SOCIO-ECONOMIC IMPACT ASSESSMENT

Scoping and Environmental Impact Assessment for the Proposed Expansion of the Pietermaritzburg Airport

January 2017

Institute of Natural Resources

Socio-Economic Impact Assessment for the Proposed Expansion of the Pietermaritzburg Airport

FINAL REPORT FOR COMMENT

Prepared for

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Prepared by

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EXECUTIVE SUMMARY

1. INTRODUCTION

Pietermaritzburg Airport (previously known as Oribi Airport) is owned by the Msunduzi Municipality (MM) and serves the city of Pietermaritzburg and surrounds as well as the outer west suburbs of Durban. Outcomes of sustainability assessments conducted for the airport indicate that the airport has operational constraints which restrict the expansion of services[1]. To improve the service provision of the both operators and the public at large, and to effectively meet the increasing growth in passenger and cargo volumes and air traffic movements, the MM has proposed the expansion of the Pietermaritzburg Airport. The proposed expansion takes into account the factors cited above and links it with other future opportunities that have arisen in relation to Pietermaritzburg Airport. These opportunities include the development of industrial, commercial and other complimentary land-uses within the Municipal owned land adjacent to the current Airport operations.

The Institute of Natural Resources (INR) has been commissioned to undertake a Scoping and Environmental Impact Assessment (S&EIA) process for the proposed expansion to assess the potential impacts on the receiving environment, and provide management guidelines for implementation if authorisation is granted. The proposed expansion includes upgrading of the airport facilities to meet the anticipated demand for Phase 1 of the Airport Master Plan. The expansion also includes the facilities associated with the airport operations, as well as non-aviation related land uses.

A key component of the S&EIA is an assessment of the socio-economic environment and potential impacts that the proposed expansion is likely to have on the receiving regional and local environment. This report documents the Socio-Economic Impact Assessment (SEIA) that was undertaken.

The SEIA includes analyzing, monitoring and managing the intended and unintended social and economic consequences and impacts, both positive and negative, of the planned development, on the local and regional receiving environment. The purpose of the assessment is therefore to identify and evaluate the potential socio-economic impacts that the proposed expansion is likely to have on the lives and circumstances of people affected. The outcomes of the assessment enable means to reduce, remove and prevent such impacts from occurring. Alongside the identification of adverse socio-economic impacts, the assessment also evaluates means of maximising potential beneficial impacts of the proposed expansion, which may include impacts such as employment and business opportunities, improved standards of living and community upliftment, education and training, among others.

The purpose of this SEIA is to:

- Describe the nature of the receiving socio-economic environment (status and state)
- Identify and describe likely impacts (positive and negative) as a result of the proposed development
- Identify potential mitigation, enhancement and management measures

[1] Pietermaritzburg Master Plan Report, 2014

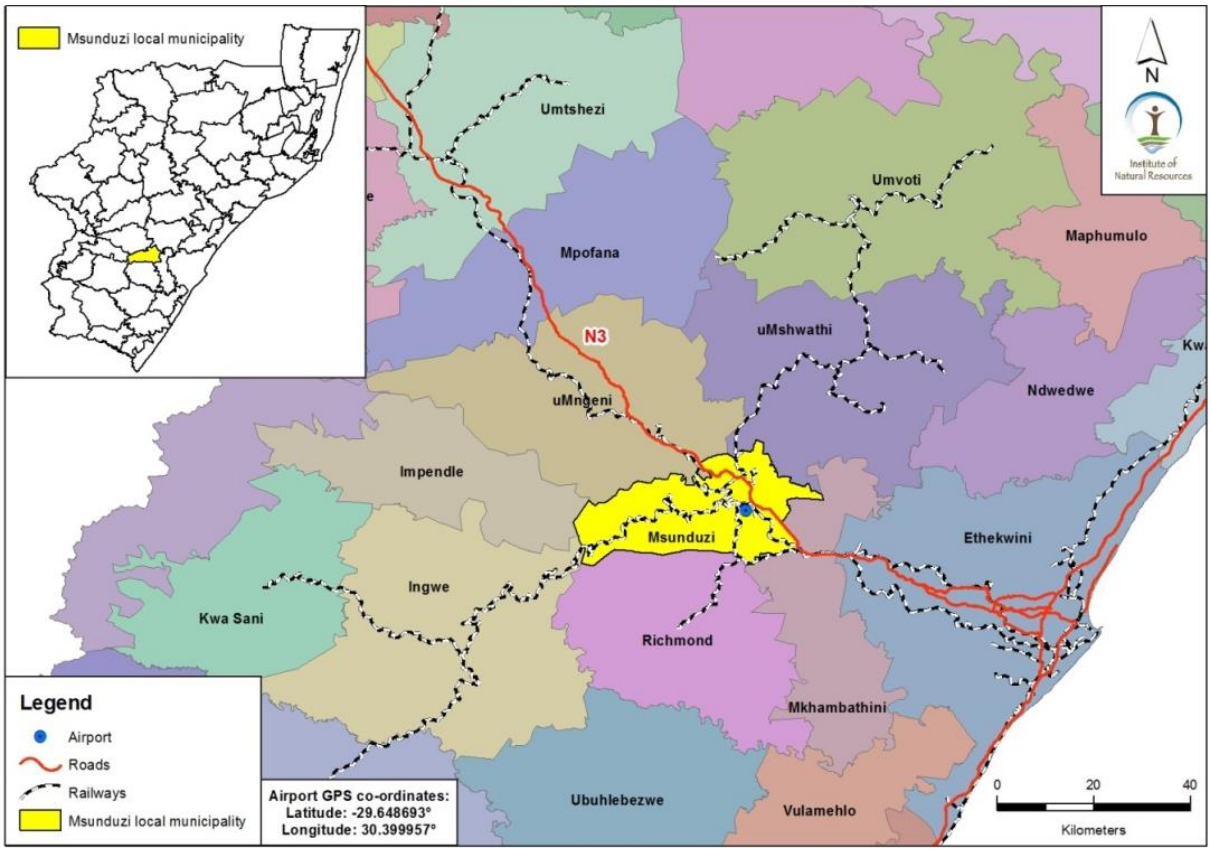
- Assess the significance of impacts via an accepted assessment methodology for pre- and post-mitigation scenario.
- Provide recommendations regarding management, enhancement and mitigation – these will feed into the EMPr.

