to determine the demarcation of the 1:50 and 1:100 year floodlines for watercourses within Support Precinct 2 of the Dube TradePort Development. Refer to the Floodline Assessment in Appendix 6.6.

The Floodline Determination Report presents results from the hydrology and hydraulic assessment in determining the 1:50 and 1:100 year floodlines for Support Precinct 2.

The findings of the Floodline Determination Assessment are as follows:

The site is traversed by various streams which drain into three tributaries of the uMdloti River. The tributaries drain in a southerly direction feeding into the uMdloti River at a confluence approximately 2.3km downstream from the site. The site is currently undeveloped (grassland vegetation) with minor informal roads crossing the site. There are currently no structures which cross the watercourses.

The layout of the proposed development, as supplied by LMJV, is such that none of the proposed roadways will cross the existing watercourses.

The estimated flood levels and hydraulic characteristics at the cross sections modelled across the watercourses are included in Appendix C of Appendix 6.6. It should be noted that the hydraulically calculated flood levels take preference over the mapped flood lines due to limited information between the cross sections.

The flood lines are delineated on Drawing 469202/001 in Appendix E of Appendix 6 for proposed site conditions and a detailed output from the floodline analysis (HECRAS) can be found in Appendix C of Appendix 6.6.

No flooding of the proposed cadastral layout was estimated for the 1:10, 1:50 and 1:100 year flood levels.

b) Flood Risk and Hazard Rating

The flood hazard is based on an expected flow depth and flow velocity (values based on 1:100 year annual probability of exceedance). The approach followed at this stage is therefore a probabilistic risk assessment using quantitative values based on 10^{-2} annual probability of exceedance for the flood hazard assessment.

The flood hazard is rated in terms of a high, medium and low category based on Figure 5 below. This information is abstracted from the HECRAS model giving an indication of a flow velocity and flow depth at a point of interest, based on the existing topography. From this information the expected hazard can now be categorised as given below. The three categories are classified as follows:

- Low hazard (LH): mainly inconvenience, no damage to infrastructure and low safety risk;
- Medium hazard (MH): possible damage to infrastructure and high safety risk;
- High hazard (HH): significant damage to infrastructure and high safety risk.

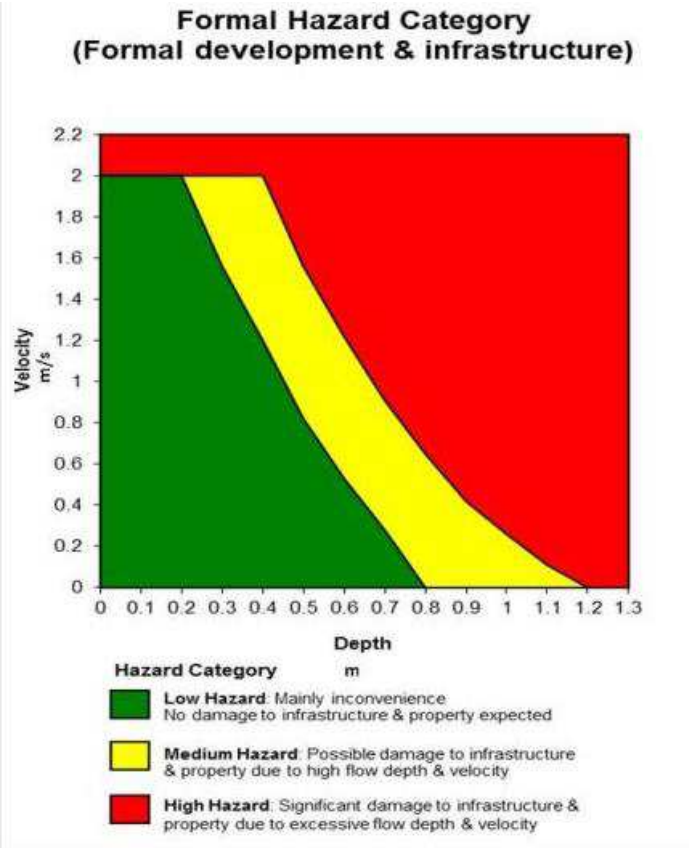


Figure 4: Flood Hazard Assessment

c) Recommendations

A flood risk and hazard rating was carried out on the study area. A summary of the ratings can be seen in Figure D-1 in Appendix D of Appendix 6.6: Floodline Determination Report.

The following is to be considered with regards to the floodlines for the properties:

- The 1:50 and 1:100 year flood levels as shown in Appendix C, and the floodlines indicated on Drawing 469202/001 in Appendix E of Appendix 6.6: Floodline Determination Report, are to be adopted;
- The flood hazard rating for the study area can be seen in drawing Figure D-1 in Appendix D of Appendix 6.6: Floodline Determination Report;
- The floodlines and flood levels should be shown on all future relevant drawings, and any drawings

that are required for submission to the Municipality (*flood levels taking preference over floodlines*);

- All embankments which may result from earthworks to create platforms for Support Precinct 2 should fall outside the 1:100 year floodline;
- No mitigation measures are required as the proposed development falls outside the 1:100 year floodlines, however, should embankments be constructed during the development that encroach into the floodlines, protection to these embankments will be required;
- The watercourse must be re-analysed if any changes occur in the geometric configuration of the river or additional infrastructure or/and controls are introduced into the system; and
- All local stormwater systems draining into the river from the development must be adequately designed and the flow from the outlets be dissipated to prevent potential erosion or localised flooding. The Municipality also requires that increases in flooding peaks resulting from development be attenuated to pre development flows before entering the river. This needs to be considered during the design of the development.

The DEA, DWS and other Municipality legal requirements need to be adhered to, i.e. for development within the 1:50 year floodline and the eThekwini Flooding Annexure (Appendix C) of Appendix 6.6 needs to be referred to.

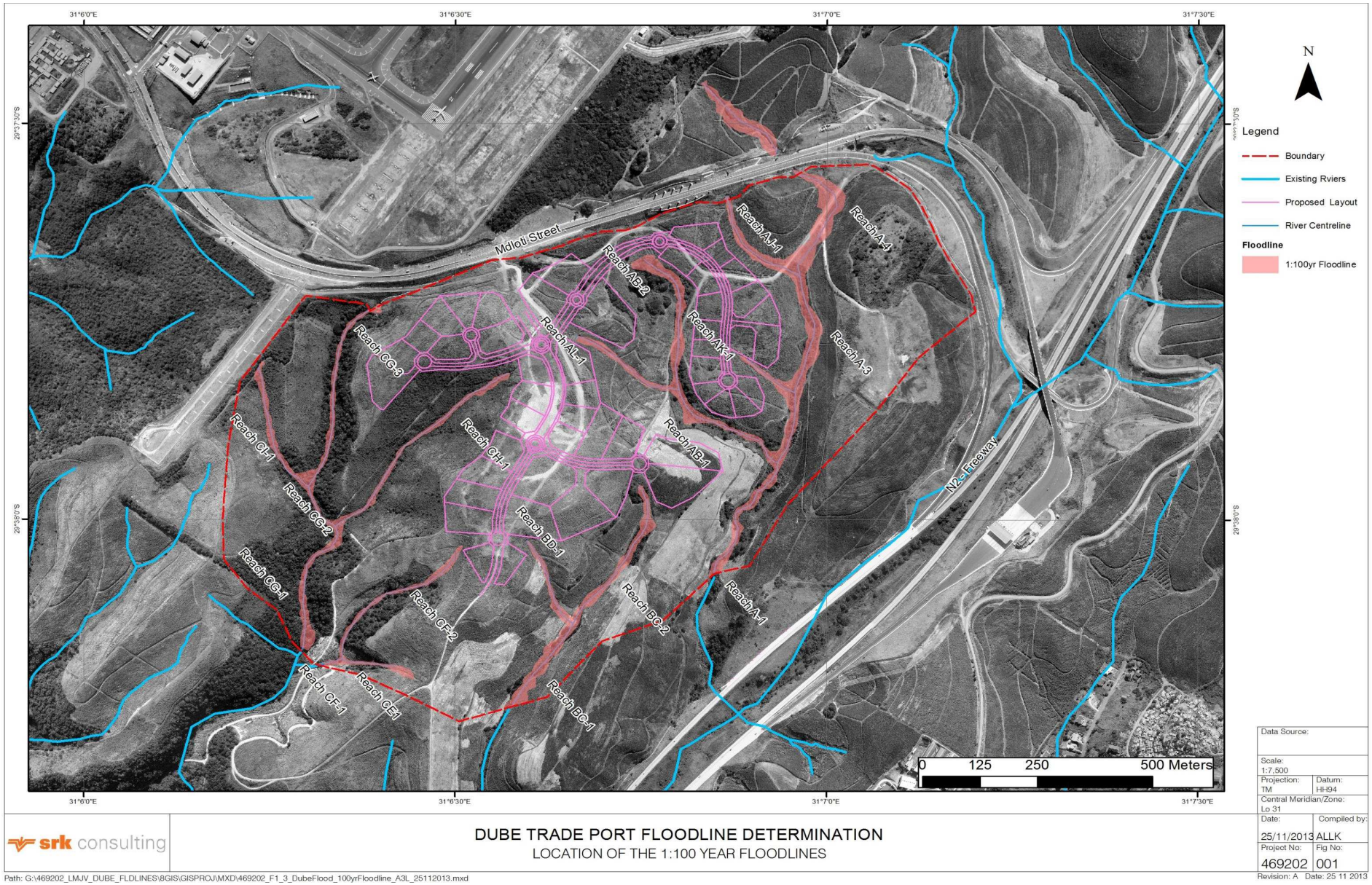


Figure 5: Location of the 1: 100 year floodlines

B-1.5 Wetland Delineation and Functional Assessment

A Wetland Delineation and Functional Assessment was conducted by Natural Scientific Services CC (NSS) in May 2014. Refer to Appendix 6.7. The assessment included a desktop review, field investigation, impact assessment and a description of recommended mitigation measures, including buffer zones.

The study area falls within the U30B Quaternary Catchment of the KwaZulu-Natal Coastal Foreland Hydrogeological Region (DWAF, 2008). The U30B catchment drains in a south-westerly direction towards the uMdloti River to the south of the study area, a perennial system with a mean annual flow of approximately 2m^3/sec (www.ewisa.co.za). The Hazelmere Dam on the uMdloti River provides a major source of water to the uMdloti region (www.umgeni.co.za). The reduced freshwater flow entering the uMdloti Estuary as a result of the Hazelmere Dam has resulted in periods of prolonged mouth closure. As a consequence, the system is characterized by low salinities that have ultimately contributed to the development of a dense stand of *Barringtonia racemosa* ('Freshwater Mangroves') at the mouth of the estuary (Forbes & Demetriades, 2008).

No Freshwater Ecosystem Priority Areas (FEPAs) are recognised within the study area although the systems within the study area feed into the uMdloti River, with the uMdloti Estuary classified as a Level 1 FEPA.

Please note that subsequent to this Wetland Delineation and Functional Assessment, the proposed development layout has been amended to reduce the development footprint and as such the figures within this report do not reflect the latest development layout footprint. Please refer to Figure 14 and Appendix 3.1 for the updated version.

a) Wetland Classification:

Seven inland wetland systems (Figure 7-2 of Appendix 6.7), with three types of Hydro Geomorphic (HGM) Units, were identified within the study area (Ollis et al, 2013);

- Channelled Valley Bottom Systems are a valley-bottom wetland with a river channel running through it;
- Un-Channelled Valley Bottom Systems are characterised by their location on valley floors, an absence of distinct channel banks and the prevalence of diffuse flows;
- Seeps. A wetland area located on gently to steeply sloping land and dominated by colluvial (i.e. gravity driven), unidirectional movement of water and material down-slope. Two types of seeps were identified in the study area:
    - Seep without a channelled outflow: Water exits from the seep without channelled outflow by means of a combination of diffuse surface flow, interflow, evaporation and infiltration; and
    - Seep with a channelled outflow: Water exits from a seep with channelled outflow mostly by means of concentrated surface flow. As per the Wetland Consulting Service's report (WCS, 2011), these seep areas have been referred to as Valleyhead seepage systems. According to the 2011 National Biodiversity Assessment, floodplain wetlands have the highest proportion of critically endangered ecosystem types, followed by valley-head seeps and valley-bottom wetlands (MacFarlane et al, 2014).

All of the wetland systems have been significantly altered due to various human activities, mainly historic sugarcane plantations, and hence the HGM unit assigned, is the current state of the wetland. In some of the cases, wetlands assumed to have been unchannelled valley bottom systems are now channelled systems. A summary of the classification for each major wetland system, assessed by NSS (based on Ollis *et al*, 2013), is presented in Table 5. Cowden and Kotze (2007) undertook a broad assessment of the wetlands at KSIA in 2007, the applicable HGM unit references from this study have also been included in Table 5.

Table 5: Summary of results of the application of Levels 1 to 4 of the Classification System for wetland systems within the Support Precinct 2 study area

HGM Wetland Unit (Cowden and Kotze, 2007)	WETLAND NAME (NSS Study)	LEVEL 1	LEVEL 2		LEVEL 3	LEVEL 4		
		System	DWA Eco Regions	NFEPA Wet Veg	Landscape Unit	4a	4b	4c
HGM 4	System 4a	INLAND	17.02	IOCB Group 2	Valley Floor	Channelled Valley Bottom	N/A	N/A
HGM 4	System 4b	INLAND	17.02	IOCB Group 2	Slope & Valley Floor	Valley Head Seep & Channelled Valley Bottom	Seep with a channelled outflow	N/A
HGM 4	System 4c	INLAND	17.02	IOCB Group 2	Slope	Valley Head Seep	Seep with a channelled outflow	N/A
HGM 5 (R1)	System 5a	INLAND	17.02	IOCB	Valley Floor	Unchannelled & Channelled Valley Bottom	N/A	N/A
HGM 5	System 5b	INLAND	17.02	Group 2	Slope & Valley Floor	Valley Head Seep & Channelled Valley Bottom	Seep with a channeled outflow	N/A
HGM 5 (R2)	System 5c	INLAND	17.02	IOCB	Slope & Valley Floor	Valley Head Seep, Channelled & Unchannelled Valley Bottom	Seep with and without a channelled outflow	N/A
HGM 5	System 5d	INLAND	17.02	Group 2	Slope & Valley Floor	Valley Head Seep, Channelled & Unchannelled Valley Bottom	Seep with a channeled outflow	N/A

The wetland extent, within the Support Precinct 2 site, is approximately 1.52 ha.

b) Present Ecological State (PES)

The PES of the wetlands identified within the study area was assessed using the Level 1 WET-Health tool, as described by Macfarlane et al (2008). The WET-Health tool is designed to assess the health or integrity of a wetland. In assessing the health of the wetlands, the tool uses indicators based on the main wetland drivers: geomorphology, hydrology and vegetation.

The wetlands have been assessed as per the broad HGM Units identified by Cowden and Kotze (2007) and highlighted in Table 5: HGM Unit 4 (*System 4a, 4b and 4c*) and HGM Unit 5 (*System 5a, 5b, 5c and 5d*). The current impacts have been discussed below, per main wetland driver (hydrology, geomorphology and vegetation). The impacts are similar between the various systems, with the historical planting of sugarcane within the wetland and riparian fringes, the intersection of wetland systems by roads and infrastructure, historical excavation and infilling during the construction of the main KSIA and extensive stands of alien and invasive vegetation being the greatest impacts. Table 6 highlight the results of the WET- Health assessment for the wetland systems. The wetlands scored from Moderately Modified to Seriously Modified. HGM Unit 5, is more impacted on in terms of both hydrology and vegetation, with the majority of the site previously cleared for

sugar cane plantations. Although the sugarcane has been removed from these areas, a number of impacts still remain.

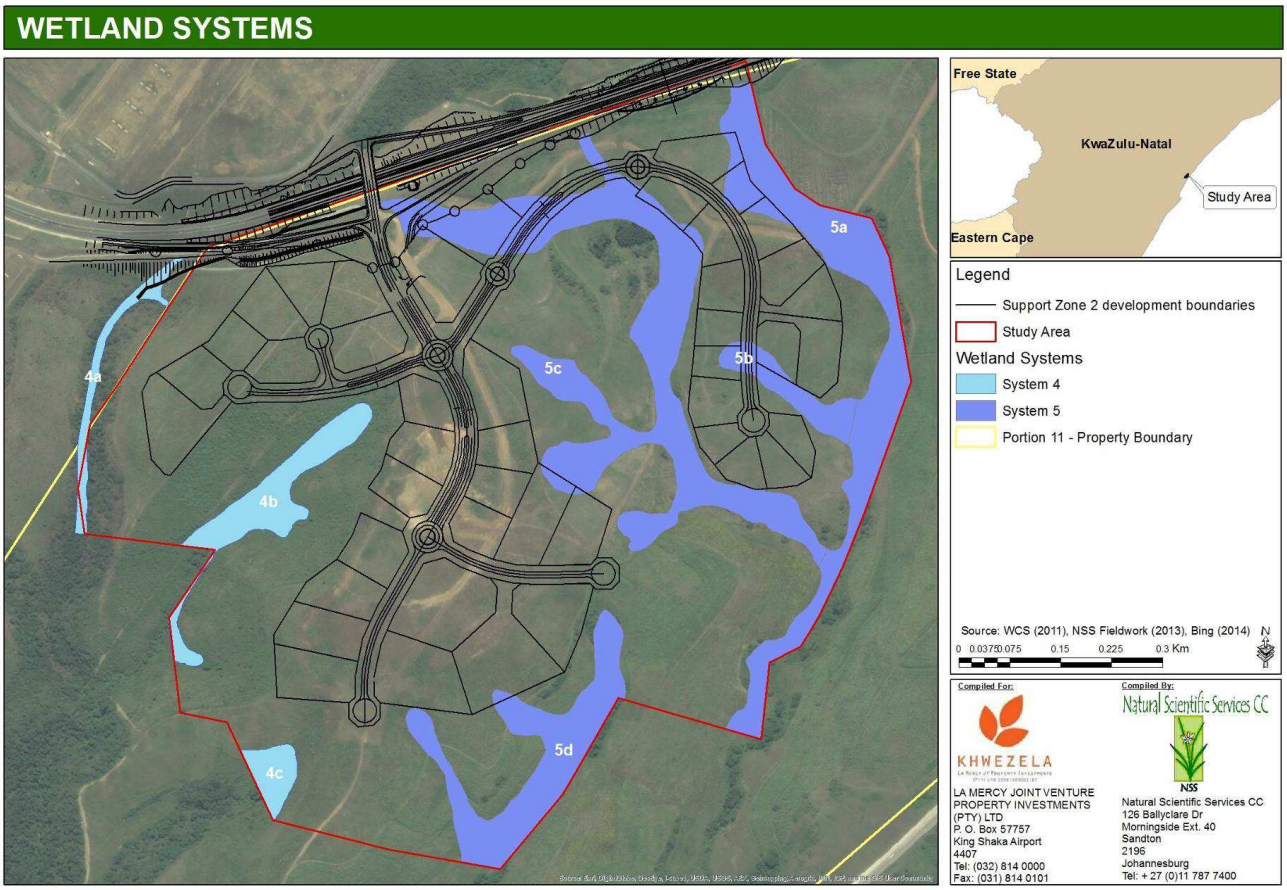


Figure 6: Wetland Systems at Support Precinct 2 Site

Table 6: Summary of the overall health of the wetland systems assessed

Support Precinct 2 Wetlands	Ha	Extent (%)	Hydrology		Geomorphology		Vegetation	
			Impact Score	Change Score	Impact Score	Change Score	Impact Score	Change Score
HGM 4 (System 4a, 4b, 4c)	2	26	3.5 (C)	-1	2 (C)	-1	4 (D)	1
HGM 5 (System 5a, 5b, 5c, 5d)	12	74	6.5 (E)	-2	2 (C)	-2	6.2 (E)	-1

(i) Hydrology

Within the catchments (water inputs and flood patterns), the current hydrological impacts are as follows:

- A reduction in flow due to:
  - ✓ The upstream catchment for HGM Unit 5 is still covered in sugarcane plantations (including the wetlands and riparian fringes). Sugarcane has one of the heaviest water consumption needs of any crop, placing significant pressure on natural water resources.
  - ✓ Reduction in flow due to alien and invasive species, for example Brazilian Red Pepper (*Schinus terebinthifolius*), Guava (*Psidium spp*) and Syringa (*Melia azedarach*), still present in the remaining riparian fringes. Although extensive clearing of alien and invasive vegetation took place in 2012, a large portion of the wetlands are still infested with these species mainly due to re-colonisation.

- An increase in flood peaks due to:
  - ✓ Hardened surfaces, for example the stormwater run-off that has been diverted from the existing KSIA infrastructure into the adjacent wetland systems, for example the run-off from the KSIA platform and M65/Mdloti Street into Systems 4a, 5a and 5c.
  - ✓ The bare areas associated with vegetation still being in a recovery phase.
  - ✓ A subsurface drainage system was historically installed for the KSIA platform area to facilitate rapid drainage from the levelled area, although the adequacy of this system is questionable (Cowden & Kotze, 2007).

In all of the systems there is evidence of an increase in sediment delivery to the system and erosion due to the increased run-off and flood peaks.

- Within HGM Units (water distribution and retention)
  - ✓ The historic sugarcane plantations and areas of alien and invasive vegetation would have resulted in a change in the wetness regime of the wetland. Over time these wetness regimes are expected to recover assuming the removal of the alien and invasive species is successful in the long-term and no further development impacts on the wetland systems.
  - ✓ Herringbone drainage systems and ridge and furrow systems still present in the upstream stretch of Wetland system 5a. The drainage systems intercept the flow of water through the wetland.
  - ✓ Erosion gullies are present within a number of systems, specifically those associated with HGM Unit 4 and at the crest of the systems.
  - ✓ Branches and cut stems have been stacked within the channel of wetland system 5a. This may impede flow during flood events, resulting in channel scouring and soil erosion.
  - ✓ In-stream reservoir, within wetland system 5c, assumed from historical sugarcane activities.
  - ✓ The channels in all of the systems have been modified due to the historic sugarcane plantations. In a number of the systems, the assumed unchannelled nature of the system, in its natural state, has been changed to a channelled system, with a weir type structure towards the lower end of the system. This would have resulted in a reduction in stream length (although only a minor reduction as due to the steep topography the space within the valley bottom is naturally limited). The change from unchannelled to channelled and the deepening of some channels may also result in the lower flows being confined to the channel as opposed to overtopping banks into the wetland and riparian fringe on a more frequent basis.
  - ✓ In most of the systems the sugarcane historically extended into the wetland area, with the riparian vegetation removed or significantly reduced. Although the sugarcane has been removed (2012), and the vegetation is in the process of recovery, there are still large areas with very limited vegetation cover. The impact of this reduced surface roughness is high resulting in a marked decrease in water retention.
  - ✓ Extensive storm water drains and culvert systems changing the water retention and distribution patterns of water in the upstream catchments (from the KSIA and from upstream of M65/Mdloti Street and M65/Mdloti Street itself).
  - ✓ Due to the development of the KSIA and the historic farming practices within Portion 11 and more specifically Support Precinct 2, there have been significant areas impacted by excavation and deposition/infilling, for example:
    - The infilling of the KSIA platform in the 1970's, impacting on the upstream catchments of the systems entering Support Precinct 2;
    - The excavation and infilling of various construction areas for the KSIA;
    - The infilling required for the various farm roads/tracks between the sugarcane fields.

(ii) Geomorphology

The main geomorphic impact was related to the increased runoff due to the bare areas or areas with minimum growth associated with the recovering vegetation, and the stormwater entering the wetland systems from the

adjacent infrastructural developments, for example M65/Mdloti Street and KSIA. Erosion features were also present on the systems downstream of historic excavation activities, specifically at the crest of these systems. Related to the run-off from the bare areas and the discharge of stormwater into the systems there were also extensive amounts of sediment entering the riparian and wetland system.

Due to the fact that the vast majority of the wetlands investigated were transformed due to historic sugarcane plantations and recent restoration activities, the diagnostic component of the geomorphic state of the wetlands was the main component assessed, with the indicator-based component assessed where possible. The diagnostic components affecting the geomorphic integrity include the shortening of streams, infilling and the change in floodpeaks and flows.

(iii) Vegetation

A separate terrestrial biodiversity investigation was undertaken for the proposed Support Precinct 2 Development (NSS, 2014). A summary of the major impacts, associated with the wetland vegetation, has been given below. In terms of wetlands, by far the major impact associated with the vegetation, within all wetland systems, is the historic planting of sugarcane and removal of natural vegetation within the wetlands and riparian zones. In 2012, the sugarcane was removed from the area and a process of rehabilitation undertaken. The dominant species found within the areas cleared of sugarcane included *Sorghum spp*, *Paspalum spp*, *Eragrostis spp* and *Panicum spp*. During the April 2014 field investigation, coverage with these species was relatively good, with some upper catchment areas dominated by *Eustachys cf paspaloides* and *Cynodon dactylon*. The rehabilitation process included, in addition to the removal of the sugarcane, the removal of alien and invasive species. Unfortunately, subsequent to the clearing of alien and invasive vegetation no further maintenance has been undertaken and a number of the species removed have re-colonised the riparian fringes. Due to the rapid growth rate of these species, the ongoing monitoring and continual clearance of these species will be required if the removal is to be successful. A number of weedy species are also present in the areas previously covered by sugarcane, with *Sesbania bispinosa* specifically dominating in the moist areas. Planting of indigenous woody species was evident within some of the riparian fringes. WCS (2011) have included the restoration of the upstream portions of Wetland System 5a and 5c as part of their restoration plan. No further restoration practices have been planned for this area, as it has always been earmarked for future development, however, it is recommended as part of this study that all wetlands are restored in order to ensure the protection of the upstream catchment for the important downstream habitats, such as the uMdloti Estuary, Froggy Pond and Lake Victoria.

The area surrounding Support Precinct 2 will undergo a restoration process due to the area falling within the 'Conservation Area' and the important habitat within the area, for example the remaining Scarp Forest, Froggy Pond and Lake Victoria. This restoration process will include erosion control, reforestation, removal of alien invasive species, re-vegetation of disturbed areas, reintroduction of desired species, as well as habitat and range improvement for targeted species (Environmental Management Specialists, 2010).

The western boundary of the study area includes a portion of Scarp Forest. During a previous assessment and mapping exercise (EMS, 2010), a portion of the forest on shale outcrops (Shale Slope Woodlands) between the southern boundary of the property and Mount Moreland was identified as Scarp Forest (Mucina and Rutherford, 2006). The study undertaken by Environmental Management Systems (EMS, 2010) found that although the forest edges were infiltrated by alien vegetation, beyond this it was species diverse, with some rare or unusual species present.

(iv) Water Quality

Water quality is not one of the aspects assessed in WET-Health, although is briefly mentioned here as it affects the ecological state of the wetland and is important for biodiversity. Although no surface water quality study was undertaken as part of this assessment, a number of potential aspects that could negatively affect the water quality within the systems were identified as follows:

- Although the sugarcane has been removed, the historical use of pesticides and insecticides, for example Vydate, and Herbicides, for example Round-Up, may have had long term effects on the microorganisms within the soil, birds, mammals, amphibians, fish and aquatic invertebrates.
- Oil/Grease from the adjacent roads, specifically Mdloti Street leading to the airport from the N2.

c) Ecosystem services

Due to similarities in the nature of the systems located within the different land types, the wetland functionality was assessed as per the broad HGM Units identified by Cowden and Kotze (2007) and highlighted in Table 7-1: HGM Unit 4 (System 4a, 4b and 4c) and HGM Unit 5 (System 5a, 5b, 5c and 5d). For both broad HGM units the maintenance of biodiversity scored the highest due to the remaining Conservation Important (CI) habitats and species identified. HGM Unit 4 scored higher than the HGM Unit 5 for Maintenance of biodiversity, specifically due to the Scarp Forest on the western boundary of the study area. The systems also scored high in terms of the opportunity to trap sediment, due to the sediment sources in the catchment, with the effectiveness of the wetland scoring an intermediate. In terms of phosphate, nitrate and toxicant removal, the systems once again scored moderately high too high in terms of the opportunity to remove the elements as opposed to the effectiveness to do so (scoring intermediate to moderately high).

d) Ecological Importance and Sensitivity

At a quaternary catchment scale, the U30B catchment has a Moderate Ecological Importance and Sensitivity (EIS), (http://www.dwaf.gov.za/WAR/systems.html). This quaternary is considered to be unique on a provincial or local scale due to biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). The rivers (in terms of biota and habitat) are usually not very sensitive to flow modifications and often have a substantial capacity for use.

At a local scale the EIS was assessed as per the broad HGM Units identified by Cowden and Kotze (2007) and highlighted in Table 7: HGM Unit 4 (System 4a, 4b and 4c) and HGM Unit 5 (System 5a, 5b, 5c, and 5d). Both systems were classified as having a HIGH EIS (Table 7) mainly due to the floral and faunal species identified within the greater systems (particularly downstream of HGM 4) and the important conservation status of the remaining natural patches of habitat (particularly the riparian and scarp forests).

Table 7: Ecological Importance and Sensitivity

DETERMINANT	HGM 4 (System 4a, 4b and 4c)	HGM 5 (System 5a, 5b, 5c and 5d)
PRIMARY DETERMINANTS		
1.Rare & Endangered Species	4	3
2.Populations of Unique Species	4	3
3.Species/taxon Richness	3	2
4.Diversity of Habitat Types or Features	3	3
5.Migration route/breeding and feeding site for wetland species	4	3
6.Sensitivity to Changes in the Natural Hydrological Regime	2	2
7.Sensitivity to Water Quality Changes	2	2
8.Flood Storage, Energy Dissipation & Particulate/Element Removal	2	2
MODIFYING DETERMINANTS 9.Protected Status	3	3
10.Ecological Integrity	1	1

TOTAL	25	24
MEDIAN	2.5	2.4
Overall Ecological Sensitivity and Importance	High	High
Ecological Management Class	**B**	**B**

e) Wetland Conservation Status and Buffers

All wetlands are protected in South Africa and are required by KZN to be marked as sensitive (EKZNW, 2010). In addition to the wetlands, buffers are required on the wetlands and riparian fringes. A minimum of a 30m buffer is required on all wetlands as per EKZNW (2010). The following wetland buffers are applicable:

- Minimum of 30m on all wetlands with shallow slopes and no natural vegetation remaining;
- On wetlands with steep slopes, the catchment of the wetlands, particularly the valley heads must all be marked as buffers.
- A 100m buffer on all remaining forest vegetation units (*including the Shale Slope Woodlands and the small patch remnant of Scarp Forest within southern tip of Portion 11*).
- Twenty meters above the 1:100 year floodline.

B-1.6 Climate

The study area falls within the warm fully humid frost-free climate of the subtropical Indian Ocean Coastal belt isotherm for which temperature and precipitation seasonality is low, held relatively constant by the warm Mozambique current. Due to the site's proximity to the ocean temperatures do not fluctuate drastically with average daily maximum and minimum temperatures of 25 ºC and 17 ºC respectively. The estimated annual evaporation is ≤ 1400mm annually. The hottest times of the year occur from December to March. The coldest periods are experienced during June and July with an average daily minimum of 11 ºC. This is also usually the driest time of the year with an average monthly rainfall of 28 and 39 mm respectively. The lowest rainfall months during the year of field investigations (December 2012 – April 2014) were August and September 2013 and April 2014. The wettest times of the year take place during October to March (summer) with a mean annual rainfall ranging between 800mm to 1000mm (South African Weather Service Website, 2013).

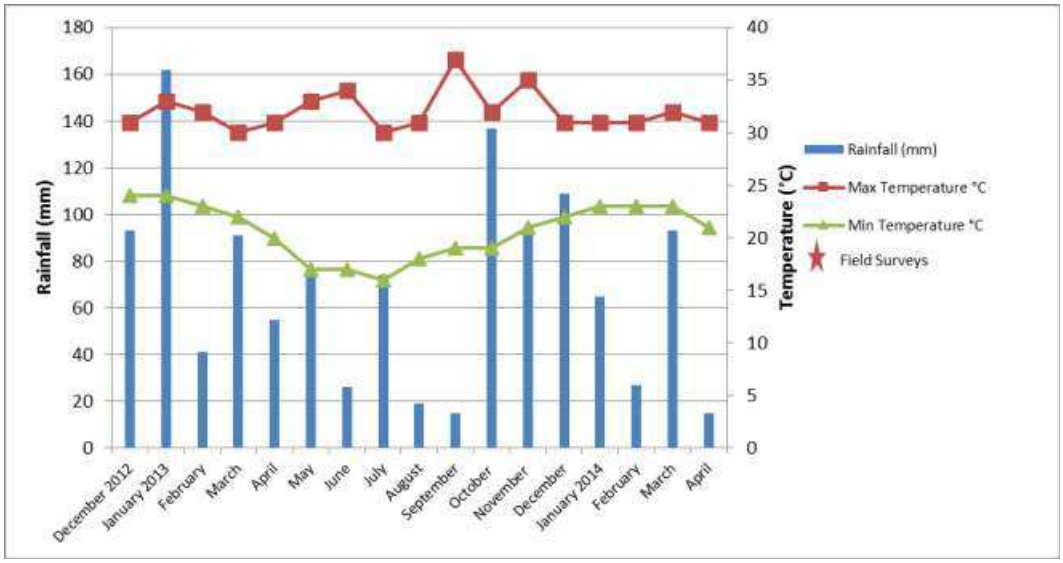


Figure 7: Monthly temperature and rainfall data for the King Shaka International Airport

B-1.7 Flora and Fauna

Natural Scientific Services (NSS) cc conducted the Baseline Biodiversity and Impact Assessment for the proposed development site, which focussed on the floral and faunal assemblages on the site. Refer to the Baseline Biodiversity and Impact Assessment in Appendix 6.8.

B-1.7.1 Flora

The study area is located within the KwaZulu-Natal Coastal Belt (CB3) regional vegetation unit (Figure 5-4 of Appendix 6.8), as classified by Mucina & Rutherford (2006). The region consists of highly dissected coastal plains at altitudes from 20 m to 450 masl and is characterised by coastal bush vegetation punctuated by patches of Indian Ocean coastal belt forest. Forests once covered most of South Africa during the last glacial period but since the warming of global temperatures during the Pleistocene have receded to such an extent that only small isolated relics of forest remain. Most of the region (approximately 50%) has been transformed through cultivation of sugarcane, urban sprawl and road building further diminishing this forest habitat (Mucina & Rutherford, 2006).

The proposed Support Precinct 2 site is surrounded by the 'Conservation Area' that was designated as part of the Record of Decision (RoD) for the Phase 1: KSIA EIA. The 'conservation area' is currently undergoing a process of restoration, in terms of the removal of the sugarcane plantations and rehabilitation, in terms of the removal of alien vegetation (Sivest, 2012). As indicated by the 2009 land cover data, the main land use within the study area was sugarcane (historic plantations), these fields are now covered by the alien weed *Erigeron bonariensis* (Figure 5-8 of Appendix 6.8). Remnants of natural forest remain within the riparian fringes along the watercourses, with a section of Shale Slope woodland (typical association to Scarp Forest) remaining on the south western boundary of the study area. The riparian areas are infested by a number of alien and invasive species, for example Solanum mauritianum (Bugweed), *Schinus terebinthifolius* (Brazilian Pepper Tree) and *Psidium spp* (Guava). Extensive clearing of these alien and invasive species was underway, throughout the KSIA, during the current field investigations. Examples of the current land uses are illustrated in Figure 5-5 of Appendix 6.8.

Sugarcane farming in the study area has had an extensive and severe impact on biodiversity due to vegetation clearing, tilling, irrigation, fertilizer and pesticide application, and resulting erosion, sedimentation, environmental contamination and alien establishment. Although this is considered the main activity that has had an impact on Portion 11, the construction of the airport and the main road networks surrounding the site has also played a role.

a) Vegetation Communities and Habitats

The site was previously used for sugar cane cultivation. During the construction of the highway off-ramps and the airport construction, two main areas within Portion 11 were extensively worked and used as borrow pits and stockpile areas. Approximately 83% of Portion 11 has had the primary vegetation removed for sugarcane farming (88% of Support Precinct 2 footprint area) and therefore there is consequently little remaining natural habitat for wildlife. The Primary vegetation would have included the Interior Coastal Grasslands on the upper lands as per SANBI (2011) and the Mixed Woodland/Riparian Thickets along the drainage and wetland areas. Current vegetation and faunal diversity are restricted within the remaining natural pockets on the site.

With all the transformation on site, very limited natural to semi-natural areas exist within Portion 11, but specifically within the Support Precinct 2 development footprint. From the field investigations, three main groupings were identified and within these 5 different habitats (Table 8) within the greater Portion 11. The main vegetation communities that had some structure and were not solely dominated by aliens included the following:

- Shale Slope Woodlands (small patch remnant of Scarp Forest to the south west of the study area);

- *Acacia-Erythrina* wooded areas (largely associated with Riparian – Wetland Zones);
- Acacia Mixed Woodland; and
- Open Grasslands.

The habitats and vegetation communities that were predominantly recorded are provided in Table 8: below:

Table 8: Vegetation Communities on Site

DESCRIPTION OF VEGETATION COMMUNITY	% SUPPORT PRECINCT 2	% PORTION 11	SIGNIFICANCE
1. Coastal Bush and Woodland			
Shale Slope Woodlands (small patch remnant of Scarp Forest within southern tip of Portion 11)	0.30%	6.06%	HIGH
Acacia-Erythrina wooded areas (largely associated with Riparian-Wetland Zones)	1.90%	7.97%	HIGH
Acacia Mixed Woodland	-	2.09%	MEDIUM
2. Grassland Areas			
Open Grassland Patch	-	0.89%	MEDIUM
3. Past Agricultural Areas			
Fallow Sugarcane (*Saccharum* spp) Fields (showing signs of grassland recovery-reseeded and limited rehabilitation event)	97.79%	82.99%	LOW

With the Support Precinct 2 development site, only three habitats were identified, as in Table 8 above.

b) Description of the Vegetation Units

(i) Coastal Bush and Woodland

The vegetation communities consists of the following:

- Shale Slope Woodlands (small patch remnant of Scarp Forest)
- Acacia-Erythrina wooded areas (largely associated with Riparian – Wetland Zones)
- Acacia Mixed Woodland (Portion 11 only)

Condition

The majority of this vegetation unit lies outside of the study area and contains a remnant of Scarp Forest. Alien invasives are a threat to this unit, however, the intensity of encroachment is much less than that found within the wooded areas concentrated along the drainage and stream areas. Alien invasives plant species, including *Melia azedarach*, *Schinus*, *Psidium guajava*. Understory alien species include *Cardiospermum grandiflorum*; *Cestrum laevigatum*, *Chromolaena odorata*, *Lantana camara*, *Passiflora suberosa*, *Rivina humilis*, *Solanum mauritianum*, *Solanum seaforthianum* and *Verbena bonarensis*.

This vegetation unit represents approximately 0.5% of the study area (Support Precinct 2) and 6% of Portion 11. The portion just south west of the site contains a remnant of Eastern Scarp Forests: Northern Coastal Scarp Forest.

Conservation Important (CI) Species

Species found on site:

- *Eulophia speciosa* (Declining species as per TSP) (Dec)
- *Scadoxus puniceus* (Protected (P)

Potential species include:

- *Adenia gummifera* (Harv.) *Harms var. gummifera* (Dec)
- *Assipourea malosana* (Baker)

- Alston(Dec)
- *Cineraria atriplicifolia* DC.(Vulnerable) (VU)
- *Elaeodendron croceum* (Thunb.) DC.(Dec)
- *Stangeria eriopus* (Kunze) Baill.(VU)
- *Cryptocarya latifolia Sond*. (Dec)

CI Faunal Species

- Crowned Eagle (Near Threatened) (NT) (foraging)
- Potentially:
  - Blue Duiker (VU)
  - Specialist leaf-litter frogs
  - Globally threatened millipedes

- Potentially provincially protected fruit chafer species.
- Foraging opportunities for Large-eared Freetailed Bat (VU), Geoffroy's Horseshoe Bat (NT), Natal Clinging Bat (NT), Temminck's Hairy Bat (NT).

(ii) *Acacia-Erythrina* wooded area (largely associated with Riparian-Wetland Zones)

Condition

This habitat is mainly associated with the wetland areas but easily transitions into the Shale Slope Woodland. These units are very sensitive to change, which will ultimately change the vegetation community structure. Pressures on these systems are from the surrounding sugarcane fields, alien invasives and pesticides/herbicides. Removal of a lot of alien vegetation within certain drainage areas in Support Precinct 2 unit was underway during the field investigations. Herbaceous hydromorphic species found instream include *Typha, Kyllinga, Pycreus, Cyperus* and the alien Category 1 *Canna indica*.

Other alien species include:

- *Bauhinia tomentosa**
- *Cardiospermum grandiflorum* Sw.*
- *Chromolaena odorata* (L.) R.M.King & H.Rob. *
- *Cirsium vulgare **
- *Coix lacryma-jobi L.**
- *Lantana camara* L. *
- *Melia azedarach **
- **Paspalum urvillei Steud.*
- *Psidium guajava L.**
- *Schinus terebinthifolius Raddi **
- *Solanum mauritianum **

This unit is approximately 2% of the study area (Support Precinct 2) and 8% of Portion 11. All wetlands are deemed sensitive and protected in terms of the NWA. Buffers at a minimum of 30m from the outer edge of each wetland system are required, as well as the protection of the upper catchment.

Conservation Important (CI) Species

Identified during the initial studies:

- *Eulophia speciosa (DEC)*
- *Gladiolus dalenii (P)*
- *Gloriosa superba L*
- *Hypoxis hemerocallidea Fisch., C.A.Mey. & Avé-Lall.*
- *Ornithogalum t. Tenuifolium(P)*

Potentially occuring species

- *Kniphofia pauciflora Baker*
- *Mondia whitei (Hook.f.) Skeels*
- *Raphia australis Oberm. & Strey*
- *Rapanea melanophloeos (L.) Mez*

Conservation Important Faunal Species

- Potentially *Black-headed Dwarf Chameleon (*PIA*)*
- Potentially *Natal Leaf Folding Frog (*EN*)*
- Potentially *Spotted Shovel Nosed Frog (*VU*)*
- Potentially *Water Rat (*NT*)*

(iii) Transformed Units (Fallow sugar cane fields – grassland in a recovery phase)
Condition

Past sugarcane fields present 98% of Support Precinct 2 and 83% of Portion 11. In areas where wetlands were prior to planting, these areas are showing signs of moisture and wetland indicator species such as *Aristida junciformis, Cyperus* and *Imperata*. Once cleared, recovery is relatively quick with pioneer species, although homogeneous in nature. During the April 2014 site visit, a large number of weedy and Category species were emerging.

No CI species were noted.

B-1.7.2 Fauna

This section has been divided into two parts, i.e. species that are commonly-occuring and species of Conservation Importance (CI).

B-1.7.2.1 Commonly Occuring Species

a) Mammals

NSS recorded a total of 21 mammal species during fieldwork on Portion 11, which represents 21% of the 94 potentially occurring species. This is the same number of species detected during the DTP EIA within the greater KSIA premises (INR, 2007). However, ten of the species detected by NSS represent additional species not previously recorded during the DTP EIA. These include Scrub Hare. (*Lepus saxatilis*), Single-striped Mouse (*Lemniscomys rosalia*), Tete Veld Rat (*Aethomys ineptus*), Greater Galago (*Otolemur crassicaudatus*), Forest Shrew (*Myosorex varius*), Tiny Musk Shrew (*Crocidura fuscomurina*), Angolan Free-tailed Bat (*Mops condylurus*), Natal Clinging Bat (*Miniopterus natalensis*), Banana Bat (*Pipistrellus nanus*) and Red Duiker (*Cephalophus natalensis*). Additionally five species detected by NSS on site, namely Scrub Hare (*Lepus saxatilis*), Single-striped Mouse (*Lemniscomys rosalia*), Angolan Free-tailed Bat (*Mops condylurus*), Bushpig (*Potamochoerus larvatus*) and Bushbuck (*Tragelaphus scriptus*) have not previously been recorded during national atlassing surveys within the QDGS 2931CA according data provided in Friedmann & Daly (2004) and Mammal Map (2013).

Of the various main habitat types on site the coastal bush habitat supported the highest number of mammal species, followed by the Shale Slope Woodland, transformed grasslands, wetlands, historic sugarcane and lastly alien bush clumps. The coastal bush habitat was found to support species such as Single-striped Mouse (*Lemniscomys rosalia*), Forest Shrew (*Myosorex varius*) Reddish-grey Musk Shrew (*Crocidura cyanea*), Egyptian Slit-faced Bat (*Nycteris thebaica*) and Red Duiker (*Cephalophus natalensis*). In contrast species found to be associated with the afromontane forest habitat included Natal Multimammate Mouse (*Mastomys natalensis*), Angolan Free-tailed Bat (*Mops condylurus*), Little Free-tailed Bat (*Chaerephon pumilus*), Natal

Clinging Bat (*Miniopterus natalensis*), Banana Bat (*Pipistrellus nanus*), Yellow House Bat (*Scotophilus dinganii*) and Greater Galago (*Otolemur crassicaudatus*).

b) Birds

NSS recorded 103 bird species during fieldwork on portion 11, representing 28% of the 366 potentially occurring species and 72 % of the 143 species recorded during SABAP 2 (2935_3105). NSS recorded 12 species within portion 11 that have not previously been recorded within the pentad during SABAP 2 surveys. These included African Wattled Lapwing (*Vanellus senegallus*), Emerald-spotted Wood-dove (*Turtur chalcospilos*) Black Cuckoo (*Cuculus clamosus*), European Nightjar (*Caprimulgus europaeus*), Narina Trogon (*Apaloderma narina*), Green Wood-hoopoe (*Phoeniculus purpureus*), Black-collared Barbet (*Lybius torquatus*), Acacia Pied Barbet (*Tricholaema leucomelas*), Chorister Robin-chat (*Cossypha dichroa*), Chinspot Batis (*Batis molitor*), Long-tailed Widowbird (*Euplectes progne*) and Grey Waxbill (*Estrilda perreini*).