It is important that the SEIA integrates the findings and outcomes of other specialist studies to ensure that there is/are:

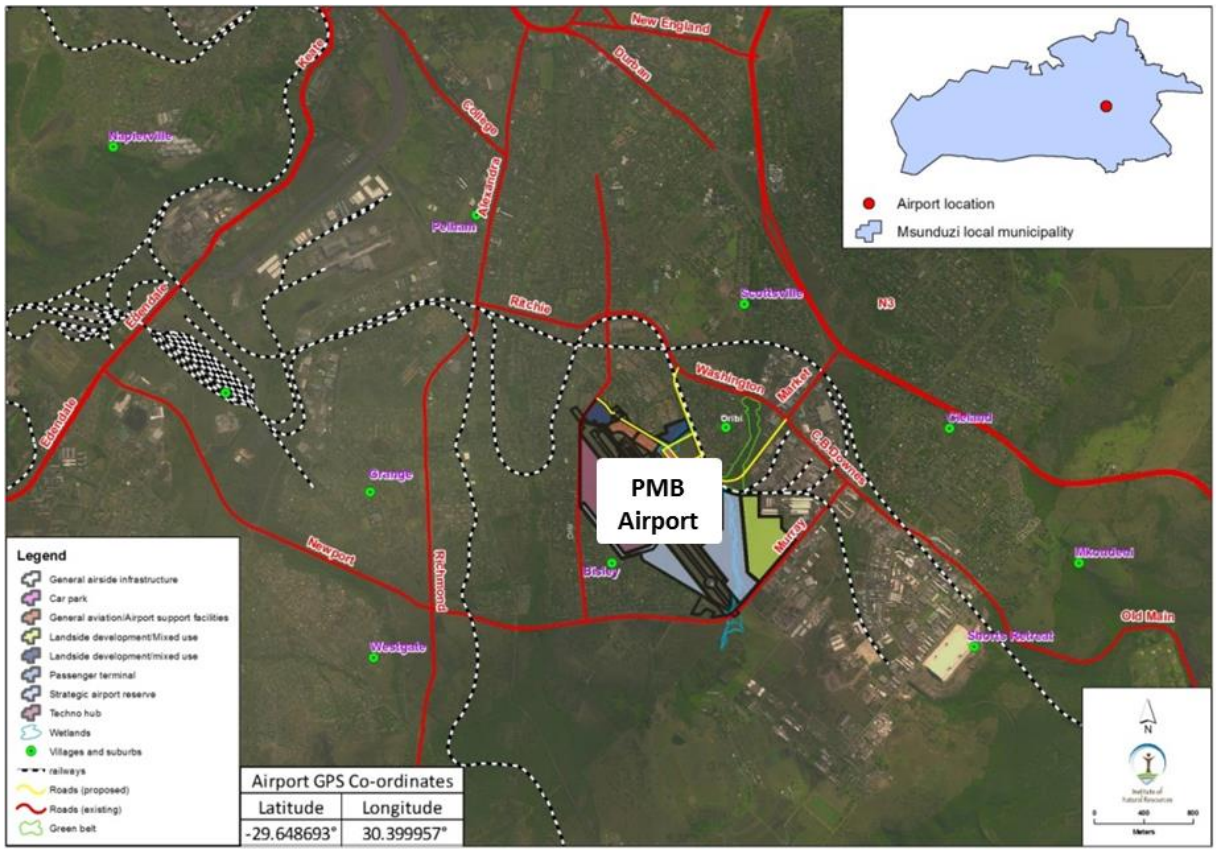
- identification and assessment of cross cutting issues and cumulative impacts;
- co-ordination between investigations that rely on outputs from other studies;
- linkages between the impacts to the biophysical environment and the resultant consequence for human users; and
- relevance to the socio-ecological contexts where the various elements are interrelated.

2. PROJECT CONTEXT AND DESCRIPTION

The Pietermaritzburg Airport, formerly known as Oribi Airport, is located within the Msunduzi Local Municipality (MM), in KwaZulu-Natal, South Africa. The MM is approximately 640 square kilometres in extent and located at the centre of the uMgungundlovu District Municipal, about 80 km North West of Durban along the N3. Figure 2 figures below provide an indication of the extent and locality of MM, and the location of the airport in relation to the MM and its local surroundings. The Airport is located in the outskirts of Pietermaritzburg, owned and managed by the local MM and serves the city of Pietermaritzburg and surrounds as well as the outer west suburbs of Durban.



Location of Msunduzi Local Municipality



Location of Pietermaritzburg airport in relation to MM

Construction of the Pietermaritzburg Airport was completed in March 1931 when the municipality also received a license to operate from the Civil Air Board. The Municipality has continued to run the airport but not without subsidizing the provision of this service. This subsidy was estimated to be approximately R 5.5 million in 2007[1]. Various factors have limited the ability to increase the primary revenue stream in the past and limited the number of passengers that could be transported per flight and frequent diversions to Durban particularly in summer, reducing passenger confidence in using Pietermaritzburg Airport. It also limited the amount of airlines able or willing to operate from the Airport which reduced competition. This has a negative impact on ticket prices. An analysis of aircraft arrivals at the Airport showed a generally declining trend between January 2003 and March 2010 (Internal feasibility and Economic Assessment Study, 2010).