The belt of afromontane forest habitat in the south-western region of portion 11 supports a rich diversity of birds including several specialist forest species such as Buff-spotted Flufftail (*Sarothrura elegans*), Narina Trogon (*Apaloderma narina*), White-eared Barbet (*Stactolaema leucotis*), Yellow-rumped Tinkerbird (*Pogoniulus bilineatus*), Chorister Robin-chat (*Cossypha dichroa*), Red-capped Robin-chat (*Cossypha natalensis*), Dark-backed Weaver (*Ploceus bicolour*), and Black-bellied Starling (*Lamprotornis corruscus*). The comparitively drier and more open coastal bush habitat in, contrast, supports species such as Red-backed Shrike (*Lanius collurio*), Blue Waxbill (*Uraeginthus angolensis*) and Pin-tailed Whydah (*Vidua macroura*). The weedy nature of the transformed grassland (recovering from past sugar cane cultivation) supports large flocks of seed-eating Long-tailed Widowbirds (*Euplectes progne*) while the more natural patches of grassland are characterised by cryptic insect eaters such as Rufous-naped Lark (*Mirafra africana*), Cape Grassbird (*Sphenoeacus afer*), Zitting Cisticola (*Cisticola juncidis*) and Neddicky (*Cisticola fulvicapilla*). Bird species associated with permanent wetland habitats on site included Reed Cormorant (*Phalacrocorax africanus*), Grey Heron (*Ardea cinerea*), Yellow-billed Duck (*Anas undulata*) and Pied Kingfisher (*Ceryle rudis*) while more seasonal zones were typically inhabited by species such as Red-headed Quelea (*Quelea erythrops*), Southern Red Bishop (*Euplectes orix*), Red-collared Widowbird (*Euplectes ardens*), African Firefinch (*Lagonosticta rubricata*), Burchell's Coucal (*Centropus burchelli*) and Rufous-winged Cisticola (*Cisticola galactotes*). Alien bushclump and historic sugarcane habitats remained comparatively species depauperate and supported mostly habitat generalists.

c) Reptiles

Three reptile species were detected by NSS during fieldwork on portion 11. Funnel traps yielded a large Brown House Snake (*Boaedon capensis*) and an Eastern Green Snake (*Philothamnus natalensis natalensis*) within the coastal bush (trap site 4) and afromontane forest habitats respectively (trap site 5). Active searching within transformed grassland yielded a Moreau's Tropical House Gecko (*Hemidactylus mabouia*) from beneath a rock.

The varied habitats on Portion 11 provide suitable habitat for a wide diversity of reptile species. The humus rich substrates of the afromontane and coastal bush habitats are suitable for fausorial species such as Bibron's Blind Snake (*Afrotyphlops bibronii*), Peter's Thread Snake (*Leptotyphlops scutifrons*), Sundevall's Garter Snake (*Elapsoidea sundevallii* media) and the unobtrusive alien species, the Flowerpot Snake (*Ramphotyphlops braminus*). Additionally these habitats provide the complex vegetation structure frequented by arboreal species such Spotted Bush Snake (*Philothamnus semivariegatus*), Boomslang (*Dispholidus typus typus*), Vine Snake (*Thelotornis capensis capensis*) and Green Mamba (*Dendroaspis angusticeps*). The transitional zone between these densely wooded habitats and the more open transformed grasslands likely support Flap-necked Chameleon (*Chamaeleo dilepis dilepis*) and Black-headed Dwarf Chameleon (*Bradypodion melanocephalum*) particularly near wetlands.

The moist loamy soils of the wetlands on site provides an ideal burrowing medium for the illusive Fitzsimon's Dwarf Burrowing Skink (*Scelotes fitzsimonsi*), Günther's Dwarf Burrowing Skink (*Scelotes guentheri*), Smith's Dwarf Burrowing Skink (*Scelotes inornatus*) and Montane Dwarf Burrowing Skink (*Scelotes mossambicus*). Permanent wetland zones that hold significant bodies of water such as the ponds near the main access point and the uMdloti river (along the southern border of Portion 11) are likely inhabited by Marsh Terrapin (*Pelomedusa subrufa*) while the more seasonal zones are likely to support species such as Common Water Snake (*Lycodonomorphus rufulus*), Green Water Snake (*Philothamnus hoplogaster*) and Water Leguaan (*Varanus niloticus*).

The transformed grasslands provide suitable habitat for a number of terrestrial species that are tolerant of a fair degree of habitat modification such as Mole Snake (*Pseudaspis cana*; a species that has not been recorded within the QDGS since 1970), Spotted Skaapsteker (*Psammophylax rhombeatus*), Olive Grass Snake (*Psammophis mossambicus*), Common Night Adder (*Causus rhombeatus*), Puff Adder (*Bitis arietans*), Montane Speckled Skink (*Trachylepis punctatissima*) and Cape Dwarf Gecko (*Lygodactylus capensis*).

d) Frogs

Based on distribution and availability of suitable habitat approximately 30 species are considered highly likely to occur on site.

Portion 11 contains a variety of amphibian microhabitats likely supports numerous species particularly within the family Hyperolidae and Pyxicephalidae. The clear, streams within the Afromontane forest were found to support Natal Tree Frog (*Leptopelis natalensis*), Clicking Stream Frog (*Strongylopus grayii*) and Common River Frog (*Amietia angolensis*) but may also support species such as Natal Cascade Frog (*Hadromophryne natalensis*) and the Endangered Kloof Frog (*Natalobatrachus bonebergi*). The leaf litter within this forest and surrounding coastal bush habitats supports Bush Squeaker (*Arthroleptis wahlbergii*) and may provide suitable habitat for Plaintive Rain Frog (*Breviceps verrucosus*).

The transformed grasslands surrounding these habitats are typically inhabited by Snoring Puddle Frog (*Phrynobatrachus natalensis*), Dwarf Puddle Frog (*Phrynobatrachus mababiensis*) and Sharp-nosed Grass Frog (*Ptychadena oxyrhynchus*) particularly near wetland habitats. However, species such as Bushveld Rain Frog (*Breviceps adspersus adspersus*), Mozambique Rain Frog (*Breviceps mossambicus*), Raucous Toad (*Amietophrynus rangeri*), Red Toad (*Schismaderma carens*), Bronze Caco (*Cacosternum nanum*) and Striped Caco (*Cacosternum striatum*) may also occur.

Within the more permanently inundated pools and wetland areas species detected included Guttural Toad (*Amietophrynus gutturalis*), Painted Reed Frog (*Hyperolius marmoratus marmoratus*), Bubbling Kassina (*Kassina senegalensis*), Common Platanna *(Xenopus laevis*), and Natal Sand Frog (*Tomopterna natalensis*). Species such as Greater Leaf-folding Frog (*Afrixalus fornasini*), Natal Leaf-folding Frog (*Afrixalus spinifrons spinifrons*), Sharp-nosed Reed Frog (*Hyperolius acuticeps*), Water Lily Frog (*Hyperolius pusillus*), Yellow-striped Reed Frog (*Hyperolius semidiscus*), Tinker Reed Frog (*Hyperolius tuberilinguis*), Rattling Frog (*Semnodactylus wealii*) and Striped Stream Frog (*Strongylopus fasciatus*) may also occur in this habitat. It is possible that Pickersgills Reed Frog may be encountered within Portion 11 as individuals have been observed within the greater KSIA premises at distances of up to 1.2 km from known breeding locations (Tarrant, 2012) although no suitable breeding habitat was observed on site, Froggy Pond is immediately adjacent to Portion 11 and 1.1km from Support Precinct 2.

e) Terrestrial Macro-Invertebrates

During the site visits by NSS to Portion 11 fourteen species of butterfly were recorded. Butterflies most often observed in forest and coastal bush habitats include Common Bush Brown (*Bicyclus safitza safitza*), Yellow-banded Acraea (*Telchinia cabira*), Common Mother-ofpearl (*Salamis parhassus*), Soldier Pansy (*Junonia terea elgiva*), Citrus Swallowtail (*Papilio demodocus demodocus*), Green-banded Swallowtail (*Papilio nireus*

lyaeus) and Pied Piper (*Eurytela hiarbas angustata*). The latter species displays a colour phase described as rare by Woodhall (2005), having an orange instead of white bar across the wings. In the drier transformed grasslands species such as Painted Lady (*Vanessa cardui*), Brown-veined White (*Belenois aurota aurota*), Broad-bordered Grass Yellow (*Eurema brigitta brigitta*) and African Common White (*Belenois creona severina*) predominate.

Several subfamilies particularly Lycaeninae (Sapphires, Playboys, Coppers, Opals, Hairtails and Blues), Heliconiinae (Acraeas) and Perinae (Vagrants, Orange Tips, Whites and Borders) were under sampled due, in part, to the small size, inconspicuous colouration (e.g. and) and/or the fast and/or erratic flight of species in these taxa. Baited live-trapping and sweep-netting during different times of the year and at more localities could have increased the number of butterfly species recorded on site.

Other particularly abundant macro-invertebrates (excluding butterflies) were represented by the insect orders Orthoptera (crickets, locusts and grasshoppers) and Coleoptera (beetles).

The distributions of four species of scorpions overlap the study. These include three Buthid (*Pseudolychas pegleri, Uroplectes triangulifer* and *Uroplectes formosus*), one Ischnurid (*Opistacanthus validus*) and one Scorpionid (*Opistophthalmus glabrifrons*) species. Only one of these species namely *Uroplectes formosus* was detected on site. *Uroplectes formosus* is the smallest member of its genus and like most its congenerics stings readily although the envenomations are not of medicinal importance (Leeming, 2003).

B-1.7.2.2 Conservation Important Fauna

a) Mammals

The distributions of 37 CI mammal species overlap the study area. Of these, 5 species have been recorded in the QDGS overlapping the study area (Friedmann & Daly, 2004). NSS detected four CI mammal species during fieldwork on Portion 11. These included the nationally Near-threatened Natal Long-fingered Bat (*Miniopterus natalensis*) as well as three species listed as Protected Game in Kwa-Zulu Natal namely Greater Galago (*Otolemur crassicaudatus*), Bushbuck (*Tragelaphus scriptus*) and Red Duiker (*Cephalophus natalensis*) according to (NNCO, 1974) with the latter also being listed as a Protected Indigenous Animal (KNCMA, 1999).

- Natal Long-fingered Bat (*Miniopterus natalensis*) – Near-threatened

This diminutive bat was confirmed on site during an acoustic transect using an EM3 ultrasonic time expansion bat detector. Although distributed widely across the Southern African subregion (with the exception of the Kalahari) the presence of Natal Long-fingered Bat within any given area is largely limited by the availability of nearby caves (or other similar subterranean habitats such as mine shafts) rather than the type of vegetation or prey base available.

An additional 15 conservation important mammal species are highly likely to occur on site based on distribution ranges and presence of suitable habitat. Eight of these species have a Red list status above Least Concern (Table 7-13 of Appendix 6.8). Although suitable cave/crevice roosting habitat for Temminck's Hairy Bat (*Myotis tricolor*) and Geoffroy's Horseshoe Bat (*Rhinolophus clivosus*) was not confirmed on site the presence of Natal Clinging Bat suggests the species may very well be utilizing the site for foraging. The outhouses on site provide suitable roosting habitat for Large-eared Free-tailed Bat (*Otomops martiensseni*) while the riparian and afromontane forest vegetation in the west provide the well wooded habitat frequented by two woolly bat species (*Kerivoula argentata* and *Kerivoula lanosa*) as well as Anchieta's Pipistrelle (*Pipistrellus anchietae*).

Apart from bats the Near-threatened Water Rat (*Dasymys incomtus*), which frequents wet habitats throughout its wide distribution over sub-Saharan Africa (Skinner & Chimimba, 2005), is likely to inhabit rank vegetation along some of the more permanent wetlands on site while the Near-threatened Honey Badger (*Mellivora*

capensis) may occur as suitable habitat exists on site for this species and it has been recorded during atlassing projects in the adjacent QDGS 2930DD (Friedmann & Daly, 2004).

b) Birds

The western boundary of Portion 11 touches on and, in places, slightly overlaps the Mount Moreland Global IBA (SA 123), so designated due to the extraordinarily large population (ca. 3000 000 individuals) of migrating barn swallows which congregate in the *Phragmites* reedbeds of Lake Victoria and surrounding wetlands (www.birdlife.org.za). Although suitable *Phragmites* reedbed roosting habitat is lacking on site, Portion 11 (and surrounds) still provides important foraging habitat for these swallows.

Apart from the swallows the distribution ranges of some 94 CI bird species overlap the QDGS 2931 CA (Table 7-14 of Appendix 6.8). Of these, 38 species have been recorded during atlassing projects within the pentad 2935_3105 covering the study area (SABAP, 2013). To date NSS has detected 13 CI bird species during fieldwork within Portion 11. One of these species the African Crowned Eagle (*Stephanoaetus coronatus*) is listed globally and nationally as Near-threatened (Barnes, 2000; IUCN, 2013) while the remaining 12 species are listed are listed as Protected Indigenous Animals in Kwa-Zulu Natal (KNCMA, 1999). These included Grey Heron (*Ardea cinerea*), Blackheaded Heron (*Ardea melanocephala*), Cattle Egret (*Bubulcus ibis*), Hamerkop (*Scopus umbretta*), Hadeda Ibis (*Bostrychia hagedash*), Buff-spotted Flufftail (*Sarothrura elegans*), Helmeted Guineafowl (*Numida meleagris*), Yellow-billed Kite (*Milvus aegyptius*), Long-crested Eagle (*Lophaetus occipitalis*), African Crowned Eagle (*Stephanoaetus coronatus*), Jackal Buzzard (*Buteo rufofuscus*), Steppe Buzzard (*Buteo vulpinus*) and Purple-crested Turaco (*Gallirex porphyreolophus*).

- African Crowned Eagle (*Stephanoaetus coronatus*) – Near-threatened.

A single individual was observed attending a downy fledgling at a nest situated within a fork of a tall Eucalyptus sp. tree 430 m outside the south-western boundary. The adult presumably makes regular foraging bouts into the study area. During the April 2014 site visit this fledgling was out the nest and a fully fledge juvenile. The species is regarded as an uncommon resident (Hockey et al. 2005), listed both nationally (Barnes, 2000) and internationally (IUCN 2013) as Near-Threatened.

An additional 37 bird species of CI are highly likely to occur based on their distribution ranges (SABAP, 2013) and the presence of suitable habitat on site. Nine of these species have a red list status above Least Concern. The leaf litter and dense understory of the afromontane forest patch on site provides suitable habitat for the Endangered Spotted Ground-thrush (*Zoothera guttata*) and Near-threatened Black-throated Wattle-eye (*Platysteira peltata*). The former species (if present) is most likely to be observed skulking around small forest clearings with short emergent growth while the latter may inhabit riparian vegetation overhanging water (Hockey et al. 2005). Grey Sunbird (*Cyanomitra veroxii*) is also likely to occur within the canopy of these forest patches but may also move into the drier surrounding coastal bush habitat. Southern Bald Ibis (*Geronticus calvus*) may make occasional foraging bouts into the more natural areas of the transformed grassland habitat on site especially following veld fires (no breeding habitat for this species occurs on site). Wetland habitats on site may support the Near threatened Woolly-necked Stork (*Ciconia episcopus*) and Broad-tailed Warbler (*Schoenicola brevirostris*) particularly in tall rank grass. Pools of open water may be visited by the Near threatened Wooly-necked Stork (*Ciconia episcopus*). The Vulnerable Southern Bald Ibis (*Geronticus calvus*) as well as the Near threatened Peregrine Falcon (*Falco peregrines*) and Lanner Falcon (*Falco biarmicus*) are likely to make occasional foraging bouts into the more natural areas of transformed grassland habitat that exist on site (however no breeding habitat for these three species occurs on site).

c) Reptiles

Although no CI reptile species were detected by NSS on Portion 11, two species were recorded immediately adjacent to the site. Distribution records (Reptile Map, 2013; Branch, 1998) and the presence of suitable habitat suggests that seven CI species are highly likely to occur on site.

Anecdotal observations suggest the presence of the provincially and nationally Protected African Rock Python (*Python natalensis*) based on communications with Sivest staff and public sightings posted on the Mount Moreland Conservancy website (http://www.mountmorelandconservancy.co.za). The species is likely to be most prevalent in more natural areas with good cover and an ample prey base, particularly (but not always) near water.

The provincially Protected Natal Purple-glossed Snake (*Amblyodipsas concolor*) and the nationally Near-Threatened (provisional listing as in Bates et al. in press) Natal Black Snake (*Macrelaps microlepidotus*) are both burrowing species, which may occur within the moist leaf litter microhabitats created by the afromontane forest and dense coastal bush habitats on site. The INR (2007) reports that these generally rare species are highly susceptible to the destruction of their forest habitats and that population appear to be declining rapidly.

Wetland habitats on site likely support the provincially protected Natal Dusky-bellied Water Snake (*Lycodonomorphus laevissimus natalensis*) and Water Leguaan (*Varanus niloticus*) while the moist loamy soils associated with them may provide a suitable burrowing medium for several species of dwarf burrowing skink (genus: Scelotes). A dwarf burrowing skink was detected by NSS during surveys on the adjacent Portion 10 area. The specimen could not, however, be positively identified from the photographic evidence at hand. Although the specimen was most likely the Least Concern *Scelotes mossambicus* (G. J. Alexander pers. comm.) the possibility that it may be the globally Endangered *S. inornatus* or Vulnerable *S. guntherii* could not be ruled out without close examination of the actual specimen (J. Marais pers. comm.). The latter two possibilities are of particular interest as Smith's Dwarf Burrowing Skink occupies a very small distribution of only 431 km^2 and has not yet been recorded north of the uMgeni River while very little is known of the Günther's Dwarf Burrowing Skink (WCMC, 1996) which is generally regarded as extinct (J. Marais pers. comm.) Further sampling with drift fences and pitfall traps in the loamy wetland soils should be conducted. In April 2014, NSS did relay the trap site in the area where it was captured. However, this yielded no results.

The Afromontane Forest habitat just south of the runway provides a suitable habitat for Green Mamba (*Dendroaspis angusticeps*). The INR (2007) highlights the importance of preserving this habitat particularly in light of the dwindling Green Mamba population in and around Durban. The species has recently been upgraded (albeit provisional) to Near-Threatened (Bates et al. in press).

Suitable habitat exists on site for Black-headed Dwarf Chameleon (*Bradypodion melanocephalum*) particularly within grasslands and wetlands along the edges of dense coastal bush habitat with an abundance of finely branching bushes. A single adult male was recorded by NSS during the field investigation within a large Phragmites reedbed known as 'Froggy Pond' situated 320 m west of the most south-western corner of Portion 11 (GPS: S29.63829 E31.09741). The coastal population of Black-headed Dwarf Chameleon is highly fragmented and restricted to the eThekwini Municipal Area (Armstrong, 2009). Studies conducted over two decades suggest that populations of these small chameleons are in decline largely as a result of habitat destruction through sugarcane farming, commercial afforestation and rapid rates of urban and industrial development (Raw, 1976, 1995). The conservation status of the species has recently been upgraded to a provisional Red-listing of Vulnerable in South Africa (Bates et al. in press).

Large-scaled Grass Lizard (*Chamaesaura macrolepis*) may occur within the more natural grassland habitats that remain between patches of forest. Their greatly reduced limbs, elongated bodies and rough scales enable them to effectively swim through their grassland habitat. It is likely that, like other members in the genus, Large-scaled Grass Lizard is threatened by habitat loss, human disturbance and inappropriate burning regimes. The species is provisionally listed as Near-threatened (Bates et al. in press).

d) Frogs

The distribution ranges of eight CI frog species cover the study area (Table 7-16 of Appendix 6.8). Three CI species namely Natal Leaf-folding Frog (*Afrixalus spinifrons spinifrons*), Spotted Shovel-nosed Frog (*Hemisus*

guttatus) and Pickergill's Reed Frog (*Hyperolius pickersgilli*) have been recorded both within the QDGS 2931CA and within the greater KSIA premises during atllasing projects (Minter et al. 2004) and the DTP EIA (INR, 2007) respectively. Based on distribution records (Minter et al. 2004), observations in the greater KSIA project area (INR, 2007; NSS, 2011) and the available habitat all three of these CI species are considered highly likely to occur on Portion 11. The Critically Endangered Pickergill's Reed Frog (*Hyperolius pickersgilli*) was identified by NSS in the habitat immediately adjacent to Portion 11.

Along the coast Spotted Shovel-nosed Frog typically inhabits marshy areas in coastal bush and grassland habitats particularly on alluvial ground with a slight gradient (Minter et al. 2004). Although males of this fausorial species are notoriously difficult to detect, as they most often call from burrows or from underground, the species is likely to be present on site. Previous NSS surveys for Dube TradePort in July 2011 confirmed the presence of this species within the greater KSIA study area (GPS: S29.60302 E31.09977) when several individuals were heard calling from cut sugarcane fields just outside the riparian zone of a small stream during light drizzle (NSS, 2011). However, neither of these species were detected during the current NSS surveys within Portion 11. Additional active searching and acoustic monitoring over longer periods will likely reveal the presence of both these CI species on site. The main threat faced by these two CI frog species is habitat destruction as a result of infrastructure development, urbanisation, agriculture and afforestation (Minter et al. 2004).

The Critically Endangered Pickergill's Reed Frog (*Hyperolius pickersgilli*) frequents large stagnant marshes supporting dense stands of *Phragmites* and Cyperus immensis (Minter et al. 2004; Du Preez & Carruthers, 2009). This habitat is present at the nearby Froggy Pond (situated only 320 m from the south-western corner of Portion 11), which is known to support one of the largest populations (estimated 1928 adults in 2011) of Pickergill's Reed Frog (Bowman, 2011). Although this habitat is distinctly lacking on site, the presence of Pickergill's Reed Frog on Portion 11 cannot be conclusively ruled out as the species has been observed not only in gardens bordering Froggy Pond but as far as 1.2 km away within the KSIA premises often some distance from water (Tarrant, 2012).

Natal Chirping Frog has been recorded in the adjacent QDGS 2930DD. The species frequents patches of forests along streams and ravines in mountainous terrain where it is found either amongst the leaf litter of the forest floor or mossy embankments, waterfalls and pools of rocky kloofs (Lambiris, 1989). Suitable habitat may occur within the Afromontane Forest patches on site.

Striped Caco occupies a range of grassland vegetation types, typically breeding in inundated wetlands or near slow flowing streams. The species has previously been recorded from a golf course in Durban located in the QDGS 2930DD (Scott, 2004). The species shows similar habitat preferences to that of the more ubiquitous Boettger's Caco (*Cacosternum boettgeri*) and as such may occupy various unchanneled valley bottom wetlands on site.

e) Terrestrial Macro-invertebrates

Twenty-five CI terrestrial macro-invertebrate species (Table 7-17 of Appendix 6.8) have the potential to occur on site based on distribution the presence of suitable habitat and species previously recorded by the INR (2007). Despite the exceptionally high number of potentially occurring butterfly species only two occupy a conservation status and both of which are only moderately likely to occur based on their marginal distributions over the study area.

Although no CI terrestrial macro-invertebrates were detected by NSS during fieldwork on Portion 11, eleven of the potentially occurring CI species are highly likely to occur on site. The Afromontane Forest habitats are likely to support two species of protected fruit chafer namely *Ichnestoma nasula* and *Xeloma aspersa*. The tall moist canopy of this forest habitat may host the provincially protected East-coast Acraea (Acraea saitis) butterfly. However the butterfly has not been recorded within the QDGS 2931CA in more than three decades

(Mecenero, 2013). Additionally these habitats provide the damp microhabitats frequented by two CI millipede species that are listed as Key Biodiversity Features of the Critically Endangered North Coast Grasslands Threatened Ecosystem (Godman, 2007) namely the globally Endangered Rubifooted Black Millipede (*Doratogonus rubipodus*) and protected Coastal Coral Millipede (*Centrobolus anulatus*). It should be noted that the distribution of the Rubi-footed Black Millipede is marginal in the area. The soft Berea red sands of the drier north-eastern regions of the study site provide suitable habitat for other protected invertebrates such as monster tiger beetles (genus: Manticora), baboon spiders (genera: Ceratogyrus and Harpactira) scorpions (Opisthacanthus and Opistophthalmus).

B-1.7.3 Areas of Conservation Concern

a) Vegetation communities, floral and faunal species

During the site visits a number of CI species were recorded, or through research have a high probability of being on site. Their habitats are defined and ranked under the Areas of Conservation Significance (Table 9), however, certain further protection requirements (i.e. buffers) are needed on either their habitats, breeding sites or point localities to ensure long term survival. A summary of the required buffers is presented in Table 8-3 of Appendix 6.8. Species such as the possibly near extinct *Scelotes guentheri* (Günther's Dwarf Burrowing Skink), may have been recorded on Portion 10 and similar habitat exists on site for the species. A minimum buffer of 30m on the wetland is required as well as the protection of its upper catchment. Other confirmed species that require buffers found in the immediate surrounds include *Philantomba monticola* (Blue Duiker), *Miniopterus natalensis* (Natal Clinging Bat), *Stephanoaetus coronatus* (African Crowned Eagle).

Table 9: Areas of Concern for the study site (Support Precinct 2)

Vegetation Type	Ecological Sensitivity (Rating 1 – 5)	Conservation Value (Rating 1 – 5)	Presence of CI Species (Rating 1 – 5)	Faunal Diversity and CI Species (Rating 1-5)	Level/Extent of Disturbance (Rating 1-5_	Total Score
Coastal Bush & Woodland						
Shale Slope Woodlands (small patch remnant of Scarp Forest within southern tip of Portion 11)	5 Alien Invasives can be seen as a threat as approaching from the drainage areas. Canopy remains, however understory more vulnerable. Once removed recovering is extremely slow and possibly over decades	5 Falls within the INCG Threatened Ecosystem and the Critically Endangered KZN Coastal Belt. This is considered to contain a remnant Northern Coastal Scarp Forest and requires protection – limited unit locally, provincially and nationally. This habitat to the south requires a 100m buffer	3 Lower ranked CI species present	5 High importance, Likely to support a high faunal diversity such as the African Crowned Eagle	-2 Limited Alien disturbances, mainly within understorey or smaller tree species. This includes *Litsea glutinosa, Melia azedarach, Rivina humilis, Cardiospermum grandiflorum. Ipomoea purpurea, Passiflora suberosa* and *Lantana camara*	16 HIGH
Acacia-Erythrina wooded areas (largely associated with Riparian	5 Restricted mainly to wetland areas with a transition zone into the	5 Falls within the INCG Threatened Ecosystem and the **Critically Endangered** KZN Coastal Belt. All	3 Lower ranked CI species present including: **Eulophia*	5 Well wooded wetlands have the potential to support (amongst	-3 Pressure from sugarcane fields, alien invasives and pesticides/herbicides. Removal of a lot of riparian vegetation	15 HIGH

– Wetland Zones)	Shale Slope Woodlands (largely inundated areas). Very sensitive to change which will ultimately change the vegetation community structure	wetlands are deemed sensitive and protected in terms of the NWA. Buffers at a minimum of 30m from the outer edge of the zone are required.	*speciosa (DEC) *Gladiolus dalenii (P) *Hypoxis hemerocallidea *Ornithogalum tenuifolium(P)*	others) Water Rat (NT), Broad-tailed Warbler (NT), Günther's Dwarf Burrowing Skink (VU), Natal Leaf Folding Frog (EN) and Spotted Shovel Nosed Frog (VU),	has taken place.	
Past Agricultural Areas						
Sugarcane (*Saccharum*) (Grassland in initial stages of recovery)	1 No natural vegetation remaining, reseeded in areas and recovery evident into homogenous stands. A portion of the area is re-transforming into wetlands showing both wetland vegetation indicators and soil wetness characteristics	1 Rehabilitation process underway in certain areas	1 Unlikely	1 Of currently low faunal importance until rehabilitation is successful	-5 Completely transformed	-2 LOW
INCG - Inner North Coastal Grassland "Ecological sensitivity" refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred.						

B-2 SOCIAL ENVIRONMENT

B-2.1 Heritage

As per the KwaZulu-Natal Heritage Act No. 4 of 2008, a Phase 1 Heritage Impact Assessment was conducted by Umlando: Archaeological Surveys and Heritage Management, for the proposed development site (refer to Appendix 6.9).

The study recorded one archaeological site, occurrences of Middle Stone Age artefacts, and the remains of buildings predating 1937.

No national monuments, battlefields, or historical cemeteries are known to occur in the study area.

The survey was divided into three main types of heritage sites:
Palaeontological, Archaeological and Historical Ruins. The archaeological sites consist of scatters of artefacts on specific hills that have been severely affected by earthmoving activity: bulldozers, quarry and/or farming.

The location of these sites are summarised in Table 10 and indicated in Figure 9.

Table 10: Location of Heritage Sites

NAME	LATITUDE	LONGITUDE	DESCRIPTION
Dip	29°37'50.225"S	31°6'47.057"E	1937-1969 buildings - foundations
Dip2	29°37'43.697"S	31°6'47.262"E	1937-1969 buildings - foundations
Ruins	29°37'43.338"S	31°6'52.505"E	1937-1969 buildings
Ruins 2	29°37'47.552"S	31°6'50.449"E	1937-1969 buildings
Ruins 3	29°37'49.402"S	31°6'50.243"E	1937-1969 buildings
St1	29°37'44.16"S	31°6'45.001"E	1937-1969 buildings - foundations
St2	29°37'43.903"S	31°6'45.618"E	1937-1969 buildings - foundations
St3	29°37'44.674"S	31°6'46.183"E	1937-1969 buildings - foundations
St4	29°37'43.747"S	31°6'46.577"E	1937-1969 buildings - foundations
Cobalt	29°37'49.916"S	31°6'51.323"E	Historical Artefact
Pottery	29°37'45.65"S	31°6'33.128"E	LIA scatter
MSA	29°37'44.468"S	31°7'4.12"E	MSA occurrence
Fossil	29°37'44.725"S	31°6'49.935"E	Palaeontological tree

a) DUBSP02: 1937 -1969 BUILDINGS

The buildings that appear on the 1937 aerial (fig. 5 in Appendix 6.9) and 1969 topographical (Figure 6 in Appendix 6.9) maps have now been destroyed. Since they do not occur on the 2000 topographical maps (fig. 3 in Appendix 6), an assumption is made that these structures were destroyed before 2000. The remains of the houses (labelled as Ruins in fig 7 in Appendix 6.9) are now clumps of bricks across the hills and/or

scatters of bricks on the slopes of the various hills (fig. 9 in Appendix 6.9). Artefacts are scattered throughout the area where buildings occur (fig. 10 in Appendix 6.9). These artefacts date from the early to late 20th century, e.g. faunal remains, cobalt blue glass, two types of Coronation Bricks, stoneware fragments, ceramics, and various types of clear bottles. There are two types of Coronation bricks at the site and these probably date to different times. There is a third brick type at the site. The brick was manufactured by Speirs, Gibb Co. (Fig. 8 in Appendix 6.9), Speirs Gibb was a fireclay works in Paisley, Renfrewshire, Caledonia, Scotland. They manufactured bricks between 1882 and 1915. Since Coronation bricks were only manufactured from 1902 onwards, there is a possibility that the buildings were in fact constructed before 1900. There are no formal refuse middens as earth-moving activity has spread the artefacts and disturbed the middens, especially the older middens. The buildings on the western side of the study area are mostly broken; however, the foundations remain. These are labelled as St in figure 7 and illustrated in fig. 11 in Appendix 6.9. These foundations are probably part of the original farm work buildings. One structure appears to be a cattle dip – labelled as Dip 2 (fig. 12 in Appendix 6.9). The feature labelled, as 'Dip' appears to be part of a water control/retaining system, and a similar ruined version occurs to the north of this (fig. 13 in Appendix 6.9).

Significance: The buildings do not appear to be of significance since they have been destroyed. If there were more foundations with intact walling, then the area may have had some significance in terms of early 20th century farm architecture. The study area has some significance in that it is one of the few areas where the original farm labourers living quarters occur, and where there are still artefacts directly associated with these quarters. There has been no sampling of the material culture from early labourers' houses. Often these remains have been removed through time, and this is a rare chance to obtain these artefacts. The Heritage Specialist rated the site as having low-medium significance.

Figure 8: Location of Recorded Sites in the Study Area

b) Archaeological Material

Two types of archaeological sites occur in the study area: Late Iron Age (LIA) artefact scatter, and occurrences of Middle Stone Age (MSA) stone tools.

MSA artefacts occur throughout the entire area. Due to their age (250 000 – 30 000 years ago), most of the MSA sites are in a secondary context due to natural colluvial action, erosion and then recent farming activity. The eastern hill just outside of the study area has the highest concentration of isolated artefacts (Figure14 in Appendix 6.9), but this is probably due to the road cutting. Isolated stone tools were found within the study area.

The hill in the northwest corner of the study area has been severely affected by a quarry/borrow pit, heavy-duty machinery and agricultural activity. Various pottery sherds and upper grinding stones were observed on the main hill where there is still a sandy deposit (Figure 15 in Appendix 6.9). eThembeni recorded working activity south of the small quarry; however, this has now been cleared and was not observed during Umlando's survey. This area is referred to as DUBSP01.

Significance: The MSA aspect is of low significance as it consists of isolated artefacts over a wide area. DUBSP01 is of low significance in that the archaeological deposit has been damaged and the density of artefacts is very low.

c) Palaeontological Impact Assessment (PIA)

Umlando undertook a desktop palaeontological impact assessment for the area just northwest of the study area in 2013 (see Appendix A of the Appendix 6.9 for full report). The Vryheid Formation underlies the study area: Light grey, coarse-grained sandstone and carbonaceous mudstone. The Vryheid formation is known to be very rich in plant and ichnofossils and these have a high sensitivity rating. However, since the area is overgrown and has had less weathering, the PIA has given it a moderate sensitivity rating. Dr Groenewald suggests that any excavations deeper than approximately 2m below the current surface would require a palaeontologist on site.

Umlando did not request a PIA desktop for this study area since it is 2km southeast of the previous PIA with the same geology. The results from the desktop PIA would thus hold for this area. During the field survey, Umlando noted one fossilised tree fragment (Figure 16 in Appendix 6.9).

Significance: The PIA desktop noted that material from the Vryheid formation would be moderately significant.

d) Conclusion

The survey noted the archaeological sites, and that they were of low significance requiring no further mitigation. The buildings date from at least 1937, if not before, and most have been demolished. The demolished buildings tend to be the old labourers' houses that were used until the 1980s-1990s. There are no intact refuse middens; however, older artefacts do occur in the study area and these should be sampled. The foundations of several of the farm buildings still exist and these would be protected by the KZN Heritage Act. The Heritage Specialist suggested that these be mapped and photographed. The applicant, LMJV will require two permits from Amafa KZN. The first will be a permit to destroy the archaeological site at DUBSP01. The second permit will be from the Amafa KZN Built Environment Committee, which specifically deals with buildings and related structures older than 60 years. The applicant has already submitted the application and received positive feedback from Amafa aKwaZulu-Natal.

B-2.2 Visual

The KSIA, DTP TradeZone 1 and Dube City 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 Socio-Economic Environment

Urban-Econ Development Economists were appointed to undertake a Socio-Economic Impact Assessment for the proposed development. Refer to the Socio Impact Assessment in Appendix 6.10.

Interviews were conducted with real estate agents who operate within the study area in order to get a better understanding of the trends and demand for commercial office space within the market area.

The majority of agents interviewed indicated that there is demand for office space in northern eThekwini. The demand is mostly for prime and A-grade office space and the highest demand is for small offices. All of the agents interviewed indicated that the trend is for companies to move north within eThekwini.

According to the agents, the take-up rate is short for small offices and is slightly longer for bigger offices, but on the whole, it is still relatively short. The agents indicated that the vacancy rate is between 10% and 30%.

a) Office Assessment

This section presents the assessment of the net demand for rentable office space for the study area.

(i) Supply

The vacancy rate for the study area is 3%, translating into 8,236m^2 of area available for leasing out of a total of 273,068m^2 total rentable area.

(ii) Demand

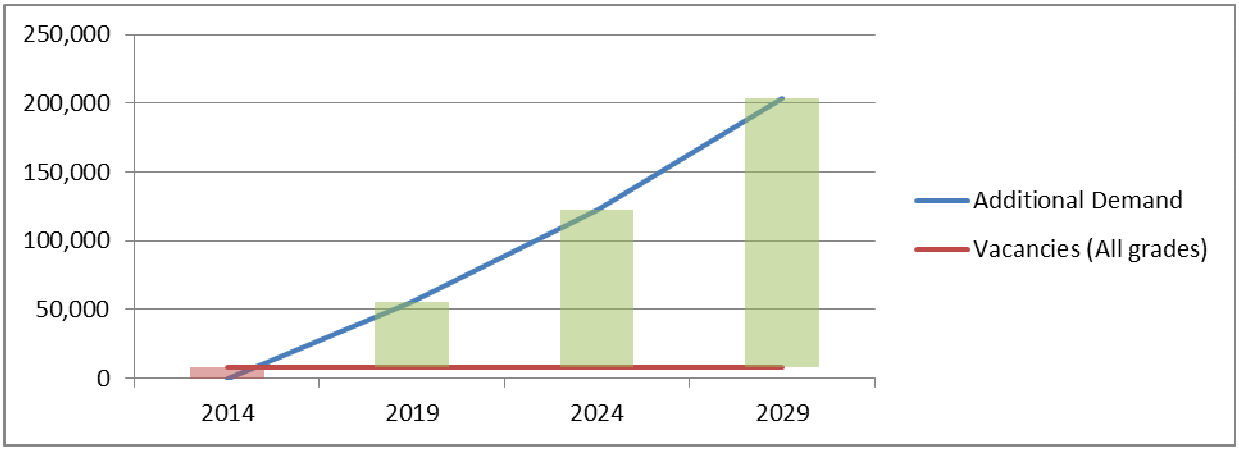
The demand for office space is a function of the output of the finance, insurance, real estate and business services sector; the community, social and personal services sector; and the general government sector, as well as the number of people who are employed within these sectors within the economy.

Table 11 gives an indication of the demand for additional rentable office space within the study area up to 2019.

The additional demand for office space will increase to 203,475 m^2 by 2029. However, current vacancies will have to be used first before additional space will be taken up within the market. Figure 10 represents this graphically.

(iii) Net Effective Demand

The demand for additional office space will surpass the current vacancies in 2015. The green shaded areas represent the additional demand for office space once the current vacancies have been eradicated. Refer to Figure 11.



Source: Urban-Econ (2014)

Figure 9: Demand and vacancies of office space, 2014-2019

The following table indicates the effective demand for rentable office space.

Table 11: Effective demand for rentable office space, 2014-2019

Concept	2014	2019	2024	2029
Additional Demand	0	55,622	122,660	203,475
Vacancies (All grades)	8,236	8,236	8,236	8,236
Effective Demand	**-8,236**	**47,386**	**114,425**	**195,239**

Source: Urban-Econ Modelling (2014)

The demand for additional office space will surpass the current vacancies in 2015. The effective demand for rentable office space will be around 195,239 m^2 by 2029. This indicates good demand for additional rentable office space.

b) Hotel Assessment

The location of the proposed boutique hotel within an office park will mean that it will mostly serve business visitors. The following table indicates the total number of domestic tourists visiting eThekwini on an overnight trip as well as the number of business tourists visiting eThekwini on an overnight trip.

Table 12: Domestic tourists visiting eThekwini on an overnight trip, 2012

Type	Number	Percentage
Total Tourists	836,583	100.0%
Business Tourists	18,770	2.2%

Source: Quantec (2014)

The following table indicates the total number of foreign travellers arriving at King Shaka International Airport (KSIA) as well as the number of foreign travellers that are considered to be business tourists.

Table 13: Foreign traveller arrivals at KSIA, 2012

Type	Number	Percentage
Total Tourists	41,323	100.0%
Business Tourists	7,686	18.6%

Source: KZN Tourism (2013)

From the preceding two tables it is evident that 18,770 domestic business tourists visited eThekwini in 2012, while 7,686 foreign business travellers arrived at King Shaka International Airport in 2012.

(i) Supply

There are a total of 26 hotels within the study area with an estimated 4,892 beds available. This translates into a total of 1,785,580 bed nights, while 40,062 bed nights will serve business visitors.

(ii) Demand

The total demand for hotel bed nights was calculated using the number of business visitors visiting the area multiplied by the average length-of-stay[4] for both domestic and foreign visitors. However, not all business visitors will stay in a hotel as some business visitors prefer to stay in guesthouses. Consequently, a ratio[5] was applied in order to get the total demand for hotel bed nights by business visitors. The following table indicates the demand.

Table 14: Demand for hotel bed nights by business visitors, 2014 – 2029

Concept	2014	2019	2024	2029
Demand for bed nights	43,979	54,129	67,955	86,910
Total additional demand	0	10,150	23,977	42,932

Source: Urban-Econ Modelling (2014)

(iii) Net-Effective Demand

The following table details the net effective demand for beds by business visitors visiting the study area.

Table 15: Net effective demand for beds, 2014 – 2029

Concept	2014	2019	2024	2029
Demand for bed nights	43,979	54,129	67,955	86,910
Total additional demand	0	10,150	23,977	42,932
Supply of bed nights	40,062	40,062	40,062	40,062
Net Demand	3,916	14,067	27,893	46,848
Estimated number of beds	**11**	**39**	**76**	**128**

Source: Urban-Econ Modelling (2014)

There will be an estimated net effective demand of 39 beds by 2019 and this will increase to 128 beds by 2029. This is very modest demand, given the levels of supply in Umhlanga and Ballito. The demand will be dependent on business travel based demand.

c) <u>Retail Assessment</u>

The retail component of the proposed development will mainly serve the office precinct of the development. It is highly unlikely that residents from the surrounding area will come here to make purchases. As a result of this the retail demand has been calculated based on the expected retail spend of the employees working in the office precinct on the site.

(i) Demand

The demand for retail Gross Leasable Area (GLA) is a function of the expected number of employees that will be working on the site as well as the expected expenditure per person. The total expenditure per annum is divided by the trading density in order to express the demand for retail space in GLA.

The following table shows the total expenditure, trading density and GLA demanded.

Table 16: Total expenditure, trading density and demand for retail GLA, 2014

Total Expenditure	Trading Density	GLA (m^2)
R 28,677,925	R 28,825	995

Source: Urban-Econ Modelling (2014)

[4] Based on Tourism KZN statistics for 2013.
[5] Based on Tourism KZN statistics for 2013.

The GLA demanded totals 995 m^2.

(ii) Net Effective Demand

The existing retail offerings in the surrounding area will not compete with the proposed retail component. The following table indicates the net effective demand between 2014 and 2029.

Table 17: Net effective retail demand, 2014 – 2029

Year	2014	2019	2024	2029
GLA Demand	995	1,442	2,089	3,027

Source: Urban-Econ Modelling (2014)

The total net effective demand of 995 m^2 GLA is expected to increase to 3,027 m^2 GLA by 2029. Demand is evident and is linked to the office precinct retail needs.

A summary of the office, hotel and retail assessments are listed below.

- There is good demand for additional rentable office space;
- There is very modest demand for hotel beds, given the levels of supply in Umhlanga and Ballito. The demand will be dependent on business travel based demand;
- Retail demand is evident and is linked to the office precinct retail needs.

B-2.4 Noise

The Planning Initiative and Delta BEC were appointed to undertake a research study: Strategies for dealing with noise in Airport Regions. Refer to this study in Appendix 6.11. 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, however, based on the preferred site alternative (office park and hotels), the potential noise impacts are negligible.

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 eThekwini 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)[6] contour is considered sensitive to noise (SANS 1010) and must adhere to additional development controls if permitted.

No permanent residential development is permitted with the 55dB DNL (2035) noise contour i.e. tourist accommodation permissible with sound attenuation. A hotel is proposed at the Support Precinct 2 development site. Therefore appropriate sound attenuation measures must be adopted in the building design.

The Noise Research Study focused on establishing an understanding of noise issues around airports through research of a number of international airports. The ultimate aim was to contribute to the development of policies and strategies for forward planning and addressing/mitigating noise generated by aircraft around the King Shaka International Airport. This will assist in the forward planning and implementation of an Aerotropolis surrounding the Dube TradePort Hub as well as development within the Dube TradePort Precinct.

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.

[6] DNL is Day Night Average Sound Level – recognised industry standard to measure average aircraft noise levels over a 24 hour period.

B-2.5 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. The proposed filling station may be a source of fumes from fuel storage and air emissions may impact on the receiving environment. Since the adjacent area is not residential in nature, this is not expected to be a significant impact.

B-2.6 Screening Risk Assessment

Environmental Resource Management (ERM) was appointed to conduct a Screening type Risk Assessment for the proposed filling station at the Support Precinct 2 development site. Refer to the Screening Risk Assessment in Appendix 6.12.

The detailed design of the proposed filling station will be undertaken, post receipt of the Environmental Authorisation (EA). Therefore, at this stage, there was insufficient information available to make an accurate assessment of the layout and throughputs of the proposed Filling Station. Therefore, the information utilised for, and contained in this report was based on a number of similar Filling Stations for which ERM has performed risk assessments on, in the past.

Both petrol and diesel will be delivered to the proposed filling station by road tankers. These fuels will be off-loaded from the road tankers into the underground storage tanks on the Filling Station site and the fuel will then be sold to the public.

The assumption is, that in common with normal Petrol Filling Stations, this site will be designed to allow the underground storage tanks to be filled by gravity flow of Petrol and Diesel from the off-loading road tankers. Therefore, it is assumed that no off-loading pumps will be required. It is further understood that the offloading flexible hose has a maximum length of 3 m and a diameter of 100 mm. It is also understood that due to the hazardous nature of the fuel being offloaded, the driver and an employee of the Filling Station will be required to be present at all times during this procedure.

B-2.6.1 Consequence Assessment

a) Harm Criteria

(i) Thermal Radiation

The main cause for harm to people considered in this study is thermal radiation, which occurs as a result of a fire. The vulnerability of people exposed to thermal radiation depends on the intensity of the incident radiation and the duration of exposure. Thermal flux values are used as criteria for long duration fires such as pool fires as well as jet fires and thermal dose values are used for short duration intense fires such as Boiling Liquid Expanding Vapour Explosions (BLEVEs) and fireballs.

(ii) Fatality Probabilities

To assign a probability of fatality to people exposed to the thermal flux values, probabilities of fatality have been assigned based on the required time to reach thermal doses and the probability of fatality that the HSE has assigned to these thermal.