Further factors identified in the various investigations as limitations to reversing the declining use of the Airport included:

- Need for additional parking.
- Resurfacing of the runway.
- Development of a parallel taxiway.
- Upgrade of the terminal facilities.
- Amendments to the institutional and business arrangements for managing the Airport.
- Optimization of the unutilized municipal land adjacent to the airport.

[1] Coetzee, C. and Oldham, G. 2007. Economic Impact Study of the Pietermaritzburg Airport. University of KwaZulu-Natal.

The municipality has commissioned various studies over the years to establish how to optimize this asset and reverse the increasing subsidization resulting from declining use of the Airport. These investigations even considered alternative sites for the Airport and selling the facility.

The outcomes of these studies were reviewed in the 2010 Feasibility and Economic Study conducted in 2010. The Municipality made a decision to retain the Airport and implement the recommendations coming out of this investigation. This included the development of a Master Plan for the Airport as an update to the existing plan, dated 1996. The outcomes of the study also served as motivation for securing R40 million from Provincial Treasury to address requirements for improving the sustainability of the Airport.

These various improvements importantly enabled the use of the Airlink BAE/146/200, 97 seater aircraft with a capacity more than double the Turboprop aircraft previously employed. This has resulted in:

- A significant reduction in the number of flight diversions as safety and reliability issues have been overcome.
- Increase in total passenger use (arriving and departing)
- A positive impact on the Net Cash flow of the Airport

In summary, there has been a significant improvement in the use and sustainability of the Pietermaritzburg Airport.

The following additional factors and trends further support the MMs further optimization of the Airport through the proposed development:

- The emergence of the aerotropolis or airport city concept, which identifies major airports as engines of local economic development, attracting aviation-linked businesses of all types to their environs. These include, among others, time-sensitive manufacturing and distribution facilities; hotel, entertainment, retail, convention, trade and exhibition complexes; and office buildings that house air-travel intensive executives and professionals. While not a ‘major’ airport, the vacant land surrounding the airport has been identified with several investors expressing interest in:
    - Industrial land. There has been considerable interest from industrial developers for the land adjoining the airport which is approximately 17ha and already zoned for industrial use.
    - The technology-hub. During the master plan process, the KZN Cabinet approved the establishment of four Technology Hubs in the province, one of which was for Pietermaritzburg. It was agreed that the ideal site would be at the airport, and the master plan makes provision for this. The province has secured funding from the EU for the design and infrastructure costs of establishing the hubs. The funds will be dispersed based on the readiness of each site. The concept plan for the Pietermaritzburg hub has been completed. The municipality has received letters of intent from four prospective tenants, including the DUT who is planning to establish an Aviation Academy, and an aircraft engine manufacturer. One of the prospective tenants is a consortium that proposes to build a multi-sports complex with a velodrome, which is likely to be used for the 2022 Commonwealth Games
    - Commercial options on areas within the Airport precinct.

    - The high existing demand for increased General Aviation. There is a long standing waiting list of private and commercial operators who are seeking to store their aircraft at Pietermaritzburg Airport. The closure of Virgina Airport may further increase this demand.
- The inconvenience of travel to King Shaka International Airport (KSIA) which has increased the user catchment for Pietermaritzburg Airport.
- The establishment of a new entity to manage the airport and the adjacent precinct. The revenue from this will be ring fenced to improve the sustainability of the airport and reduce the financial burden on the municipal budget.

While the current situation is far improved, the ***need*** remains to further improve the sustainability of the Pietermaritzburg Airport through continued growth in the scheduled flights and GA activity as well as harnessing opportunities presented by vacant unutilized municipal land adjoining the Airport.

The further development is considered as ***desirable*** as it aims to reduce/alleviate current subsidization; generate increased job and economic activity at a local scale and to the broader Municipal GDP. Further, the Airport properties are owned by the municipality and are zoned for airport and related uses. It is considered desirable to optimize this asset.

The MM is considering the development of the Airport more broadly than in just in terms of Air traffic and has commissioned a range of investigations to inform the optimal development of the Airport and adjoining municipal land in relation to the surrounding Airport 'precinct'. These investigations have been drawn from in defining the project description.

3. METHODOLOGY

This assessment comprises both social and economic components, and the methodology of this assessment is guided by the key activities of a SIA as described by Barbour (2007).

To determine and evaluate the significance of potential impacts on identified resources and receptors, impact assessment and mitigation is applied in accordance with define assessment criteria. The purpose of this method is to develop and describe measures to be applied in order enhance the potential benefits, and to minimize or avoid any potential harmful effects.

Specialists' expertise based on assessment, desktop analysis and field observations was used to assess potential impacts. To determine the significance of these impacts, the INRs impact rating methodology was used. The subsections to follow provide the methodology adopted, as well as defines key terminology to ensure consistent assessment.

This assessment was largely based on secondary data gathered through a desktop analysis, and complimented by specialists' field observations, interviews and surveys conducted by specialists, and consultation with I&APs conducted as part of the PPP. Due to the extensive amount of baseline information available and the in-depth consultations conducted, socio-economic surveys and/or primary field work was deemed unnecessary.

- This report therefore depends on the accuracy of previous studies, municipal and census records, and the assessments undertaken by specialists'.