- At a thermal flux of 37.5 kW/m^2:

For outdoor, a high thermal dosage (1800 tdu) is reached rapidly offering little chance of escape and leaving a high probability of fatality. For indoor, although a building may offer some degree of protection, as 37.5 kW/m2 is above the spontaneous ignition threshold of wood (1) , there is a high probability that the building will catch fire and force occupants to escape into a higher thermal flux field resulting into a high probability of fatality.

- At a thermal flux of 12.5 kW/m2:

For outdoor, a thermal dose of 1000 tdu is reached after 30 seconds and 1800 tdu after 1 minute, leading to a fatality probability of 1% and 50% respectively. This offers some chance of escape at this level. For indoor, piloted ignition of wood is possible during long exposure at this thermal flux causing a building to catch fire. However, even if the building does ignite, there is still possibility of the occupants escaping to alternative shelter.

- At a thermal flux of 6.3 kW/m2:

For outdoor, a thermal dose of 1500 tdu is reached after 1.5 minutes seconds and 1800 tdu after 2.5 minutes, leading to a fatality probability of 1% and 50% respectively. This offers a chance of escape resulting in a low fatality. For indoor, thermal flux levels are below the piloted ignition threshold for wood and therefore the likelihood of fatality for building occupants is considered to be very low.

b) Land Use Planning Advice

In the absence of 'official' South African guidance, the risk levels applied in this assessment are those employed by the UK Health and Safety Executive (HSE) when setting zones around MHIs. The zones for an annual individual being harmed from exposure to flame/heat, explosion overpressure, toxic gas or asphyxiant (i.e. a specified frequency of receiving a dangerous dose); have been set to correspond to the following risk levels:

- Inner zone - 10 chances per million per year (10-5);
- Middle zone - 1 chance per million per year (10-6); and
- Outer zone (Consultation Distance) - 0.3 chances per million per year (3 x 10-7).

The UK HSE modified its zoning criteria and is described in Table 18 below, with proposed developments categorised as either 'advise against' (AA) or 'don't advise against' (DAA). This refers to the advice the HSE would give to the local authority in relation to a development proposal of a given type in the vicinity of a potentially hazardous site. For example, the HSE would advise the local authority against building of a new housing development in the inner zone.

Table 18: Land-use Sensitivity to Risk

Level of Sensitivity	Inner Zone	Middle Zone	Outer Zone
1.The normal working public	DAA	DAA	DAA
2.The general public at home	AA	DAA	DAA
3.Vulnerable members of public (schools, hospitals, etc)	AA	AA	DAA
4.Large examples of No. 3 and large outdoor examples of No. 2 (i.e. recreational areas)	AA	AA	AA

Note that some types of development can change Sensitivity Level depending on their size. For example, large industrial / office land-uses (for more than 100 persons) would move up a Sensitivity Level from Sensitivity Level 1 to Sensitivity Level 2.

c) Scenarios Considered

In this study, the criteria have been used as a screening step to judge the appropriateness of the surrounding land uses in the event of a worst case scenario type accident.

The following scenarios will be considered to result in the most severe consequences for a potential accident on site:

(i) Catastrophic Failure of a Road Tanker or a Single Road Tanker Compartment

A catastrophic failure of a road tanker is assumed to result in the release of the entire road tanker inventory. This type of incident is typically associated with the collision of an object with the tanker or the tanker colliding with a structure on site. The release of fuel from all of the road tanker compartments simultaneously is extremely unlikely. This does however represent the absolute worst case pool fire scenario. This scenario will therefore be demonstrated.

These conclusions are largely dependent upon the actual location of the drop point where the road tankers will off-load in the proposed Service Station. Based on the assumption that the actual location of the drop point is positioned in such a way as to minimise the effects on the surroundings, a conclusion can be made that none of the surrounding land uses for the proposed Filling Station would be considered as incompatible land uses. That is that there are no permanent manned buildings in the area which could be affected by incidents at the Filling Station. Considering the largest pool fire consequence does not lead to incompatible land uses, the off-loading location for the road tankers still needs to be carefully considered to reduce the risks from this procedure to be as low as possible according to the land use planning guidelines. A more detailed Risk Assessment should be carried out on the proposed Filling Station when the detailed design is completed and the actual frequency of delivery of the fuels is established.

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.

An 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.

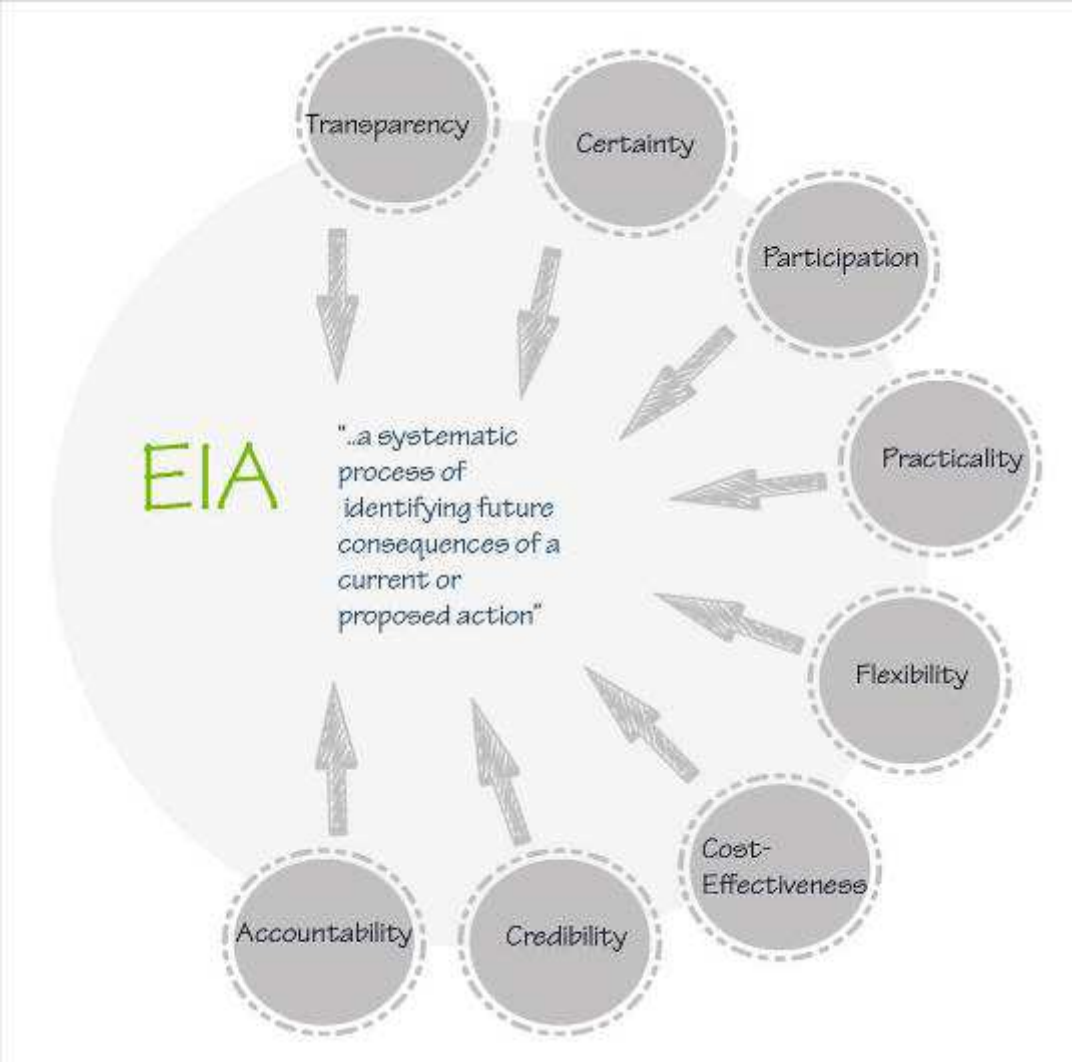


Figure 10: The eight guiding principles for the EIA process

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 29 April 2013. The project was subsequently registered and DEA issued the project with reference number DEA Ref: 14/12/16/3/3/2/549. Refer to Appendix 4.1 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 7 October 2013. The report was rejected by the DEA in a letter dated 29 November 2013 (refer to Appendix 4.2).

Another submission of the Final Scoping Report was made to the DEA on 22 April 2014 and was accepted by the DEA in a letter dated 5 June 2014 (refer to Appendix 4.3 for the acceptance of the Final Scoping Report and PoS for 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:

- Geotechnical Investigations;
- Geohydrological Assessment;

- Biodiversity Assessment (Flora, Fauna and Avifauna);
- Wetland Delineation and Functional Assessment;
- Phase 1: Cultural Heritage Impact Assessment;
- Agricultural Potential Assessment;
- Research Study: Strategies for dealing with noise in airport regions;
- Socio-Economic Impact Assessment;
- Screening Risk Assessment for proposed filling station;
- 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 5.1 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 project was announced on 24 July 2013 in the following manner (see Appendix 5) for public announcement documentation):

- Publication of media advertisement (in English) in the local newspaper, Coastal Weekly and in the Mercury (Appendix 5.2);
- On-site notices advertising the S&EIR process were placed on and around the site, as well as at the Tongaat Library, M65 entrance and Dube City (Appendix 5.3); and
- Distribution of letters by fax/ by hand/ post/ email to I&APs including Registration and Comment (Appendix 5.4).

C-4.3 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 I&APs on the distribution list (refer to Appendix 5.4 for example of the letter that was sent out);
- 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 Economic Development, Tourism and Environmental Affairs (KZN DEDTEA): Land Use and Soil Management;
  - Department of Water and Sanitation (Water Quality Section);
  - eZemvelo KZN Wildlife (EKZNW); and
  - eThekwini Municipality.

The Draft Scoping Report and PoS for EIR were distributed for public comment from 24 July 2013 to 03 September 2013 on the SEF website: 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 5.5.) 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 5.5.1.

C-4.4 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. Monday 7th October 2013 to Monday 28th October 2013 at the Tongaat Public Library and at the SEF website: www.sefsa.co.za. Notification letters regarding the availability of the Final Scoping Report for public review is provided in Appendix 5.7. Refer to the Comments and Responses Report for comments that were raised during public review of the Draft and Final Scoping Reports in Appendix 5.5.5. The actual comments and responses are in Appendix 5.5.2.

The Final Scoping Report, which was simultaneously submitted to the DEA on 7 October 2013, was rejected by the DEA in a letter dated 29 November 2013 (Appendix 4.2).

A re-submission of the Final Scoping Report to the DEA and simultaneously to the public was made on 22 April 2014 (Refer to Appendix 5.9). The Final Scoping Report and PoS for EIR was accepted by the DEA in a letter dated 5 June 2014 (refer to Appendix 4.3 for the acceptance of the Final Scoping Report and PoS for EIR). Refer to the actual comments and responses in Appendix 5.5.3 and 5.5.4.

C-4.5 Draft Environmental Impact Report

The findings of the Impact Assessment Phase are presented in this Draft EIR and draft EMPr (including the specialist studies conducted) and is available for public review and comment.

A period of **40 calendar days (02 September 2015 – 13 October 2015**) has been 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 will be announced by means of personal letters to all the registered I&APs on the distribution list (Appendix 5.10). Refer to the database of registered I&APs in Appendix 5.6.

In addition, the Draft EIR will be 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 been captured in a CRR. I&APs will be sent letters acknowledging their contributions.

C-4.6 Final Environmental Impact Report

The EIR will be updated with comments and/or concerns raised by I&APs. The CRR will be attached to the Final EIR. The Final EIR will be submitted to the DEA and registered I&APs simultaneously for review. Registered I&APs will 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 Environmental Assessment Practitioner (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 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 development.

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.

Extent 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.

Duration 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.
Intensity 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.
Probability 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		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		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-1.2 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-1.3 below.

Table 19: 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-1.3 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-1.4 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-1.4.1 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-1.4.2 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-1.4.3 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-1.4.4 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.

SECTION E: ALTERNATIVES

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 applicant owns the site which is strategically located and in close proximity to the Phase 1 of Dube TradePort TradeZone and the KSIA. This development node was identified during the EIA for the entire KSIA and as such, is being proposed for development by the applicant.

The proposed land uses do not occur within the 'conservation area' that forms part of the mitigation measures for Phase 1 of the KSIA/DTP development.

E-1.2 Land Use Alternatives

Alternative 1: The Preferred Alternative is to develop the site for mixed land uses that incorporates an office park, hotels, petrol filling station, limited retail/commercial and an open space area that complements the adjacent 'conservation areas' as part of the KSIA Phase 1 Mitigation Strategy.

The remaining area on site would accommodate internal roads through the development and supporting services infrastructure, such as internal water, sewer, stormwater lines and stormwater attenuation ponds.

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, office parks, hotel, filling station, internal roads and services infrastructure, the entire site would be developed for agricultural land use practises.

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

E-1.3 Development Layout Alternatives

Layout Alternative 1: Preferred Layout

As far as possible, the preferred layout has been re-aligned to ensure that the proposed hard structures and infrastructure avoids encroachment into the riparian areas and the wetlands. The vegetation community, *Acacia-Erythrina* wooded areas is associated with the riparian and wetland areas and is of high conservation importance. Vegetation clearance of this vegetation community will be kept to the minimum.

Buffers at a minimum of 30m from the outer edge of the wetlands are required in line with the guidelines by EKZNW, 2010. However, there will be various landuses occuring within the 30m wetland buffer. To mitigate the loss of wetland, as a result of the construction of the internal road through the wetland and construction within the 30m wetland buffers, a Wetland Rehabilitation Plan will be compiled and included in the Final EIR for public review and comment.

An internal road that links the two development nodes, goes through the wetland on the northern portion of the site. To mitigate the impact on the wetland, a Water Management Plan, an Erosion and sediment control programme and a Stormwater Management Plan must be implemented during the construction and operational phases of the development.

Sediment barriers (e.g.: silt fences/sandbags/hay bales) must be installed immediately downstream of active work areas (including soil stockpiles) as necessary to trap any excessive sediments generated during construction. Any erosion gullies/channels created during construction should be filled immediately to ensure silt does not drain into the wetland.

Once operational, maintenance measures such as the clearing of debris from culverts and the monitoring and stabilising of any head cut or gulley erosion that forms take place regularly.

Refer to the Preferred Site Layout Plan in Figure 14 and Appendix 3.1.

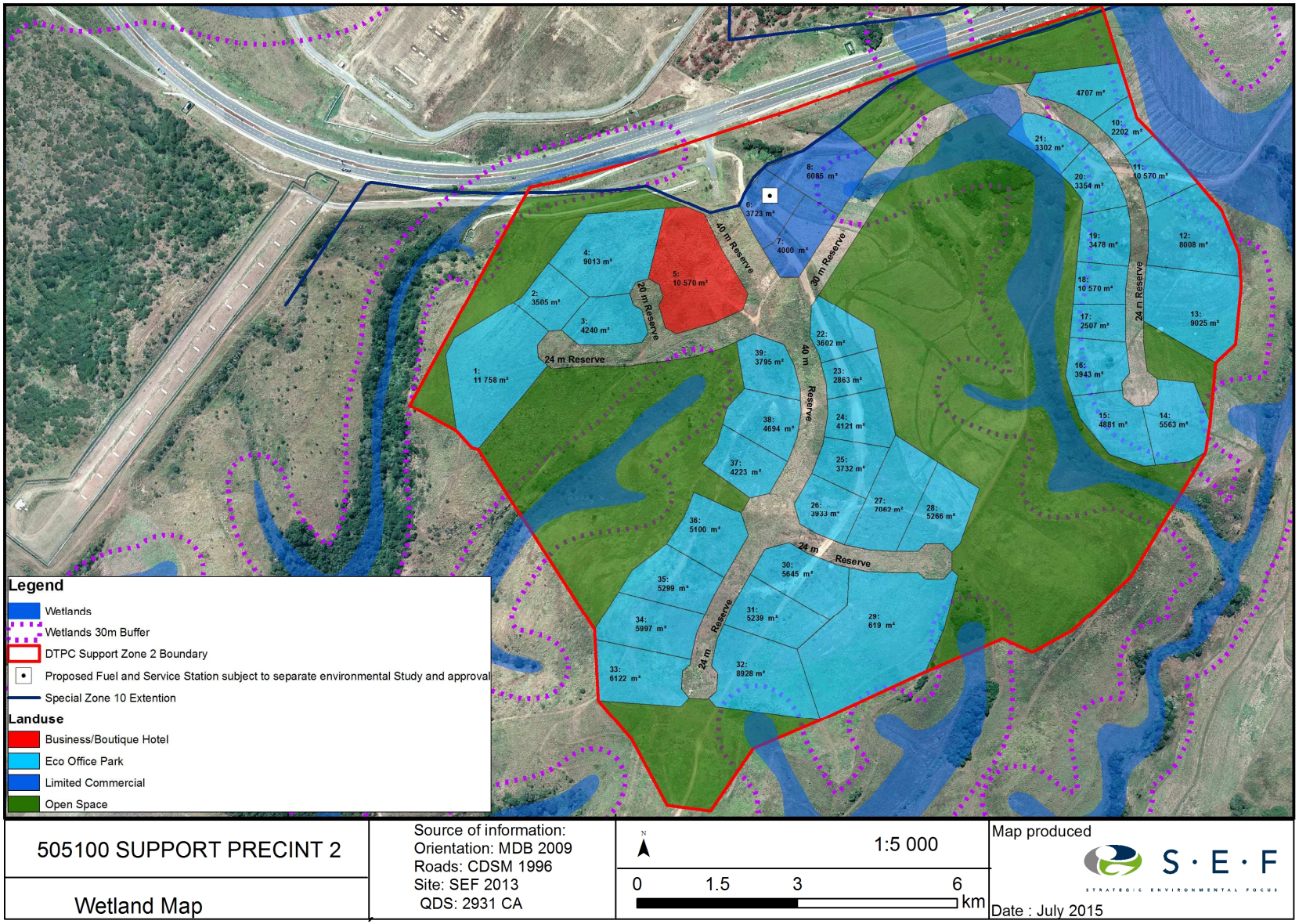


Figure 13: Preferred Site Layout Plan

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.

However, rehabilitation of the site, erosion control and eradication of alien invasive plants will have a positive impact on the site and will complement the surrounding Durban Metropolitan Open Space System (D'MOSS) should the no-go alternative be adopted.

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 Support Precinct 2 development not take place, there would be no support towards 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 Support Precinct 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[7] development plans.

The DTP has been identified as a key development node in the north, and this is evident in the eThekwini Municipality's IDP, as well as the Northern Spatial Development Plan, and the Tongaat/DTP LAP. In the absence of the Support Precinct 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 Support Precinct 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 and upgrades to a 400mm Class 12 uPVC pipe.

In addition, there would not be the need for the construction of proposed lifting stations and a 3 365m rising main network to the Southern Waste Water Treatment Works (SWWTW) 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 eThekwini Municipality to collect waste that would have been generated at the Support Precinct 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 Support Precinct 2 development not go-ahead.

[7] 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).
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).

E-2 COMPARATIVE ASSESSMENT

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

E-2.1 Layout Alternatives

No-Development Alternative	Layout Alternative 1: Preferred Layout
√ There will be no construction and operational phase impacts on the receiving biophysical and socio-economic environment. √ Rehabilitation of the site, erosion control and eradication of alien invasive plants will have a positive impact on the site and will complement the surrounding Durban Metropolitan Open Space System (D'MOSS). X There would be no support towards 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. X Failure to construct the Support Precinct 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 development plans. X The present status quo in terms of stormwater run-off would prevail and there would be no need for the construction of attenuation ponds and other service reticulation on the site and connection to the municipal network.	X There will be an 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. √ The proposed land uses and services infrastructure is located such that it will not require infilling of wetlands for construction. This reduces the potential impacts on the sensitive wetlands on site. 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. X Increased erosion risks due to increased flood peaks and concentrated surface water runoff. X Increase in alien and invasive plant species on-site and downstream. √ The proposed layout allows for linkage with the adjacent D'MOSS areas. √ The layout has significantly reduced the developable area to accommodate the sensitive wetlands on site. √ The adoption of on-site mitigation measures during the construction and operational phase (see Section E-1.3) for construction of the road through the site could reduce the impact on the wetlands.

E-2.2 Land Use Alternatives

Alternative 1	Alternative 2	Alternative 3
Mixed use development comprising hotel, filling station, open space, office park and limited commercial/retail facilities	**Only one land use – Agricultural practises**	**Light industry and residential land uses**
√ This is in line with the local policies (*NSDP*) for development of the DTP area, for land uses such as logistics, business, industry and service opportunities for the region and surrounding local areas. √ The bulk of the precinct will be rehabilitated for conservation purposes. √ The proposed development is a commercial orientated real estate development that is located close to the KSIA and the N2. √ The hotel use will cater for business people and is ideally located near the airport.	X The Tongaat-DTP LAP: NUDC encourages mixed-use development to enforce the new airport node as an internationally competitive 'Aerotropolis.' X Soils at the site have poor soil water characteristics and a moderate to low potential in good seasons. X If improvements were not made, under current production costs for both irrigated and dry land production costs and sugarcane prices, losses could be incurred. Sugar cane yields in the past eight years have been very low. X Site has shallow soils with rocky outcrop	X 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 (*Day Night Average Sound Level*). Permanent residential development would be impacted by noise of the aircrafts. √ 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. X The Tongaat-DTP LAP: NUDC encourages mixed-use development to

√ Support Precinct 2 is ideally located and has good access to the passenger terminal and accessibility form the airport access road linking from the N2 interchange. √ Dube City is likely to become the Airport City around which support uses and activities (*such as those proposed*) are located. √ The proposed business development will form a major new development node in the northern sub-metropolitan area of the municipality. √ In line with the Aerotropolis Plan – 2013, as mixed-use/office/business park development is proposed around the KSIA. √ The proposed Support Precinct 2 development will: • Fulfil the planned expansion of the Northern Node of the eThekwini Municipality; • Provide infill development in this node; • Comply with Provincial and Municipal strategic planning; • Comply with local planning; • Make effective and efficient use of existing infrastructure and resources; and • Create positive employment and socio-economic benefits.	(not suitable for cultivation). **X** The soil, land topography and climate properties inhibits cultivation of annual irrigated crops. It is not commercially viable for extensive agriculture. **X** Less than 25% of the total site area is suitable for cultivation of perennial pastures, sugarcane and timber. √ The road infrastructure to and from the site is good. The infield road network is good. √ The site is close to local and export markets, DTP and KSIA.	enforce the new airport node as an internationally competitive 'Aerotropolis.'

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

- Impact on ground and surface water due to hydrocarbon spillages during both the construction and operational phases of the development;
- Impact on soil contamination during the operational phase;
- Disturbance of estuarine wetlands;
- Loss of hydrological functioning of downstream wetlands and riparian habitats;
- 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);
- Loss of wetland ecosystem and habitat through infill;
- Impact on geological formations as a result of the proposed development;
- Destruction of existing flora within the study area; and
- Increased faunal mortalities and changes in faunal community dynamics.

Socio-Economic Impacts

- Increased dust and noise generation during the construction phase;
- Increase in atmospheric pollution during the operational phase;
- Impact of noise caused by airport noise on the proposed development during the operational activity;
- Change in the visual character of the area;
- Potential impacts on heritage and cultural resources;
- Impact on safety and security;
- 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).

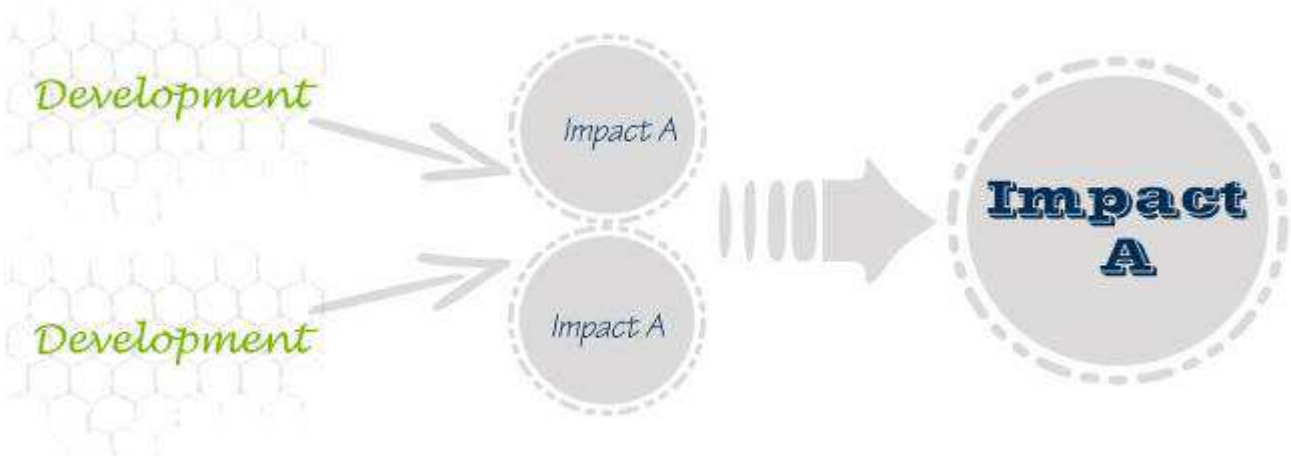


Figure 14: The identification of Cumulative Impacts

The following cumulative impacts have been identified in terms of the proposed development and warrant further investigation during the assessment phase:

- Cumulative impacts of the proposed development and other projects within the KSIA/DTP Precinct;
- Impact on the surrounding conservation areas and ecological linkages/corridors;
- 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 sedimentation of the wetlands, riparian areas and drainage lines

Source and nature of the impact

The impacts that could result in a decline in the geomorphic integrity of the wetlands, associated with Support Precinct 2, includes, increased run-off and erosion. A more detailed description of these impacts is given below:

- Increased run-off. The increase in floodpeaks, due to the increase in hardened surfaces associated with the development, will result in an increased capacity for the wetland to transport sediment. This, together with the concentrated surface water runoff, will increase erosion risks in the downstream wetlands.

The increased run-off, excavation, re-distribution and compaction of soil for the construction of Support Precinct 2 (*as discussed above*) could result in an increase in erosion. This increase in erosion could result in an increase in sedimentation of the downstream wetlands. The increased run-off could continue into the operational phase of the project. Changes to the condition and functioning of downstream wetlands could affect frogs, waterbirds and other aquatic organisms. Froggy Pond is situated upstream of the Support Precinct 2 footprint and, therefore, should not be affected by the increased sedimentation in the uMdloti system due to construction activities for the development.

Table 20: Soil erosion and silting of the wetland, riparian areas and drainage lines

Impact source(s)	Increased run-off		Status	-
Nature of impact	Decline in wetland geomorphological integrity			
Reversibility of impact	Low			
Degree of irreplaceable loss of resource	Medium to high			
Affected stakeholders	Surrounding and downstream land owners			
Magnitude	*Extent*	Regional -3		
	Intensity	Medium – 3		
	Duration	Permanent – 5		
	Probability	Definite - 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+5+5) x 4 = 64 Medium to High		M - H
	With mitigation	*WOM x ME = WM* 64 x 0.4 =25.6 Low - Medium		L - M

Mitigation measures

- The effective implementation of the Water Management Plan and Storm Water Plan discussed in Section F-3.1.2 below.
- It is important to ensure that the vegetation within the wetland and riparian areas are re-instated with indigenous vegetation (grasses and indigenous trees) as soon as practically possible once construction ceases, so as to stabilize erosion-prone areas. WCS (2011b) highlights the re-vegetation strategy for habitat within KSIA.

Significance of the impact

The effective implementation of the above mitigation measures will reduce the impact from Medium - High to Low - Medium.

F-3.1.2 Surface and ground water contamination

Source and nature of the impact

Two main impacts have been identified in terms of a decline in water quality in the lacustrine wetlands, mainly during the construction phase: sedimentation and an increase in pollutants (predominantly hydrocarbons):

- Increased sediment load. There will likely be an increase in sediment load during the construction phase due to the excavation, re-distribution, infilling and compaction of soil; the stockpiling of soil, exposed surfaces etc. The wetlands will also have an increased capacity to transport this sediment load downstream due to increased and concentrated run-off. This was evident in the wetlands, after the construction of the Dube TradePort Head Office, which is situated in the same catchment (NSS, 2012a). Begg (1978) also referred to "siltation... from the earthworks associated with the construction of the La Mercy International Airport (as being) severe in recent years" (Demetriades and Forbes, 2008). An increase in sedimentation can have a number of negative effects on the downstream flora and fauna, specifically within the uMdloti Estuary. An increase in sedimentation will also impact on the geomorphological and hydrological wetland drivers.
- Increase in pollutants. Potential contamination by pollutants, for example accidental spills of hydrocarbons (oils, diesel etc.) or leakage of such substances from construction machinery is an impact associated with the construction phase. Increased run-off described above are expected to be accompanied by an increase in diffuse point pollution from spills or leaks (Coke, 2006). These impacts may occur during both the construction and operation phases, although will be more significant during the construction phase of the project and may enter the wetland directly through surface water runoff or indirectly through subsurface movement.

Table 21: Surface and ground water contamination

Impact source(s)	Excavation, re-distribution, infilling and compaction of soils, spills and leakages		Status	-
Nature of impact	Contamination of surface and ground water during heavy rainfall events			
Reversibility of impact	Medium			
Degree of irreplaceable loss of resource	Medium to high			
Affected stakeholders	Surrounding and downstream land owners			
Magnitude	*Extent*	Regional – 3		
	Intensity	Medium – 3		
	Duration	Long Term – 4		
	Probability	Highly Likely – 4		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+4+4) x 4 = 56 Medium		M
	With mitigation	*WOM x ME = WM* 56 x 0.4 = 22.4 Low to medium		L - M

Mitigation measures

- *Water Management Plan*
  - It is critical that a Water Management Plan is implemented during the construction and operational phases of the proposed project to prevent contributing further to the problems facing the uMdloti River and associated estuary and introducing new problems. Aspects to be included in the plan, but not limited to, include the following:
  - Monthly water quality monitoring of downstream wetlands, including the uMdloti 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 DWS.

- Ensure that a Water Use Licence (WUL) is obtained for all aspects of the project impacting on watercourses.
- Ensure that all water, including, storm water runoff, entering the wetland meets the DWS WUL requirements and that the flow is dissipated to mimic natural run-off velocities as far as possible to prevent erosion downstream.
- Monitoring of river flows entering the head of the estuary pre- and post- construction (Demetriades et al, 2007).
- Ensure that clean and dirty water are separated and that the clean water re-enters the wetland systems in a dissipated flow.
- Maintain areas of vegetation as far as possible to reduce the risks of erosion.
- 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.
- Any cement batching activities must occur outside of the delineated wetland boundary and associated 30m buffer. Cement products/wash not to be disposed of into the wetlands/natural environment.
- Ensure that suitable overnight facilities are provided for vehicles, away from any wetlands and associated 30m buffer. Provide drip-trays beneath standing machinery.
- Routinely check machinery for oil or fuel leaks before construction begins.
- Sanitation – portable toilets to be provided where construction is occurring and outside of all wetland areas and associated 30m buffers. Workers need to be encouraged to use these facilities and not the natural environment.
- Clear and completely remove from site all general waste, construction plant equipment, surplus rock, and other foreign materials once construction has been completed.
- During the construction phase, adequate dust control strategies should be applied to minimise dust deposition and reduce sedimentation in the wetland systems, for example:

- *Storm Water Management Plan*

This plan 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. Aspects to be considered include:

- In order to minimize artificially generated surface stormwater runoff, total sealing of paved areas such as parking lots, driveways, pavements and walkways should be avoided and permeable material should rather be used.
- Stormwater management should encourage infiltration of clean stormwater into the soil, yet ensure that all water entering the wetland systems is slowed down to decrease the risk of scouring and reduce flow modifications in the wetlands.

- *Erosion and Sedimentation Control Programme*

It is critical that any form of soil erosion from the site during the construction and operational phases is controlled to prevent contributing further to the increased sediment load in the uMdloti River and downstream estuary. Erosion control barriers and surface water runoff dissipating measures must be constructed in the drainage lines, 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:

- Excavated material/sediments/spoil from the construction zone (including any foreign materials) should not be placed within wetlands or associated buffer (30m minimum buffer to be applied).
- 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.
- Any erosion gullies/channels created during construction should be filled immediately to ensure silt does not drain into the wetland.

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 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 Disturbance of Estuarine Wetlands

Source and nature of the impact

The watercourses impacted upon by the proposed Support Precinct 2 development all drain into the uMdloti River which ultimately reaches the uMdloti Estuary. This estuary has been identified as a Level 1 FEPA. Estuary FEPAs are the national priority estuaries identified in the National Biodiversity Assessment 2011 (Van Niekerk and Turpie, 2011). Marine and Estuarine Research (MER) undertook an assessment on the proposed impact of the KSIA on the uMdloti and Tongati Estuaries (Demetriades *et al*, 2007). The development of Support Precinct 2 was included in Phase 2 of the KSIA project plan, since the initial EIA was undertaken in 2007 and hence a separate estuarine assessment has not been undertaken for the proposed Support Precinct 2 development. The potential impacts raised in the MER assessment (Demetriades *et al*, 2007) would therefore apply to the proposed development of Support Precinct 2 and include the following:

- *Sedimentation and Shallowing of the uMdloti Estuary*. The construction phase of Support Precinct 2 could result in an increase in erosion and a resultant influx of sediment into the downstream systems. This increase in sedimentation has the possibility to result in the further shallowing of the uMdloti Estuary ultimately reducing the overall habitat available for estuarine functioning, smothering of benthic habitat and reducing the scour potential during breaching by further reducing the volume of water. Fresh water flowing to estuaries and the sea maintains important ecological processes that keep our marine resources healthy, unfortunately the Hazelmere Dam is already impacting on the amount of freshwater reaching the uMdloti Estuary resulting in period of prolonged mouth closure (Forbes and Demetriades, 2008), this will also increase the risk of back-flooding during storms (Driver *et al*, 2011). Begg (1978) highlights that the uMdloti estuary received large volumes of sediment during the construction of the airport site during 1975, which may have also contributed to the prolonged mouth closures.

- *Decline in Water Quality*. Overall indications are that water quality in the uMdloti and Tongati estuaries is severely impacted by catchment land-use and activities such as the disposal of sewage and effluents into the systems especially during low flow and closed mouth conditions (exacerbated by the reduced flows associated with Hazelmere Dam). The proposed Support Precinct 2 development (particularly during the construction phase) could result in a potential increase in the pollution levels in the downstream estuaries. This will be mainly due to the construction equipment and will include fuel and oil hydrocarbons and the treatment and discharge of waste water. The further reduction in water quality of the uMdloti estuary and the health of the system could impact

on the important services provided by the estuary.

- *Change in Water Quantity*. The direct water demand for the proposed Support Precinct 2 development is small if non-existent. The major impact with regards to water quantity will be the discharge of stormwater run-off and the resultant change in flow volumes and velocity. The alteration to these flows envisaged by the hardening off of the sub-catchments could result in an increase in peak flow under high flow and flood conditions or alternatively could come down to the estuary quicker than catchment flow and result in a smaller peak before the main flood peak. As highlighted in Demetriades *et al* (2007) without a detailed hydrological report it is difficult to predict the exact changes. Due to the filtering capacity of the wetlands, downstream of the proposed Support Precinct 2 development, prior to reaching the uMdloti estuary, the impact of the hardening of the upstream catchment on the estuaries is predicted to be low.

Table 22: Disturbance of Estuarine Wetlands

Impact source(s)	Excavation, re-distribution, infilling and compaction of soils, spills and leakages		Status	-
Nature of impact	Decline in estuarine integrity			
Reversibility of impact	Low			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Surrounding and downstream land owners			
Magnitude	*Extent*	National – 4		
	Intensity	Medium – 3		
	Duration	Long Term – 4		
	Probability	Highly Likely – 4		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (4+3+4+4) x 5 = 75 Medium to High		M - H
	With mitigation	*WOM x ME = WM* 75 x 0.4 = 30 Low to medium		L - M

Mitigation measures

The majority of the mitigatory measures required, are already discussed under Section 8.2 under the inland wetland systems. It is important that these mitigatory measures are adhered to as degrading the desired condition of a Level 1 FEPA compromises national goals for managing and conserving freshwater ecosystems and many of these FEPA's constitute the last remaining option for representing natural examples of the country's estuarine ecosystems and associated biodiversity (Driver *et al*, 2011).

In addition to the inland wetland mitigatory measures, the LMJV could contribute to more strategic mitigatory measures in the catchment (Driver et al, 2011), for example:

- Support the development and implementation of an estuary management plan, for the uMdloti Estuary, under the Integrated Coastal Management Act;
- Assist in the establishment of an estuary management forum required to implement the plan.

Significance of the impact

The effective implementation of mitigation measures will reduce the significance of the impact from Medium – High to Low- Medium.

F-3.1.4 Destruction of natural vegetation and loss of habitat

Source and nature of the impact

The following Vegetation Communities have high conservation significance:

- Shale Slope Woodlands (Rock remaining patch in the south-eastern section (*N.B. this vegetation type occurs outside the site boundary*)
- *Acacia-Trema-Erythrina* Riparian Zones (associated with the wetlands and riparian areas on site)

The extent of these areas are very small in relation to the remaining footprint which is largely dominated by the recovering Grasslands (Fallow Sugarcane -*Saccharum* spp Fields). These areas are monospecific, and in an initial recovery phase. No floral species are expected to occur and therefore the loss of CI species is expected to have a low significance.

This habitat also currently supports a low diversity of common, generalist fauna, although, during a 21-month avifaunal assessment for KSIA (author and date unknown), most records of Red Data bird species came from fallow sugarcane habitat where the KSIA runways are now situated. The fallow and regenerating sugarcane fields on Portion 11 could, therefore, have conservation importance for Red Data bird species such as the Black-rumped Buttonquail. This secondary habitat type could, however, be easily offset within the remaining recovering grasslands located on Portion 11. Fossorial mammals (e.g. Common Mole-rat and Hottentot Golden Mole), reptiles (e.g. burrowing snakes and skinks) and frogs (e.g. toads and the Spotted Shovel-nosed Frog) will be the most susceptible to injury and mortality while grassland-specialist (e.g. various large terrestrial and small seed-eating) birds and reptiles (e.g. grass and harlequin snakes) are likely to experience the greatest habitat loss and displacement.

Table 23: Destruction of natural vegetation and habitat loss

Impact source(s)	Habitat and vegetation community loss		Status	-
Nature of impact	Clearance of vegetation for construction activities			
Reversibility of impact	Low			
Degree of irreplaceable loss of resource	Low to Medium			
Affected stakeholders	Surrounding and downstream land owners			
Magnitude	*Extent*	Footprint - 1		
	Intensity	Medium – 3		
	Duration	Permanent – 5		
	Probability	Definite – 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (1+3+5+5) x 3 = 42 Medium		M
	With mitigation	*WOM x ME = WM* 42 x 0.6 = 25.2 Low to Medium		L - M

Mitigation measures

- Demarcate all nearby sensitive areas and prohibit their disturbance during clearing of vegetation from the footprint area.
- If certain areas cannot be avoided, transplant any floral species that can be moved from any portions of the Shale Slope Woodlands (Rock remaining patch in the south-eastern section) and *Acacia-Trema-Erythrina* Riparian Zones from the footprint to similar nearby habitats in Portion 11.
- Relocate any CI faunal species from the footprint to similar nearby habitats. For example, if dispersing Pickersgill's Reed Frogs are found in the footprint area, these should be immediately transferred to Froggy Pond.
- Rehabilitate disturbed areas with local indigenous flora. A seed mix must contain a diverse number

of indigenous species (not monospecific).

Significance of the impact

Effective mitigation could reduce the significance of this impact from Medium to Low-Medium.

F-3.1.5 Changes in vegetation structure due to spread of alien invasive vegetation

Source and nature of the impact

Portion 11, specifically Support Precinct 2 is extremely transformed (88% cultivated in the past for sugarcane) with limited remaining natural vegetation. Although a large percentage of the alien species will be removed during vegetation clearing, disturbance to these areas can increase infestations in surrounding habitats. Alien flora has already been removed from various parts of Portion 11, and local indigenous flora are currently being planted in riparian and other sensitive areas. These commendable efforts would be partially in vain if construction of the Support Precinct 2 development facilitated the spread and growth of alien flora on Portion 11. Weedy and alien flora are most likely to establish initially in the construction footprint areas such as storage areas for topsoil, building sand etc. and along access roads, and later on in downstream wetlands. If not controlled, alien invasive flora will out-compete indigenous vegetation, reduce surface and groundwater resources, increase erosion, alter fire regimes and, thereby, degrade faunal habitats and ecosystem services. Although a number of weedy species are within the recovering grasslands, a large number of Category 1 species are currently impacting on the natural regeneration of the wooded areas and forest remnant in the south western section of Portion 11 by reducing tree seedling density and growth and fecundity of perennial forest herbs. The undergrowth is infested with *Lantana camara* on the fringes and *Chromolaena odorata* and Ageratum in the understorey. A particular problem in these areas is the Category 1 species *Rivina humilis*. It spreads mainly by seed. The attractive bright red colour of the seeds makes it a choice food for many kinds of birds which allows seeds to be easily dispersed.

Table 24: Change in vegetation structure and species dynamics

Impact source(s)	Change in vegetation structure and species dynamics		Status	-
Nature of impact	Further establishment of alien flora			
Reversibility of impact	Medium			
Degree of irreplaceable loss of resource	Medium to High			
Affected stakeholders	Surrounding land owners			
Magnitude	*Extent*	Regional - 3		
	Intensity	High - 5		
	Duration	Long Term - 4		
	Probability	Definite - 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+5+4+5) x 5 = 85 High		H
	With mitigation	*WOM x ME = WM* 85 x 0.4 = 34 Low to Medium		L - M

Mitigation measures

- Implement appropriate, environmentally-friendly alien control measures, especially at the construction footprint, along access roads and in sensitive areas
- Weed hygiene procedures will be required to be put in place during construction –
  - Ensure building materials are not contaminated with alien seed. Reputable companies where materials are sourced from need to guarantee this.
  - Including actions such as washing down equipment and checking tyres for propagules prior to machinery/equipment exiting/entering the site.

- Continue to remove and rehabilitate alien invaded areas with local indigenous flora throughout the operational phase of the development
- Use only local, indigenous flora that are not accompanied by weedy and alien species

Significance of the impact
Effective mitigation could reduce the significance of this impact from High to Low-Medium.

F-3.1.6 Increase in faunal mortalities

Source and nature of the impact
Construction of the Support Precinct 2 development will result in an influx of people (contractors, labourers, etc.) and vehicles onto Portion 11. Fauna in and around the footprint area will, therefore, be vulnerable to harassment or persecution by people, injury and mortality from traffic. Small mammals, owls, nightjars, amphibians and reptiles would be vulnerable to disturbance from, specifically, night-time vehicle traffic. Off-road vehicle traffic will disturb flora and fauna, and could cause further habitat degradation to the surrounding vegetation units not within the Support Precinct 2 footprint.

Any level of vegetation clearing, construction or earthworks modification undertaken has the potential to kill or injure fauna species. Whilst potential does exist for dispersal of numerous species (particularly avifauna) to retained habitats in the surrounding area, less dispersive species or species not tolerant to a surrounding human interface may become trapped within the construction area during earthworks specifically burrowing species. Species that may be directly affected as they were recorded on site include *Cryptomys hottentotus* (Common Mole-rat); *Lemniscomys rosalia* (Single-striped Mouse); *Mastomys natalensis* (Natal Multimammate Mouse); *Aethomys ineptus* (Tete Veld Rat); as well as the Data Deficient species *Myosorex varius* (Forest Shrew) and *Crocidura fuscomurina* (Tiny Musk Shrew). Snakes include *Boaedon capensis* (Brown House Snake) and *Philothamnus natalensis natalensis* (Eastern Green Snake). In terms of amphibians, although not detected these species are more likely to be affected by earthworks as they are located within the transformed grasslands:- Snoring Puddle Frog (*Phrynobatrachus natalensis*), Dwarf Puddle Frog (*Phrynobatrachus mababiensis*) and Sharp-nosed Grass Frog (*Ptychadena oxyrhynchus*) particularly near wetland habitats. Within the wetland portion to be removed at the northern section of the site, Guttural Toad (*Amietophrynus gutturalis*), and Natal Sand Frog (*Tomopterna natalensis*) could also be affected. It must be noted that these species are not the only ones that could be affected by the earthwork activities. There are a number of other species with a high possibility of occurrence on site that could be affected (*refer to Appendix 6.8 for detailed lists*).

While the Support Precinct 2 development is operational, there will be a continuous presence of people and vehicles entering the property. Faunal species around the developed area will, therefore, be vulnerable to disturbance by people and possibly fatalities due to traffic and from being considered dangerous (e.g snakes and scorpions).

Table 25: Increase in faunal mortalities

Impact source(s)	Increase in faunal mortalities		Status	-
Nature of impact	Increased human and vehicle activity; vegetation clearing, Excavation, Earthworks etc.			
Reversibility of impact	Low			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	Surrounding land owners			
Magnitude	*Extent*	Site -2		
	Intensity	Medium - 3		
	Duration	Short to medium term – 2		
	Probability	Highly likely – 4		

Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+2+4) x 3 = 33 Medium	**M**
	With mitigation	*WOM x ME = WM* 33 x 0.6 =19.8 Low to Medium	**L - M**

Mitigation measures

- Demarcate all nearby sensitive vegetation communities and prohibit their disturbance during construction by people and vehicles
- An information pack or induction programme for awareness raising should be conducted to inform all contractors and labourers on the importance of the surrounding biodiversity.
- Perform regular patrols to remove snares and other faunal traps from within the KSIA Conservation Area
- Erect notice boards on site to warn people about prosecution for disturbing flora or fauna follow fining/prosecution route where required
- All construction roads should have speed bumps to reduce speed into and exiting the construction areas.
- Any open trenches should always provide a means of escape for trapped animals such as a ramp at one end
- Sequential clearing should be performed in such a way that ensures a number of faunal species have enough time to move out of the clearing site. i.e.:
  - carrying out the clearing in stages; and
  - ensure not more than 3ha is cleared on any one day
- Employ an ECO on site to monitor construction activities to assist in preventing any possible faunal injuries
- Rehabilitate disturbed areas with local indigenous flora
- During operational phase of the project, the office park should be fenced from the surrounding conservation area with fencing that allows small mammal movement but that prevents access by humans into the remaining habitat.
- Speed control measures within Support Precinct 2 should be implemented during operation
- All tenants of the development should also be made aware of the history of the area, the biodiversity, its importance and the reasoning for the protection of the conservation area.