- The census data use to understand the baseline socio-economic environment is based on the 2011 census data, which although five years out of date, was the most recent and reliable data available. In some cases, municipal data was available for 2015 or 2016.
- The assessment is based on the available information at the time of compilation
- Where specific information and detail reading elements of the proposed development have no yet been defined (i.e. the commercial/mixed use), the assessment cannot adequately determine the potential impacts.
- The lack of historical records in some cases made it difficult to create comparisons. For example, the property valuation assessment did not have 'before' and 'after' data to benchmark against.
- Due to the relatively short time frame of assessments, this does not allow for longer terms measurements/observations which would enhance the value and accuracy of measurements and results. This was apparent with the noise baseline assessment, where observations were limited to 2 months of the year. Results may have difference in other seasons where climatic conditions may have influence the observations. Despite this limitation, observations were contextualized given the weather conditions using expert knowledge and guidelines.
- The planning documents and feasibility studies (i.e. the Airport Master Plan, Precinct Plan and Techno Hub Study) are a high level and therefore do not provide adequate information to conduct all assessments with a high level of confidence.

Due to the subjective nature of socio-economic elements, impacts are difficult to measure objectively and are therefore inferred rather than measured. An understanding of the specific socio-economic context as well as social processes in general is therefore key in drawing valid inferences. Human sciences are both subjective and objective in nature, making them difficult to measure in real terms. For example, determining 'nuisance' is perceived differently by I&APs.

It is important to note that socio-economic impacts are typically interrelated and multifaceted, making it difficult to consider impacts in isolation. This highlights the need for a socio-economic impact assessment where the significance of impacts is contextualized as far as possible.

4. SOCIAL AND ECONOMIC ENVIRONMENT

The socio-economic characteristics of the potentially affected receiving environment is necessary to understand for contextualizing issues identified and highlight those of potentially high significance. The areas potentially affected by the proposed development is categorized into two, the regional (Msunduzi Municipality) and the local (airport and its precinct, and areas along the flight path) areas of influence. The MM is likely to experience impacts of a more indirect nature, predominately economic impacts. The local area of influence is the Pietermaritzburg airport and its surrounding suburbs, as well as the suburbs along the commercial/scheduled flight path which are directly impacted as a result of noise generated by aircraft on their approach and departure from the airport. The area surrounding the airport is inclusive of the area referred to as the Airport Precinct, for which a management plan has been developed that encompasses the proposed development.

Regional Socio-Economic Environment

The MM is located in the Umgungundlovu District Municipality, and is home to the Capital and second largest city on KwaZulu-Natal, Pietermaritzburg. Situated approximately 45 minutes' drive from Durban, the MM is astride the N3 corridor, one of the busiest development corridors in the country, which connects the Durban and Gauteng economic hubs. The MM is one of seven local municipalities in the District, and contributes 8% and 70% to the Gross Value Added (GVA) of the KZN province and District Municipality respectively. The MM is not a key tourism hub, hosting an array of events, but its capital status has resulted in it being a political and administrative hub for the province. The MM consists of 37 wards, coving an area of approximately 590.6 km^2, and predominantly urban to peri-urban in nature, with some rural residential areas. The table below summarises the key statics of the MM.

Municipal summary of key statistics

	2011 (Census) [1]	**2016** [2]	**State**
Total Population	618 536	679 039	Increase
Number of Households	163 993	180 469	Increase
Average Household Size	3.6	3.8	Increase
Population Growth Rate	1.12% p.a	2.00% p.a	Increase
Male: Female	45.45 : 54.55		
Female Headed Households	45.2%	45.9%	Increase
Unemployment	33%		
Flush Toilets Connected To Sewerage	51.6%	49.3%	Decrease
Weekly Refuse Removal	53.2%	47.4%	Decrease
Piped Water Inside Dwelling	47.9%	41.7%	Decrease
Electricity For Lighting	91.9%	96.1%	Increase

The MM is subject to several advantageous components, such as:

- Its strategic location along the N3 corridor and in close proximity to the Durban Port and the King Shaka International Airport (KSIA)
- Its good transport networks (road, air and rail)
- Is an administrative and service centre for the inland region
- Is home to leading tertiary institutions such as the UKZN and the Durban University of Technology (DUT)
- Is well equipped with services (commercial, community and infrastructure)
- Has an established business base with an integrated Chamber of Business (CoB)
- Its manufacturing basis which includes textiles, agriculture (timber, beef, dairy, agri-processing), aluminium, construction material, clothing and leather goods, motor components, and steel.
- It being a tourist destination which drives the increase of hotels and restaurants
- Its assortment of development projects and planned growth

Population and Demographics

[1] Msunduzi Local Municipality. (No Date). Integrated Development Plan (IDP) Review for 2015/16. Msunduzi Local Municipality IDP Office. Pietermaritzburg.

[2] http://www.municipalities.co.za/locals/view/88/Msunduzi-Local-Municipality#demographic

As indicated in the recent census (2011), the average annual population growth rate in the MM of 1.21%, having risen from 552 837 people in 2001 to 618 536 people in 2011. Based on the 2016 municipal records, the population has further grown to 679 039. There has been an increase in the number of households (130 292 to 163 993 to 180 469 in 2001, 2011 and 2016 respectively), however the household size has decreased from 4.0 (2001) to 3.6 (2011) and 3.8 (2016) persons per households. As indicated in the table above, there are more females than males in the MM, which is a trend that has strengthened since 2001.

The majority of the MMs population (68.4% in 2011 and 64.7% in 2016) is within the economically active age bracket (15 to 64 years), while approximately a quarter of the population (26.6% in 2011 and 31.5% in 2016) is under the age of 15, and the remaining are over the age of 64. Although the dependency ration of people within in 15 to 64 age cohort has decreased, it still remains high at 46.2% (2011) and 54.7% (2016).