Significance of the impact

Effective mitigation could reduce the Low-Medium significance of this impact slightly. Earthworks and vegetation clearing will lay claim to some faunal mortalities even with mitigation.

F-3.1.7Loss of hydrological function impacting on downstream wetland and riparian habitats

Source and description of the impact:

Hydrology is one of the 3 drivers in wetland formation. The construction and operation of Support Precinct 2 could result in a change in wetland hydrology in terms of water input into the downstream wetlands and the water distribution and retention patterns of the wetland:

- Increase in flood peaks due to the additional hardened surfaces upstream;
- Potential change in channel morphology downstream due to increased flood peaks;
- A decrease in water input due to the removal of upstream soil storability due to the covering of the soil surface by an impervious layer (i.e. the Support Precinct 2 development). This will affect the ratio of subsurface to surface water inputs constituting the current hydrological regime of the upstream wetland system;
- Increase in water input due to discharge of effluent;

- Change in water distribution due to the construction of roads, culverts, stormwater release channels etc.;
- Change in water distribution patterns due to infilling within the upstream wetlands.

Table 26: Loss of hydrological function impacting on downstream wetland and riparian habitats

Impact source(s)	Increase of hardened surfaces, discharge of effluent, construction of roads		Status	-
Nature of impact	Change in wetland hydrology (water inputs, distribution and retention)			
Reversibility of impact	Low to medium			
Degree of irreplaceable loss of resource	Medium to high			
Affected stakeholders	Surrounding land owners and downstream users			
Magnitude	*Extent*	Regional -3		
	Intensity	Medium – 3		
	Duration	Permanent – 5		
	Probability	Definite – 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+5+5) x 4 = 64 Medium to high		M - H
	With mitigation	*WOM x ME = WM* 64 x 0.4 = 25.6 Low to Medium		L -M

Mitigation measures

The implementation of a water management plan and storm water management plan is recommended:

- *Water Management Plan*
  - It is critical that a Water Management Plan is implemented during the construction and operational phases of the proposed project to prevent contributing further to the problems facing the uMdloti River and associated estuary and introducing new problems. Aspects to be included in the plan, but not limited to, include the following:
  - Monthly water quality monitoring of downstream wetlands, including the uMdloti 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 DWS.
  - Ensure that a Water Use Licence (WUL) is obtained for all aspects of the project impacting on watercourses.
  - Ensure that all water, including, storm water runoff, entering the wetland meets the DWS WUL requirements and that the flow is dissipated to mimic natural run-off velocities as far as possible to prevent erosion downstream.
  - Monitoring of river flows entering the head of the estuary pre- and post- construction (Demetriades *et al*, 2007).
  - Ensure that clean and dirty water are separated and that the clean water re-enters the wetland systems in a dissipated flow.
  - Maintain areas of vegetation as far as possible to reduce the risks of erosion.
  - 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.
- Any cement batching activities must occur outside of the delineated wetland boundary and associated 30m buffer. Cement products/wash not to be disposed of into the wetlands/natural environment.
- Ensure that suitable overnight facilities are provided for vehicles, away from any wetlands and associated 30m buffer. Provide drip-trays beneath standing machinery.
- Routinely check machinery for oil or fuel leaks before construction begins.
- Sanitation – portable toilets to be provided where construction is occurring and outside of all wetland areas and associated 30m buffers. Workers need to be encouraged to use these facilities and not the natural environment.
- Clear and completely remove from site all general waste, construction plant equipment, surplus rock, and other foreign materials once construction has been completed.
- During the construction phase, adequate dust control strategies should be applied to minimise dust deposition and reduce sedimentation in the wetland systems, for example:

- *Periodic spraying of roads with water or dust inhibitor.*
- Cover trucks to prevent dust emission during transport.

- *Storm Water Management Plan*

This plan 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. Aspects to be considered include:
- In order to minimize artificially generated surface stormwater runoff, total sealing of paved areas such as parking lots, driveways, pavements and walkways should be avoided and permeable material should rather be used.
- Stormwater management should encourage infiltration of clean stormwater into the soil, yet ensure that all water entering the wetland systems is slowed down to decrease the risk of scouring and reduce flow modifications in the wetlands.

Significance of the impact:
The effective implementation of the water management and storm water plan will reduce the impact significance from Medium - High to Low – Medium.

F-3.1.8 Possible ongoing changes in faunal community dynamics

Source and description of the impact:
Earthworks could result in increased dust and soil erosion during the construction phase. Downstream wetlands will also be degraded due to changes in the distribution and retention of water, and changes in water quality from e.g. siltation. These changes to the condition and functioning of downstream wetlands could impact on the dynamics of amphibians, waterbirds and other aquatic organisms. Froggy Pond is situated upstream of the Support Precinct 2 footprint and, therefore, should not be affected by e.g. increased sedimentation in the uMdloti system due to construction activities for the development. Detailed impacts on the uMdloti and its estuary with regards to siltation is discussed within the Wetland Assessment for Support Precinct 2 (NSS, 2014).

In the short term, herbivorous animals ranging from insects to antelope may suffer from increased dust especially if this affects the nearby wooded and forest patches to the south and south west (both in feeding and breathing).

Construction crews, vehicles, machines and activities could contribute further noise to that which is currently generated by aircrafts at KSIA, and by traffic on M65/uMdloti Street and the nearby N2. Loud construction

noises such as blasting could cause animals in the vicinity of the footprint to experience panic, stress and injury. Regular or continuous noise (e.g. drilling) could compromise foraging, socializing, and breeding of sensitive species. Of greatest concern is the potential impact of construction noise on various CI bat, bird and frog species in nearby forest and wetland habitat. For example, Pickergill's Reed Frog, produces a very soft call, and has to compete with the Painted Reed Frog, which produces a louder, higher pitched call. An increase in surrounding noise levels will exacerbate and reduce this competition with the louder species succeeding. Bats and in particular gleaning bats are especially sensitive to the effects of noise. Gleaning bats use soft (low amplitude), high frequency echolocation calls to locate and then pick their prey from objects. As an example of a species that was recorded on site, the Egyptian Slit-Faced Bat *Nycteris thebaica*, is a gleaning bat that is likely to be negatively impacted by noise and vibrations associated with the construction activities.

It is known that generally terrestrial faunal groups are particularly sensitive to disturbance with the majority, tending to inhabit areas away from the noise and movements created by people, motor vehicles and moving machinery. Mammals such as moles and mole rats are also known to be specifically sensitive to ground vibrations and may possibly be negatively affected by a change or increase.

Light from possible night-time construction work could disturb a wide range of flora and fauna whose growth, rest, behaviour and reproduction are influenced by night length. The effect of light pollution on natural ecosystems was first studied in 1938, but only during the past 10 years has this subject been more fully researched internationally; most probably due to more rapid encroachments of the urban environment into the natural environment. Light pollution poses a serious threat to wildlife, having negative impacts on plant and animal physiology, especially when introduced into areas that currently contain limited light impact. Light pollution can confuse animal navigation, alter competitive interactions, change predator-prey relations, and cause physiological harm.

If the environment were to be contaminated by e.g. fuels, oil, paint or sewage, this could jeopardize wetland integrity, fauna and ecosystem services. Froggy Pond is situated upstream of the Support Precinct 2 footprint and, therefore, should not be affected by downstream contamination of the uMdloti system. This, however, could affect the uMdloti estuary, which is a national FEPA and which might support CI fauna such as Spotted-necked Otter, storks, terns, pelicans and flamingos. Severe contamination could ultimately affect the nearby marine environment. Further discussions on this are discussed within the Wetland Assessment (NSS, 2014).

In terms of the operational phase, traffic and people will generate predominantly day-time noise, which could affect diurnal calling animals such as forest birds within the woodland/riparian thicket specifically to the west and south west of the footprint. Of greater concern is the potential impact of night-time light from the development on certain flora (e.g. bat-pollinated flowering plants) and fauna (e.g. nocturnal birds and Carnivore mammals), whose growth, rest, behaviour and reproduction are influenced by night length. Light pollution is already a concern and will potentially increase with new developments around KSIA, ultimately affecting the dynamics of species communities within the conservation area.

Table 27: Potential ongoing changes in faunal community dynamics

Impact source(s)	Changes in faunal community dynamics (including diversity and CI Species decline)		Status	-
Nature of impact	Earth works, Noise, light, chemical pollution, building rubble and potential sewage			
Reversibility of impact	High			
Degree of irreplaceable loss of resource	Low to medium			
Affected stakeholders	Surrounding land owners and downstream users			
Magnitude	*Extent*	Regional - 3		
	Intensity	Medium – 3		
	Duration	Medium term – 3		

	Probability	Highly likely – 4	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+3+4) x 3 = 39 Medium	M
	With mitigation	*WOM x ME = WM* 39 x 0.4 = 15.6 Low	L

Mitigation measures

- Mitigatory measures in Section F – 3.1.6 apply
- Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures
- An EO must be onsite during construction activities and must have knowledge of both fauna and flora of the area. The EO must be trained to handle dangerous animals such as snakes to remove them off the construction site into the surrounding vegetation.
- Minimize light pollution by e.g. shielding lights away from sensitive areas, and by using timers and dimmers. Mercury vapour, metal halide, and fluorescent lamps have the least impact on plants. Conversely, red lighting causes the least disturbance to animals. All lighting shall be of minimum necessary brightness consistent with worker safety
- Remove all construction waste and surplus material
- Septic tanks must not be constructed in or near wetlands
- Implement dust control measures with e.g. regular wetting
- Implement erosion control measures e.g. by clearing vegetation during the dry season
- Implement sediment control measures e.g. by clearing vegetation during the dry season
- During operation, landscape planning must take into consideration certain buffering techniques for noise and light reductions for certain areas within the footprint, specifically along the edges of the development that encroach the woodland/riparian thickets.

Significance of the impact:

Effective mitigation could reduce the Medium significance to an upper Low significance.

F-3.1.9 Loss of wetlands

Source and description of the impact:

The LMJV developers have already shifted the layout of the proposed development to try and stay out of the wetlands as far as possible. However, an internal road will be constructed through the wetland in the northern portion of the site to connect the two development nodes. The majority of the wetlands are at the start of the catchment or have already been disconnected from their upstream catchment to a large degree by the construction of the M65. The wetlands scored from Moderately Modified to Seriously Modified. HGM Unit 5, the unit in which wetlands will be lost, is more impacted on in terms of both hydrology and vegetation, with the majority of the site previously cleared for sugarcane plantations. For both broad HGM units the maintenance of biodiversity scored the highest due to the remaining CI habitats and species identified in the downstream wetlands. The systems also scored high in terms of the opportunity to trap sediment, due to the sediment sources in the catchment, with the effectiveness of the wetland scoring an intermediate. In terms of vegetation, a very small portion of riparian vegetation will be lost due to the proposed development, with the main vegetation lost being fallow sugarcane fields (showing signs of grassland recovery). Due to the national and provincial importance of wetlands the permanent loss of these systems will have a High impact WOM.

Table 28: Loss of wetlands

Impact source(s)	Site clearing and construction activities		Status	-
Nature of impact	Loss of wetlands			
Reversibility of impact	Low			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Surrounding land owners and downstream users			
Magnitude	*Extent*	National - 4		
	Intensity	Medium – 3		
	Duration	Permanent – 5		
	Probability	Definite – 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (4+3+5+5) x 5 = 85 High		H
	With mitigation	*WOM x ME = WM* 85 x 0.6 = 51 Medium		M

Mitigation measures

- The applicant has re-aligned the proposed structures and infrastructure to avoid encroachment into the wetlands, as far as possible.
- The proposed development site must be contained to the minimum required footprint.
- The outer limits of wetland buffers in the vicinity of planned developments should be surveyed, clearly defined on the ground and marked as no-go areas prior to the onset of construction activities.
- Comprehensive planning of construction must be conducted prior to the onset of activities. Dump sites for materials, vehicle parking areas, worker's facilities etc. need to be clearly specified and activities must be restricted to these areas. Construction staff and contractors must be informed of the importance of minimising their footprint and keeping it to these areas.
- Access routes to the site, during both the construction and operational phases, must follow existing roads or roads included in the proposed layout.

For construction of the internal road through the wetland, the following must be implemented:

- To mitigate the impact on the wetland, a Water Management Plan, an Erosion and sediment control programme and a Stormwater Management Plan must be implemented during the construction and operational phases of the development.
- Sediment barriers (e.g.: silt fences/sandbags/hay bales) must be installed immediately downstream of active work areas (including soil stockpiles) as necessary to trap any excessive sediments generated during construction. Any erosion gullies/channels created during construction should be filled immediately to ensure silt does not drain into the wetland.
- Once operational, maintenance measures such as the clearing of debris from culverts and the monitoring and stabilising of any head cut or gulley erosion that forms take place regularly.
- The wetlands on site must be rehabilitated post-construction.

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 post-construction 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 29: 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) x WF* (2+3+1+3) x 4 = 36 Low to Medium		L - M
	With mitigation	*WOM x ME = WM* 36 x 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 30: 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) x WF* (2+1+1+3) x 3 = 21 Low to Medium		L-M
	With mitigation	*WOM x ME = WM* 21 x 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 Dube City, in the area, however, most of them will have a direct view of the construction activities.

Table 31: 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) x WF* (3+3+2+4) x 4 = 48 Medium		M

	With mitigation	*WOM x ME = WM* 48 x 0.6 =28.80 Low to Medium	L - M

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 32: 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	*Extent*	Regional -3		
	Intensity	Medium – 3		
	Duration	Medium Term - 3		
	Probability	Definite - 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+3+5) x 5 = 70 Medium - High		M – H
	With mitigation	*WOM x ME = WM* 70 x 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-3.2.5Impacts on heritage resources

Source and nature of the impact

1. Foundations of old buildings

The HIA investigation revealed the presence of foundations of old farm buildings (which are older than 60 years old). This structure is protected by the KZN Heritage Act, 2008 (Act No. 4 of 2008) and if a decision to demolish it is taken, a Permit Application must be lodged with KwaZulu-Natal Provincial Heritage Resources Authority (Amafa).

2. Archaeological Site at DUBSP01

The hill in the northwest corner of the study area has been severely affected by a quarry/borrow pit, heavy-duty machinery and agricultural activity. Various pottery sherds and upper grinding stones were observed on the main hill where there is still a sandy deposit. The HIA investigation named this archaeological site as DUBSP01. The Middle Stone Age (MSA) aspect is of low significance, as it consists of isolated artefacts over a wide area. The archaeological deposit has been damaged and the density of artefacts is very low.

Table 33: Impacts on heritage resources

Impact source(s)	Construction of the proposed Support Precinct 2		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 old building and surrounding landowners			
Magnitude	*Extent*	Site – 2		
	Intensity	Medium – 3		
	Duration	Long-term - 4		
	Probability	Highly likely - 4		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+4+4) x 3 = 39 Low to Medium		L-M
	With mitigation	*WOM x ME = WM* 39 x 0.4 =15.6 Low		L

Mitigation measures

The foundations of several of the farm buildings still exist and are protected by the KZN Heritage Act, 2008 (Act No. 4 of 2008). These structures must be mapped and photographed. The area of the labourer's quarters should be systematically sampled for various artefacts, concentrating on the early 20th century artefacts. The area around the buildings must be cleared of vegetation before mitigation occurs. A Deeds Office survey may be required. The applicant must apply for a Built Environment permit application from Amafa KZN.

The MSA aspect is of low significance as it consists of isolated artefacts over a wide area. DUBSP01 is of low significance in that the archaeological deposit has been damaged and the density of artefacts is very low. No further mitigation is required. However, the applicant must apply for a permit from Amafa KZN to destroy the site.

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.

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 Support Precinct 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 Impacts on safety and security

Source and nature of the impact

There is potential for an increase in criminal activities during construction phase, as there will be increased movement of people through the area.

Any construction or development activity which causes movement/migration of people has the potential to increase the spread of diseases. Potential health risks which may stem from the construction may be:

- Increased incidence of communicable diseases resulting from an increase in local population, due to induced migration.
- Occupational health risks associated with work on a construction site.
- Increased risk of the spread of Sexually Transmitted Diseases and HIV/AIDS.

In this case, one of the most important of these is HIV/AIDS. Induced migration, as well as the movement of contractor construction workers from elsewhere in the country, can potentially increase the spread of HIV/AIDS.

Construction camps are renowned for activities such as prostitution and varying levels of promiscuity. This could lead to scenarios where an infected construction worker coming into the area spreads the disease through unprotected intercourse with sex trade workers or local individuals, who, in turn, will spread it locally.

One development alone cannot solve the HIV/AIDS problem of the country. However, it is the responsibility of all citizens to contribute towards a solution.

Table 34: Impacts on safety and security

Impact source(s)	Potential rise in criminal activity Potential increase in the spread of HIV/AIDS and other diseases	Status	-
Nature of impact	Impacts on the safety and security		
Reversibility of impact	High		
Degree of irreplaceable loss of resource	Low		
Affected stakeholders	Adjacent landowners, residents and surrounding landowners		

Magnitude	*Extent*	Regional – 3	
	Intensity	Medium – 3	
	Duration	Short – medium term - 2	
	Probability	Likely - 3	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+2+3) x 3 = 33 Low to Medium	**L-M**
	With mitigation	*WOM x ME = WM* 33 x 0.4 =13.2 Low	**L**

Mitigation measures

- Implement efficient security and access control, to ensure that only construction workers enter the camp.
- It is suggested that people from the local workforce be employed.
- To ameliorate the potentially negative impacts associated with the potential increase in the spread of HIV/AIDS and other diseases, the following mitigation measures are suggested:
- Where possible, appoint local labour, thereby reducing the number of external construction workers required.
- Ensure sufficient water and sanitation is provided at the construction camp.
- Ensure that refuse management and removal is done properly.
- Include an HIV/AIDS awareness component in the induction programme of all construction workers coming onto site.
- An on-going HIV/AIDS awareness campaign should be implemented with the workforce and communities neighbouring the site, and adequate access to HIV/AIDS-related information and condoms, for all construction employees.
- Condoms should be made available to all construction workers, with the active encouragement of their use.

Significance of the impact:
The significance of the 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-3.2.7 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 Support Precinct 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, i.e. installation of underground fuel tanks at the proposed on-site filling station, spills and/or leakages could occur and enter the stormwater management system and thus, potentially contaminate surrounding surface and ground water resources.

Table 35: 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) x WF* (3+5+5+5) x 2 = 36 Low to medium		L - M
	With mitigation	*WOM x ME = WM* 36 x 0.4 =14.4 Low		L

Mitigation measures

- The stormwater attenuation facilities must be designed to filter / trap any contaminates 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 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.
- The underground storage tanks must be built according to the applicable specifications to ensure that high standards are adhered to in terms of product and installation methods. This will reduce the risk of underground leakages. The following standards should be adhered to:
- SABS 089, 1535 and 0131 relating to tank installation;
- SABS 0108 relating to classification of hazardous locations and selection of apparatus for such installations;
- SABS 0400 relating to building regulations;
- At least three monitoring borehole must be identified or drilled downstream of the petrol tanks;
- The underground cavity, which will house the petrol tanks, must be lined with plastic or another impermeable and resistant coating;
- Pipes that deliver fuel to the pumps must be adequately sealed from the surrounding soil;

- All services to buildings must provide for flexible couplings between the ground and the structure; and
- Adhere to all applicable specifications and legislation during the construction, operation and decommissioning of the petrol station.
- To prevent soil and groundwater contamination during the operational phase, the surface of the forecourt must be constructed in such a way that no liquid runoff from the forecourt will be able to penetrate into the underlying soil.
- Prohibitive measures will have to be put in place to ensure minimal risk in the case of large product spills or releases at the site. These include the installation of drainage channels, containment tanks and separators etc. that are already incorporated into the design of new filling stations. The risk to human health and the environment is expected to be minimal if all installations are sound and accurate product and groundwater monitoring is performed.
- Facilities for the disposal of hydrocarbon-based fuels and lubricants must be made available. The following should receive particular attention:
- The ground water quality of the site must be monitored bi-annually and records of such monitoring must be kept on site;
- Dipstick readings of the fuel tanks must be taken daily and documented on site;
- If and when contamination is detected in the monitoring well, a rehabilitation plan must be compiled and executed; and
- Stock reconciliation must be performed monthly.
- The underground tanks and pipelines must be monitored regularly to detect leaks and unnatural discharges as soon as possible. The relevant authorities must be kept informed of spills and contingency plans must be in place to minimise pollution, should a spill occur.
- An Emergency Reponses and Spill Contingency Plan must be put into place in case of leakages or spillages which are not detected and can lead to the contamination of underground water. Leak detectors on pressure systems must be included.
- A groundwater monitoring network needs to be installed and a groundwater monitoring protocol put in place.
- The recommendations with regard to the identification, direction, flow etc. of any potentially contaminated plume/flows as per Section 7.1 of the Geohydrological Assessment by GEOSS in Appendix 6.4, must be strictly adhered to.
- Groundwater monitoring should be undertaken biannually (twice per year) where groundwater monitoring boreholes are installed. The parameters for groundwater monitoring boreholes as specified in the Geohydrological Assessment by GEOSS in Appendix 6.4, must be strictly adhered to.
- 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 bunded 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.

Spills and/or leakages could occur as a result of the proposed filling station-related activities and thus, potentially contaminate the soil.

Table 36: 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 filling station-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	*Extent*	Regional -3		
	Intensity	High – 5		
	Duration	Permanent - 5		
	Probability	Highly likely – 4		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+5+5+4) x 2 = 34 Medium - Low		M-L
	With mitigation	*WOM x ME = WM* 34 x 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.

Recommendations for filling station-related activities
Refer to the mitigation measures listed in Section F-3.1.2 Surface and groundwater 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, as well as pro-active measures taken in the design of the proposed filling station, are effectively mitigated the significance will be reduced to low.

F-4.1.3 Changes in Faunal Community Dynamics

Source and nature of the impact
While the Support Precinct 2 development is operational, there will be a continuous presence of people and vehicles entering the property. Faunal species around the developed area could, therefore, be vulnerable to disturbance by people and possibly fatalities due to traffic and from being considered dangerous (e.g. snakes and scorpions).

Traffic and people tend to generate predominantly day-time noise, which could affect diurnal calling animals such as forest birds within the woodland/riparian thicket specifically to the west and south west of the footprint. Of greater concern is the potential impact of night-time light from the development on certain flora (e.g. bat-pollinated flowering plants) and fauna (e.g. nocturnal birds and Carnivore mammals), whose growth, rest, behaviour and reproduction are influenced by night length. Light pollution is already a concern and will potentially increase with new developments around KSIA, ultimately affecting the dynamics of species communities within the conservation area.

Table 37: Changes in faunal community dynamics

Impact source(s)	Changes in faunal community dynamics (including diversity and CI species declines)		Status	-
Nature of impact	Increase in human and vehicle activity, light pollution			
Reversibility of impact	High			
Degree of irreplaceable loss of resource	Low to Medium			
Affected stakeholders	Surrounding and downstream land owners			
Magnitude	*Extent*	Regional - 3		
	Intensity	Medium – 3		
	Duration	Medium term - 3		
	Probability	Highly likely – 4		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+3+4) x 3 = 39 Medium - Low		M-L
	With mitigation	*WOM x ME = WM* 39 x 0.4 =15.6 Low		L

Mitigation measures
- During operational phase of the project, the office park should be fenced from the surrounding conservation area with fencing that allows small mammal movement but that prevents access by

humans into the remaining habitat.
- Speed control measures within Support Precinct 2 should be implemented during operation.
- All tenants of the development should also be made aware of the history of the area, the biodiversity, its importance and the reasoning for the protection of the conservation area.
- There should be signposts in English and Zulu placed at strategic locations on site, notifying people of the 'conservation area'.
- Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures
- Minimize light pollution by e.g. shielding lights away from sensitive areas, and by using timers and dimmers. Mercury vapour, metal halide, and fluorescent lamps have the least impact on plants. Conversely, red lighting causes the least disturbance to animals. All lighting shall be of minimum necessary brightness consistent with worker safety landscape planning must take into consideration certain buffering techniques for noise and light reductions for certain areas within the footprint, specifically along the edges of the development that encroach the woodland/riparian thickets.

Significance of the impact
Effective mitigation could reduce the impact to low.

F-4.1.4 Spread of alien invasive plant species

Source and nature of the impact
Should landscaping of the Support Precinct 2 development site occur with exotic plant species, this will hamper efforts for the removal of alien invasive plant species at the adjacent 'conservation areas'.

Table 38: Increase in spread of alien invasive plant species

Impact source(s)	Decreased biodiversity in the adjacent 'conservation area'		Status	-
Nature of impact	Increase in spread of alien invasive plant species			
Reversibility of impact	Low			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	Surrounding and downstream land owners			
Magnitude	*Extent*	Regional – 3		
	Intensity	High – 5		
	Duration	Long term – 4		
	Probability	Definite – 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+5+4+5) x 5 = 85 High		H
	With mitigation	*WOM x ME = WM* 85 x 0.4 =34 Medium – Low		M - L

Mitigation measures
- Since the removal of alien flora is labour-intensive, time-consuming and costly, further prevention is better than cure. However, ongoing clearing within the remaining natural areas in the conservation area is required throughout the operational phases of the development.
- A Landscape Architect must be appointed to compile a Landscape Development Plan, which will include the planting of vegetation endemic to the region.
- Continue to remove and rehabilitate alien invaded areas with local indigenous flora throughout the operational phase of the development.

- Use only local, indigenous flora appropriate to the site that are not accompanied by weedy and alien species.

Significance of the impact
Effective mitigation measures reduces the significance of the impact to medium to low.

F-4.2 Socio-economic Environment

F-4.2.1 Increase in ambient noise levels

Source and nature of the impact
The proposed landuses of the Support Precinct 2 development will not generate noise in the study area. The impact of proposed development on the receiving environment is therefore not significant.

The proposed Support Precinct 2 development 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. The impact of the KSIA on the proposed development, without mitigation is of high significance.

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. The implementation of this mitigation principle will reduce the impact to medium-low.

F-4.2.2 Increase in atmospheric pollution

Source and nature of the impact
Following the construction of a filling station on the site, the ambient benzene concentrations may increase. The escape of noxious gases, such as benzene and others, poses a threat to human health. The dangers associated with fuels, such as petrol, include the effect of inhaling noxious gases. Benzene is a common contaminant of volatilised gases and vehicles emit gases like total hydrocarbons (HC), oxides of nitrogen (NOx) and carbon monoxide (CO). The vapour losses occurring at a service station tank, with petrol transfer, is about 0, 16% (Stockman & Sogorka, 1997). This loss would occur when the vehicles petrol tanks are filled, and when the storage tanks at the filling station are filled.

Accidental petrol spills may increase the evaporative loss of petrol. However, with good housekeeping, this could be kept to a minimum, and it is therefore considered to be of lesser significance.

The filling station would be a source of low-level emissions. These would disperse into the atmosphere and get diffused at rates that would be determined by atmospheric stability. Pollutants would tend to follow the wind directions, and because of the turbulence and mixing, pollutant concentrations would reduce as the distance from the source increases.

Table 39: Increase in atmospheric pollution

Impact source(s)	Impact on human health		Status	-
Nature of impact	Increase in noxious gas emissions			
Reversibility of impact	Low			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	Patrons, visitors and employees on the site			
Magnitude	*Extent*	Site – 2		
	Intensity	Medium – 3		

	Duration	Short-term – 1	
	Probability	Likely – 3	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+1+3) x 3 = 27 Low to Medium	L - M
	With mitigation	*WOM x ME = WM* 27 x 0.4 = 10.8 Low	L

Mitigation measures

- Ensure that all filters, extraction fans, refrigeration compressors and air conditioning units are in a good working order.
- Ensure that all pump devices are in a good working order.
- The health risks associated with benzene concentrations could be adequately mitigated by the installation of an effective vapour recovery system. The use of an effective vapour recovery system during tanker deliveries would significantly reduce emissions of hydrocarbons from the filling station site, thereby reducing ambient Benzene concentrations at the site boundaries and lowering the associated health risks.

Significance of the impact

Effective mitigation measures reduces the significance of the impact to low.

F-4.2.3 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-4.2.4 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-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

The existing intersections were analysed with existing traffic flows and it was found that they operate well in isolation. It is envisaged that the proposed development will generate 1484 vehicles into the precinct in the AM Peak Hour, with 479 vehicles exiting. The PM Peak Hour will have 560 vehicles generated into the development, with 1498 exiting. The proposed Petrol Filling Station will also potentially generate approximately 240 vehicles in total in the AM Peak Hour, with 288 vehicles in total in the PM Peak Hour. This will significantly increase the lane requirement to two lanes on the internal road network. A majority of intersections within the study area operate at acceptable LOS.

Table 40: Increase of traffic during the operational phase

Impact source(s)	The proposed Support Precinct 2 development in conjunction with other proposed projects (such as TradeZone 2 development, Phase 1 of KSIA/DTP, 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	*Extent*	Regional -3		
	Intensity	High – 5		
	Duration	Long-term – 4		
	Probability	Definite – 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+5+5+4) x 5 = 85 High		H
	With mitigation	*WOM x ME = WM* 85 x 0.4 =34 Low - Medium		L-M

Mitigation measures

A Traffic Impact Study for the proposed development was conducted by SMEC SA (refer to Appendix 6.1). To accommodate the anticipated traffic calculated by the study on the surrounding road network, the following mitigation measures are proposed through intersection improvements:

The Traffic Engineer recommends that there be specific upgrades to the following existing intersections:

- R102 and M65/Mdloti Street; and
- M65/Mdloti Street and Harvest Avenue.

Based on an analysis of the external road network for the existing traffic flows and both the 2020 and 2025 background plus development generated traffic volumes, the upgrade requirements to the external road network are as follows:

- At the intersection of R102 and M65/Mdloti Street, the following is recommended:
- There must be a shared through and right turn lane; and
- There must be an additional right turn slip lane.

At the intersection of M65/Mdloti Street and Harvest Avenue, the following is recommended:

- There must be upgrade to signalised intersection;
- There must be upgrades to lanes in each direction. .

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.

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 to 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 Support Precinct 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 41: Loss of wetlands through infilling

Impact source(s)	Development within the Tongaat River and Umdloti River Catchments		Status	-
Nature of impact	Decline in downstream wetland and estuarine integrity			
Reversibility of impact	Low			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Surrounding land owners and downstream water users			
Magnitude	*Extent*	National - 4		
	Intensity	Medium – 3		
	Duration	Permanent – 5		
	Probability	Highly likely - 4		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (4+3+5+4) x 5 = 80 High		H
	With mitigation	*WOM x ME = WM* 80 x 0.8 =64 Medium to high		M - H

Mitigation measures

The significance of the cumulative impact is assessed as High WOM. The only effective mitigation measures will be no further development within the wetlands of these catchments, which is highly unlikely. Should all the

above mitigation measures be implemented for future developments, the significance can be reduced to Medium - High.

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 42: 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	eThekwini Municipality Surrounding land owners Environmental activists			
Magnitude	*Extent*	Regional -3		
	Intensity	High – 5		
	Duration	Permanent – 5		
	Probability	Definite - 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+5+5+5) x 5 = 90 High		H
	With mitigation	*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 high conservation areas and water resources are considered to minimise the impact on biodiversity;
- In order to provide water to the proposed development, 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 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.
- In order to cater for fire flows to Support Precinct 2, it is proposed that the existing supply line leading up to the tie-in point for the new internal reticulation system be upgraded from a 160 mm Class 12 uPVC pipe to a 400 mm Class 12 uPVC pipe.

- In order to provide for bulk sewerage drainage, proposed gravity pipelines and pumping pipeline are proposed. Based on the peak inflows, the rising main network will comprise 110mm and 200mm HDPE class 12 pipes.

Significance of the impact

The cumulative impact of the construction of the Support Precinct 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 'environmentally sensitive habitats' into consideration in the siting of the various infrastructure.

F-5.1.4 Habitat Fragmentation and Corridor Movement Restrictions

Source and nature of the impact

For Support Precinct 2, fragmentation is already occurring with the M65/uMdloti Street to the north and the N2 to the east. The development footprint is remaining outside of the wooded areas associated with the wetland/riparian zones, which will therefore remain as corridors to the south. Species that are restricted to these habitats such as Forest Shrew (*Myosorex varius*), Tiny Musk Shrew (*Crocidura fuscomurina*), Greater Galago (*Otolemur crassicaudatus*), *Apaloderma narina* (Narina Trogon), Red Duiker (*Cephalophus natalensis*) etc. will only utilise these areas within limited to no crossing through the fallow fields. Bat species such as those recorded - Angolan Free-tailed Bat (*Mops condylurus*), Natal Clinging Bat (*Miniopterus natalensis*), Banana Bat (*Pipistrellus nanus*) could move across these areas as well as larger species such as Bushpig (*Potamochoerus larvatus*) and Bushbuck (*Tragelaphus scriptus*). The development of Support Precinct 2 could potentially fragment the habitat associated with the upper catchments of a number of the wetlands, however, is likely not to affect any lateral movements along the wooded /riparian areas. This could continue into the operational phase of the project.

Table 43: Habitat fragmentation and corridor movement restrictions

Impact source(s)	Habitat fragmentation and restrictions of corridor movement		Status	-
Nature of impact	Site clearing and construction activities			
Reversibility of impact	Medium			
Degree of irreplaceable loss of resource	Low to Medium			
Affected stakeholders	Surrounding land owners and conservation groups			
Magnitude	*Extent*	Site - 2		
	Intensity	Medium – 3		
	Duration	Permanent – 5		
	Probability	Likely - 3		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+5+3) x 2 = 26 Low to Medium		L-M
	With mitigation	*WOM x ME = WM* 26 x 0.8 =20.8 Low - Medium		L-M

Mitigation measures

- There is no mitigation for the loss of vegetation communities within the Support Precinct 2 footprint. However where there are crossings of the wetland areas in the upper reaches for road networks these must accommodate movement for faunal species, using applicable culvert systems. Several research studies (Taylor and Goldingay, 2003; Clevenger and Waltho, 2000; Goosem *et al*, 2001) have shown that culverts and underpasses may be utilized by a wide range of fauna.
- Rehabilitate the remaining wooded/riparian areas in and around Support Precinct 2 by removing alien invasives and maintaining a fringe area or buffer along the boundaries.

Significance of the impact

Effective mitigation could reduce the significance of this impact Low-Medium.

F-5.1.5Increase in economic growth

The proposed Support Precinct 2 development will consist of business parks, hotels, filling station and open space areas. It is aimed at targeting international and regional business opportunity. These developments will benefit from its close proximity to the airport and the national route.

The Support Precinct 2 development will comprise an international and regional business precinct that requires good access to the passenger terminal and accessibility from the airport access road linking from the N2 interchange.

The proposed hotel on site will be suited to business people who would like the convenience of being located close to their business and the airport.

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 Support Precinct 2 development will significantly contribute and complement this existing infrastructure that has been created.

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[8] development plans. Local labour will be required for the construction of the proposed Support Precinct 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 filling station, small-scale retail, office park and hotel development, 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 Support Precinct 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.

[8] 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).
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).

SECTION G: CONCLUSIONS AND RECOMMENDATIONS

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

Should certain high ecological sensitive areas of the site be encroached upon during construction (such as the *Acacia-Trema-Erythrina* Riparian Zones) the floral species may be removed to similar nearby habitats on Portion 11. Similarly if any CI faunal species such as Pickersgill Reed Frogs are found within the footprint area, these should be immediately transferred to Froggy Pond. Disturbed areas must be rehabilitated with local indigenous flora. A seed mix must contain a diverse number of indigenous species appropriate to the site.

Where there are crossings of the wetland areas in the upper reaches for the internal road networks, these must accommodate movement of faunal species, using applicable culvert systems. The remaining wooded/riparian areas in and around the Support Precinct 2 site must be rehabilitated by removing alien invasives and maintaining a fringe area or buffer along the boundaries (NSS, 2014).

The wetland systems on site have a High Ecological Importance and Sensitivity (EIS), mainly due to the floral and faunal species identified within the greater systems (particularly downstream of HGM 4) and the important conservation status of the remaining natural patches of habitat (particularly the riparian and scarp forests). Majority of the proposed land uses and service infrastructure are located outside of the wetland and riparian areas.

Buffers at a minimum of 30m from the outer edge of the wetlands are required in line with the guidelines by EKZNW, 2010. However, there will be various landuses occuring within the 30m wetland buffer. To mitigate the loss of wetland, as a result of the construction of the internal road and construction within the 30m wetland buffers, a Wetland Rehabilitation Plan will be compiled and included in the Final EIR for public review and comment.

There must be stringent mitigation measures in place in terms of implementing a Water Management Plan and a Stormwater Management Plan to prevent negative hydrological impacts on the downstream uMdloti Estuary, the rivers and wetlands. There must be continuous monitoring of both the quality and quantity of flow of the rivers and wetlands.

The applicant must contribute to more strategic mitigatory measures, such as the support, development and implementation of an Estuary Management Plan, for the uMdloti Estuary, under the Integrated Coastal Management Act, and assist in the establishment of an estuary management forum required to implement the plan. The proposed land uses for the proposed development must include sound attenuation measures in the design of the buildings to minimise the impacts of noise from the aircrafts landing and taking off at the KSIA.

A Detailed Risk Assessment must be compiled post receipt of the EA, once detailed designs of the on-site proposed petrol filling station is available.

Due to the poor soil, land and climate conditions on the site, extensive commercial agricultural practises are not deemed financially viable for the site. Only if management and irrigation were installed, could the site be deemed to have moderate to good potential. If improvements were not made, under current production costs

for both irrigated and dryland production costs and sugarcane prices, losses could be incurred. Removing this zone from extensive agricultural production will have no impact on food security in the region and, with the introduction of the already constructed (AgriZone 1) and future (AgriZone 2) growth houses and intensive agricultural production, significantly improve such (Jeffares and Green, 2014).

The Traffic Engineer recommends that there be specific upgrades to the R102 and M65/uMdloti Street and Harvest Avenue Intersections, to accommodate the trip generations of the proposed development and future road traffic within the study area.

The Geohydrologist recommends, from a groundwater perspective, that the planned future development can proceed. It is possible that shallow groundwater does contribute to the base flow of the stream flows. The quantities have not been confirmed. The stream lines and riparian zones are intact (*although the landscape has been significantly modified for sugar cane farming*) and for this reason future development plans need to ensure the streams and riparian zones remain intact. It is also suggested that the riparian zones be widened just to ensure that if there is a groundwater contribution to river base flow, that this contribution is impacted as little as possible. Should the proposed filling station be approved, a groundwater monitoring network needs to be installed and a groundwater monitoring protocol put in place.

In terms of cultural and built heritage, the foundations of several of the farm buildings still exist and are protected by the KZN Heritage Act, 2008 (Act No. 4 of 2008). These structures must be mapped and photographed. The area of the labourer's quarters should be systematically sampled for various artefacts, concentrating on the early 20th century artefacts. The area around the buildings must be cleared of vegetation before mitigation occurs. A Deeds Office survey may be required. The applicant must apply for a Built Environment permit application from Amafa KZN.

The MSA aspect is of low significance as it consists of isolated artefacts over a wide area. DUBSP01 is of low significance in that the archaeological deposit has been damaged and the density of artefacts is very low. No further mitigation is required. However, the applicant must apply for a permit from Amafa KZN to destroy the site.

No mitigation measures are required as the proposed development falls outside the 1:100 year floodlines. However, should embankments be constructed during the development that encroach into the floodlines, protection to these embankments must take place. Job opportunities would be created during the construction and operational phases of the proposed development.

According to the Socio-Economic Impact Assessment, there is good demand for additional rentable office space. There is very modest demand for hotel beds, given the levels of supply in Umhlanga and Ballito. The demand will be dependent on business travel based demand. Retail demand is linked to the office precinct retail needs.

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 key impacts have been identified which will require the application of site and activity specific mitigation measures. These mitigation measures are included within the EMPr to ensure that they receive the necessary attention.

Table 44: Summary of the significance of identified impacts without and with mitigation measures

Impact	Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Biophysical Environment		
Soil erosion and sedimentation of the wetlands, riparian areas and drainage lines	Medium to high	Low to Medium
Surface and ground water contamination	Medium	Low to Medium
Disturbance of estuarine wetlands	Medium to High	Low to Medium
Destruction of natural vegetation and loss of habitat	Medium	Low to Medium
Changes in vegetation structure due to spread of alien invasive vegetation	High	Low to Medium
Increased faunal mortalities	Medium	Low to Medium
Loss of hydrological functionality impacting on downstream habitats	Medium to High	Low to Medium
Possible ongoing changes in faunal community dynamics	Medium	Low
Impact on loss of wetlands	High	Medium
Socio Economic Environment		
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
Impacts on safety and security	Low to Medium	Low
Temporary employment opportunities	**Medium Positive**	
Operational Phase		
Biophysical Environment		
Changes in faunal community dynamics	Low to Medium	Low
Spread of alien invasive plant species	High	Lows to Medium
Surface and ground water contamination	Low to Medium	Low
Soil contamination	Low to Medium	Low
Socio Economic Environment		
Increase in atmospheric pollution	Low to Medium	Low
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 to High
Impact of Support Precinct 2 and other developments in the KSIA/DTP Precinct	High	Low to Medium
Habitat fragmentation and corridor movement and restrictions	Low to Medium	Low to Medium
Increase in economic growth	**High positive**	

The Support Precinct 2 development has been identified as a key development node in the north, and this is evident in the eThekwini Municipality's IDP, Northern Spatial Development Plan, as well as the Tongaat/DTP LAP. Furthermore, the Aerotropolis Plan - 2013 for the development of mixed-uses around the KSIA has highlighted the role of the proposed development as contribution to Local Economic Development. This project will aim to achieve the goals of future development in the north.

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 eThekwini Municipal area.

G-2 EAP'S RECOMMENDATIONS

Two layout alternatives have been presented in the Draft EIR i.e. Preferred Layout and the No-Go Development Option.

a) Alternative Layout 1: Preferred Layout

Refer to the Preferred Site Layout in Figure 14 and Appendix 3.1.

As far as possible, the preferred layout has been re-aligned to ensure that the proposed hard structures and infrastructure avoids encroachment into the riparian areas and the wetlands. The vegetation community, Acacia-Erythrina wooded areas is associated with the riparian and wetland areas and is of high conservation importance. As far as possible, this vegetation community will be retained as part of the proposed development.

Buffers at a minimum of 30m from the outer edge of the wetlands are required in line with the guidelines by EKZNW, 2010. However, there will be various landuses occuring within the 30m wetland buffer. To mitigate the loss of wetland, as a result of the construction of the internal road through the wetland and construction within the 30m wetland buffers, a Wetland Rehabilitation Plan will be compiled and included in the Final EIR for public review and comment.

An internal road that links the two development nodes goes through the wetland on the northern portion of the site. To mitigate the impact on the wetland, a Water Management Plan, an Erosion and sediment control programme and a Stormwater Management Plan must be implemented during the construction and operational phases of the development.

Sediment barriers (e.g. silt fences/sandbags/hay bales) must be installed immediately downstream of active work areas (including soil stockpiles) as necessary to trap any excessive sediments generated during construction. Any erosion gullies/channels created during construction should be filled immediately to ensure silt does not drain into the wetland.

Once operational, maintenance measures such as the clearing of debris from culverts and the monitoring and stabilising of any head cut or gulley erosion that forms take place regularly.

Should Alternative Layout 1 be adopted, the following recommendations are suggested:

- Should any plant species of Conservation Importance (CI) 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 CI species be relocated to 'Froggy Pond' downstream of the site. Similarly, if the Pickersgill Reed Frog is found on site, it should be relocated to 'Froggy Pond'.
- The proposed development site must be contained to the minimum required footprint.
- The outer limits of wetland buffers in the vicinity of planned developments should be surveyed, clearly defined on the ground and marked as no-go areas prior to the onset of construction activities.
- Comprehensive planning of construction must be conducted prior to the onset of activities. Dump sites for materials, vehicle parking areas, worker's facilities etc. need to be clearly specified and activities must be restricted to these areas. Construction staff and contractors must be informed of the importance of minimising their footprint and keeping it to these areas.

- Access routes to the site, during both the construction and operational phases, must follow existing roads or roads included in the proposed layout.
- 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. Extensive commercial agricultural land uses are deemed unviable for the site, due to unsuitable, soil, land and climate conditions on the site, as well as low sugar cane yields in the past eight years.
- The developer must provide high standard traffic warnings and traffic calming measures where construction activities interfere with traffic.
- A groundwater monitoring system must be installed for the proposed on-site filling station. A Risk Assessment must be undertaken during the detailed design of the proposed filling station.
- 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' surrounding the site 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' 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 eThekwini Municipality's IDP, Northern Spatial Development Plan (NSDP), as well as the Tongaat/DTP Local Area Plan (LAP). The proposed development will also contribute to local economic development and provide various employment opportunities to the local people with the eThekwini Municipality.
- From a geotechnical perspective, the site is stable in its natural state and suitable for the intended development provided that cognisance is taken of the dip of the shale bedrock and the recommendations by the Geotechnical Engineer are adhered to.

The site has been identified as a key development node in the north, and this is evident in the eThekwini Municipality's IDP, as well as the Northern Spatial Development Plan, and the Tongaat/DTP LAP. Should the proposed development not proceed with the 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 Support Precinct 2 development forms part of the Aerotropolis Plan - 2013 and should the development not be approved, it would undermine future growth of the region, employment opportunities and the economy. Therefore, the proposed development's key role in the Dube Aerotropolis[9] development plans must be considered in the DEA's Environmental Decision.

[9] 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).

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 EMPr during the construction phase. Environmental Audit Reports must be compiled and made available for inspection.

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 I: APPENDICES

Appendix 1: Locality Map

Appendix 2: Photograph plate

Appendix 3: Site Layout Plans and other Layout Plans

Appendix 4: Authority Correspondence

Appendix 5: Public Participation

Appendix 6: Specialist Studies

Appendix 7: Environmental Management Programme