One of the main concerns in the MM is the prevalence of HIV/Aids. It has been recorded that the uMgungundlovu District Municipality, in which the MM falls, had the highest prevalence of the highest prevalence of HIV/Aids in the province and country in 2010[1]. The HIV/Aids prevalence rate in the MM was 42.3% (2010).

In terms of education in the MM, there has been positive change between 2011 and 2011, with a decrease in the percentage of adults of the age of 20 with no schooling (record of 5.5% in 2011 and 4.3% in 2016). In line with this trend, there has also been an increase in the percentage of adults with a matric qualification, having risen from 24.5% in 2001 to 33.7% in 2011, and a further increase to 40.5% in 2016. In addition, those who have obtained higher qualifications have also increased from 9.2% to 13.1% and 14.5% in 2001, 2011 and 2016 respectively. Despite these positive trends, the number of children of school-going age that are attending school has decreased from 66 789 in 2001 to 62 737 in 2011. isiZulu is the most predominately spoken language in the MM, followed by English. Other prominent languages include Afrikaans, isiXhosa and Sesotho.

Economy

In 2014, the MMs GDP showed signs of positive growth following the 2010 period of negative growth (3.85% for 2010). The census indicates that there has been a decline in the unemployment level, the percentage of unemployed economically active adults having decreased from 48.2% in 2001 to 33% in 2011. This trend is mirrored by the youth (15-34 years) unemployment rate, which has decreased from 58.2% to 43.1% in 2001 and 2011 respectively. The key economic sectors that drive the MM and contribute to the GDP include Community Services, Finance, Transport, Trade and Manufacturing.

In terms of the Gross Value Added (GVA), which is a measure of the value of goods and services produced in an area, the Municipality's GVA comprises of tertiary (69%), manufacturing (25%) and agricultural (6%) activities. The tertiary sector is driven by retail trade and business services, and a large portion of the manufacturing component is reliant on the commercial agricultural capacity of the surrounding municipalities. The main economic sectors contributing to the GVA are general government (19%), business services (14%), wholesale and retail trade (10%), and Transport and

[1] According to the annual Department of Health anti-natal survey undertaken at state hospitals

communication (9%). The Information Communication and Technology (ICT) is also a key sector with a growing at a rate of 7.5%, and is positively impacted by the 3.8% growth rate of the electrical machinery and apparatus sector. Alongside recent major developments (such as the Victoria Country Club Golf Estate, Liberty Midlands Mall, the Golden Horse Casino and Hotel, and 'Motor City'), property development is also on the rise in the MM, with developments ranging from residential estates to light industrial, hotel and conferring facilitates, commercial enterprises, and logistics and warehousing.

As previously indicated, the MM is fortunate in that it has a number of economic advantages, namely: locational (its central location and its situation along the N3 corridor – a primary logical corridor linking two key economic hubs, Durban and Gauteng); natural/geographic (highly fertile land); human capital (array of good schools and tertiary education facilities); and institutional (capital city of the province).

Employment and Labour

Employment figures for the MM demonstrates that majority of employment is of a formal nature, accounting for approximately 167 000, while informal employment accounts for approximately 32 500 based on the 2015 figures. Formal employment rates grew by 1.5% between 2005 and 2015, however this rate is too slow to absorb the growing labour force, which is evident in the fact that unemployment rate is 2015 was 30%.

The majority of formal employment is generated by the community services sector, followed by the trade, finance and manufacturing sectors. The informal employment is dominated by the trade sector, with other main contributors being community services, construction and transport sectors.

Total remuneration derived from the formal sector in MM in 2015 was approximately R23.5 billion. The majority of this is generated through the community services sector (almost 40%), with other main contributors being the manufacturing, finance and trade sectors. This demonstrates that the manufacturing sector plans a relatively important role in generating relatively high paid jobs, although it on contributes to approximately 13.5% of the formal sector employment.

Expenditure

Household expenditure per sector is an important reflection of economic activity in the area. Accommodation, food, transport and taxes are the highest expenditure sectors.

Infrastructure

Trends in the access to basic services varies as access to piped water and electricity having increased between 2001 and 2011, while the percentage of households with flush toilets and refuse removal has decreased. Such decreases could be attributed to the population growth of the municipality. In terms of housing backlog, the Department of Human Settlement estimated there is a need for approximately 6 800 houses.

Local Socio-Economic Environment

The overview of the local socio-economic environment is categorized into three areas: the Airport, the suburbs surrounding the airport (inclusive of the Airport Precinct), and the 'extended flight path zone' (the suburbs in the Pietermaritzburg area that are potentially impact by the commercial/scheduled flight path). The context of these three areas is provided in the sub-sections to follow.

Pietermaritzburg Airport[1]

Pietermaritzburg Airport (previously known as Oribi Airport) is owned by the MM and serves the city of Pietermaritzburg and surrounds as well as the outer west suburbs of Durban. It is is located at 29°38'44.47" S and 30°23'45.06" E off Oribi Road in the Suburb of Oribi. Construction of the Airport was completed in March 1931 when the municipality also received a license to operate from the Civil Air Board[2]. A flying school was opened in 1938, and the Aerodrome was then leased to the Defence Authorities for the duration of the war and for a year afterwards. The City Engineer took over the Aerodrome in 1945 from the Defence Authorities. Over time, concern about the state of the runway led to extensive investment by the Defence Department and the city council, culminating in an official ceremony marking the opening of the Oribi Aerodrome in July 1967. While the Airport provides a service to General Aviation (GA) and there has been significant demand for increase in the GA facilities so this revenue stream will increase, the sustainability of the airport and its contribution to the regional economy depends on the scheduled passenger services and associated "belly" freight (Coetzee and Oldham, 2007). The Municipality has continued to run the airport but not without subsidizing the provision of this service, which was estimated to be approximately R 5.5 million in 2007.

Since the initial construction of the airport, the surrounding land has naturally developed. The airfield site, contained within the airfield boundary fence, covers an area of approximately 89ha, however, there is significant area of undeveloped municipal owned land available which falls directly alongside the airfield, totaling to an area of approximately 157.45ha.

Existing infrastructure at the airport includes the airside, landside infrastructure, the terminal building, and other facilities and utilities. The capacity and condition of the existing facilities, infrastructure, utilities and roads at the airport were some of the key influential factors for the expansion of the airport. The various infrastructure types contain the following components:

- **Airside infrastructure:** runway, taxiway, apron areas, navigation aids, visual aids and signage
- **General Aviation:** facilities for non-scheduled aircraft and associated activities
- **Landside Infrastructure:** access roads and parking areas
- **Terminal Building:** public amenities including check-in counters, arrival and departure lounges, a VIP lounge, a cargo office, an airport management office, an ATM, a coffee shop and ablution facilities
- **Other facilities and utilities:** control tower, fire and rescue facility, fuel, car hire facility; hangars and general utilities (electricity, water, sewerage, communication).

[1] Source: Delta Built Environment Consultants, 2014

[2] The history presented in this section is a summary drawn from the historical overview of the airport presented in the 2007 Economic Impact study by Coetzee and Oldham.

Airport Surrounds

The Pietermaritzburg Airport and its surrounding areas (inclusive of the Airport Precinct which is defined below) falls with the *Central Business District (CBD), Ashburton and Eastern Areas* Area Based Management (ABM) region of the MM. CBD functions as the primary market area for the MM and a place of power concentration (economic, political and financial), investment, and rates revenue generation. The region also provides social interaction and integration opportunities, is a tourism destination and acts as a gateway to the surrounding tourist destinations. The Capital City status has contributed to the economic and development growth and stability of the region.

The CBD, Ashburton and Eastern Areas ABM is the main employer with the Municipality's working population, with a large portion being employed in governments departments, while other in the industrial sector, particular in areas such as Willowton, Pelham, Mkhondeni and Northdale. The ABM is also home to the major education institutions in the Municipality, namely the University of KwaZulu-Natal (UKZN) and Durban University of Technology, which are in the Scottsville area, and the UNISA and FET College/s which are in the central (CBD) areas. Although the ABM's land use is dominated by thornveld and grasslands, the region is predominantly used for residential purposes. The area is also home to important transport corridors as it accommodates a large proportion of the N3, which also connects provincial corridors, and hosts the city's airport and railway station.

The area surrounding the airport is characterised by different types of land-use, namely low and middle income residential areas, industrial areas, and open space/reserve and agricultural areas. There are several schools in the surrounding area, such as crèches and day cares and a primary school (Bisley Park Primary) as well as several churches and two sporting clubs.

In terms of commercial entities within the residential areas (therefore excluding the car hire services etc. that operate within the airport boundary, and the industrial sector), there are several shops and service providers. From a tourism perspective, there are various small scale businesses such as lodges and BnBs, and transport/tour agencies. There are also several informal, small scale business entities within the residential areas.

Airport Precinct

The Airport Precinct includes the airport and portions of the surrounding residential neighbourhoods (Scottsville Extension, Oribi Village, Bisley and Oribi Heights) and industrial areas (Shortts Retreat and Mkondeni). The Precinct is 495ha in size and is located 2km from the main national transport route (N3) and 5km south-west of the Pietermaritzburg (CBD) (TMRP, 2016).

The Airport Precinct Plan (APP) of 2016[1] was commissioned by the Municipality in line with the Aerotropolis of Airport City concept, which seeks to optimize their role of the airport through links to the immediate/local context and the broader regional economy.

Land Use

[1] Airport Precinct and Management Plan for the Pietermaritzburg Airport and Surrounds, 2016

Land-use within the Precinct is characterised below (TMRP, 2016).

- **Residential**: Accounts for approximately 23% of the Precinct and is cluster into four distinct areas:
    - *Oribi Village*: A former military barracks and low income housing area is now predominately an urban residential area managed by the Provincial Human Settlement Department.
    - *Oribi/Bisley/Westgate*: Mainly sub-urban single detached residential land-use types, with three duplex/cluster complexes.
    - *Scottsville Extension*: Mainly sub-urban single detached residential units, with seven cluster/duplex complexes.
    - *Westgate*: The main land-use type is a residential complex, Acacia Park, which is a social housing cluster managed by the Msunduzi Housing Association.
- **Economic**: Accounts for approximately 21% of the Precinct and comprises of three distinct economic clusters.
    - *Mkondeni*: A mixed use industrial areas, dominated by agri-industry, general industrial and wholesale, and auto and repairs businesses, with evidence of informal trading operations.
    - *Oribi Village*: Various small businesses making use of existing building stock and some formal operations.
    - *Shortts Retreat*: An industrial area characterised by auto repair and transport, and logistics businesses.
- **Social facilities**: Accounts for approximately 8% of the Precinct and includes a mobile clinic, clubs, a community hall (not in use), a fire station, institutional facilities, a municipal market, places of workshop (Christian denomination), public spaces and schools.
- **Vacant/public open space:** Accounts for 35% of the Precinct and has either been set aside for future use as part of the Town Planning Scheme or classified as public open space or road verges

Infrastructure

There are various infrastructure types within and adjacent to the Precinct, which are described below.

- **Road network**: The Precinct area is in close proximity to the national road network (N3), as well as connected to with main roads that link the area to the city and national routes. Traffic activity is most intense during the typically commuter peaks periods.
- **Rail network:** The Precinct vicinity contain three rail lines
- **Public transport network**: The main form of public transport is taxis (combi taxis)
- **Non-motorised transport facilities**: In general, to condition of formal non-mortised transport facilities (for pedestrians, cyclist and horses) are poor and minimal.
- **Parking**: Parking facilities are generally adequate, with sufficient parking in residential and industrial areas cater for demand.
- **Access**: Access to the airport is by means or Oribi Road, which is classified as Class 4 urban collector street. The access is somewhat remote from the main national and provincial road network, limiting the airport access ease.

- **Bulk water supply**: The Precinct and adjacent areas are supplied water from the Bisley Reservoir by means of Bisley Break pressure Tank (BPT), and the Balancing Reservoir supplies the Bisley Reservoir, which supplies the Oribi Reservoir. There is one operational fire hydrant in the area; however its use is hindered by its inadequate pressure.
- **Bulk sanitation**: The Precinct falls into three sewer catchments, namely the Scottsville Mall, Foxhill South 1 and Blackburrow catchments. All sewage drains to the Darvill Waste Water Treatment Works.
- **Stormwater drainage:** The current drainage system is governed by the Msunduzi Stormwater Management Plan, which provides stipulations for runoff management.

Property Ownership and Values

The largest land owner in the Precinct is the MM, owing approximately 39% of the land, the most of which is within the airport boundary. Of the remaining area, 31% is privately owned (either residential, commercial, mixed use or industrial), 11% belongs to the National Government (mainly Oribi Village), and 8% is unknown. In terms of property values, the total municipal value of properties in the Precinct is R 1 462 billion, over which 77% is held by the private sector.

The airport precinct currently contributes 3% in property rates to the MM, which amount to approximately R21 million per annum. Of this, the industrial properties in Mkondeni and Shortts Retreat contribute 37%, the residential areas (Scottsville Extension and Westgate/Bisley/Oribi) contribute 35%, and the airport contributes less than 1%.

Heritage Resources

The MM is rich in historical, archaeological, cultural and architectural history, totalling 646 recorded heritage sites and 32 heritage zones (Msunduzi EMF, 2010), some of which are within the airport boundary and the Precinct.

The Pietermaritzburg Aero Club is a well-known facility located adjacent to the existing airport terminal building, and is classified as medium to high heritage significance. The club house is over 60 years and has been continually used for its purpose, holding much social, historic and cultural value. Currently, the heritage resource has not been graded but protected as a grade IIB heritage resource, and therefore required permission from Amafa Kwazulu-Natal (The Provincial Heritage Resources Authority) before alternation or demolition (van Schalkwyk, 2016).

Extended Flight Path

Several suburbs within the MM are potential impacted due to their location along the commercial/scheduled aircraft flight path. These suburbs along the ‘extended flight path’ are potentially impacted due to the topography of the area, resulting in their elevation being higher than other parts of Pietermaritzburg, and therefore being exposed to aircraft noise.

These areas, classified as the ‘extended flight path zone’ for the purposes of this assessment, are located in the more upmarket suburbs of Pietermaritzburg, extending to the southern part of Hilton (De Klerk, 2016). These suburbs include Worlds View, Wembley, Athlone and Clarendon which are the established and more affluent “leafy suburbs” of Pietermaritzburg (De Klerk, 2016).

5. IMPACT ASSESSMENT AND PROPOSED MITIGATION

The potential socio-economic impacts of the proposed developed are linked to the sensitivity of the receiving environment, and the footprint and outputs of the proposed development. Such impacts may occur during the construction and/or operation phases. These impacts were identified through engagement with I&APs and specialist assessment.

The following socio-economic impacts were anticipated and assessed for this study:

- Impact on the local and regional economy
- Impact on the sustainability of the airport
- Impact on traffic operations, access, and safety
- Aircraft induced noise
- Impact on property values
- Impact on archaeological and heritage resources

This assessment also includes an evaluation of cumulative impacts as well as the no-go option, demonstrating the positive and negative implications of the option.

There are a range of socio-economic impacts that likely are imposed on the receiving environment as a result of the proposed development. However, in this context, some of these impacts are of very low or unlikely significance, and therefore did not require in-depth assessment and management.

As a result of the proposed development and the socio-economic context, the following conclusions were made about the potential impacts identified:

- Positive impact on the local and regional economy in terms of the direct and indirect effects on employment and income, and investment in and stimulation of the economy
- Positive impact on the sustainability of the airport
- Impacts on traffic in terms of operations (flow), access and safety
- Negative impacts of aircraft induced noise on the receiving environment
- Negative impacts of aircraft induced noise on property values
- Negligible impact on archaeological and heritage resources

The significance of each positive or negative impact is summarized in the table to follow, and the magnitude, likelihood and significance of the impact without and with mitigation or enhancement is detailed.

Summary of potential impacts on the receiving socio-economic environment

Impact	Status	Magnitude	Likelihood	Significance	Confidence
Impact 1: Direct and indirect effects on employment and income (construction phase)					
- Road network extension	+ve	Medium	Likely	Moderate	Medium
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
- Airport landside and airside infrastructure	+ve	Medium	Likely	Moderate	Medium
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
- Techno Hub	+ve	Medium	Likely	Moderate	Medium
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
Impact 2: Significance of investment in and stimulation of the economy					
- Road network extension	+ve	Medium	Likely	Moderate	Medium
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
- Airport landside and airside infrastructure: Aeronautical Activity	+ve	Medium	Likely	Moderate	High
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
- Airport landside and airside infrastructure: General Aviation Zone	+ve	High	Definite	Major	High

Impact	Status	Magnitude	Likelihood	Significance	Confidence
with enhancement	*+ve*	*High*	*Definite*	*Major*	*High*
- Airport landside and airside infrastructure: New Business Zones	+ve	Low	Likely	Minor	Medium
with enhancement	*+ve*	*Low*	*Likely*	*Minor*	*High*
- Techno Hub	+ve	Medium	Likely	Moderate	Low
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*Medium*
Impact 3: Sustainability of the airport					
- All proposed developments	+ve	Medium	Likely	Moderate	Medium
with mitigation/enhancement	*-ve*	*Medium*	*Definite*	*Major*	*High*
Impact 4: Traffic operations, access and safety					
- Access	+ve	High	Definite	Major	High
with mitigation	*+ve*	*High*	*Definite*	*Major*	*High*
- Traffic Operations (flow)	-ve	Medium	Definite	Moderate	High
with mitigation	*+ve*	*High*	*Definite*	*Major*	*High*
- Safety	-ve	Medium	Likely	Moderate	Likely
with mitigation	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
Impact 5: Aircraft induced noise					
- Zone 1 (Hilton and Worlds View)	-ve	Low	Likely	Minor	Medium
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*Low*
- Zone 2 (Clarendon and Wembley)	-ve	Medium	Likely	Moderate	Medium
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*Low*
- Zone 3 (Pelham and Scottsville Extension)	-ve	Low	Likely	Minor	Medium
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*Low*
- Zone 4 (Bisley)	-ve	High	Likely	Major	Medium
with mitigation	*-ve*	*Medium*	*Likely*	*Moderate*	*Low*
- Zone 5 (Mkondeni and Oribi)	-ve	Medium	Likely	Moderate	Medium
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*Low*
Impact 6: Impact on property values					
- Zone 1 (Athlone and Worlds View)	-ve	Low	Likely	Negligible	Medium
with mitigation	*-ve*	*Low*	*Likely*	*Negligible*	*Medium*
- Zone 2 (Clarendon and Wembley)	-ve	High	Likely	Moderate	High
with mitigation	*-ve*	*High*	*Likely*	*Moderate*	*High*
- Zone 3 (Pelham and Scottsville Extension)	-ve	Low	Likely	Minor	High
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*High*
- Zone 4 (Bisley)	-ve	Low	Likely	Minor	High
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*High*
- Zone 5 (Oribi)	-ve	Low	Likely	Minor	High
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*High*
Impact 7: Impact on archaeological and heritage resources					
- All proposed developments	-ve	Negligible	Unlikely	Negligible	High
with mitigation	*-ve*	*Negligible*	*Unlikely*	*Negligible*	*High*

No-Go Alternative

The no-go alternative would have varying implications on the positive and negative impacts identified in the sub-sections above. However, such impacts cannot be viewed in isolation and the potential positive implication of the no-go alternative on one impact may result or be at the expense of a negative implication on another.

The greatest cost of the no-go alternative would be loss of opportunity for the economy, both in terms of stimulating the regional and local economy, as well as the loss of employment opportunities. In addition, if the proposal were to not go ahead, it would be unlikely that the airport would be able to be a sustainable entity, and therefore continue to negatively implicate the Municipality. Currently, the MM subsidizes the airport but evidence shows that the proposed development has the potential to enable the airport sustainability within the next 10 years. The benefit of both the investment and employment opportunities, as well as the decrease need for Municipal subsidization, would stimulate the socio-economic development of the region. This opportunity would be lost of the no-go option is selected. *It is reiterated that the stimulation of the*

economy and the sustainability of the airport is strongly dependent in investment in the proposed development, which is currently larger unknown.

A potential positive implication of the no-go alternative would be on the aircraft noise impact and consequential impacts on property values and nuisance disturbance along the flight path and areas surrounding the airport. If the proposed development does not go ahead, the capacity of the current airport facilities would limit the number of additional scheduled flights operating at the airport, and therefore limit the noise and property implications of affected areas. However, even with the no-go alternative, the current airport facilities do have capacity to add additional flights and therefore would be inaccurate to presume that the no-go alternative would result in no future aircraft noise induced impacts. It is also unlikely that the no-go alternative would result in a reduction of the current noise and property value impact, meaning that the option with neither implicate a positive or negative implication, but rather remain in its constant state. The proposed development would offer the opportunity for implementation of appropriate noise management mitigation procedures, which potentially would not occur if the development does not go ahead. Similarly, the expansion of the road network proposed would also benefit the local and regional traffic operations, access and safety. Without the expansion, the traffic conditions would likely be exacerbated from the current negative situation, whereas the proposed development has the potential to increase capacity, safety and operations, particularly if recommended mitigation options are implemented.

6. CONCLUSIONS AND RECOMMENDATIONS

The proposed expansion of the Pietermaritzburg Airport, as per Phase 1 of the Airport Master Plan, will serve to increase the capacity and sustainability of the Airport. In context of the receiving socio-economic environment, the proposed development has a number of both positive and negative potential impacts which range in significance.

The local socio-economic environment in which the development is proposed is complex, with a range of land use types and activities evident. These areas consist of a mixed of low, medium and high income residential areas, scattered commercial activities, a prominent industrial zone, and open space/recreational areas.

The area that are currently affected by existing operations, and will potentially be impacted by the proposed developed, include the airport itself and its surrounding residential and industrial areas, as well as extends to more wealthy suburbs along the commercial/scheduled flight path (northern suburbs of Pietermaritzburg. Therefore the currently and potentially impacted areas range from low-medium incomes residential areas and industrial areas, to open spaces and medium-high residential areas, with scattered portions of commercial activities.

On a broader scale, the regional socio-economic environment also demonstrates a mix of land use types, activities, demographics and economies. The Msunduzi Municipality is one of the larger economic contributors in the province, driven by its capital status, location and mix of economic activities, among others. According to Oldham (2016), *"There is diverse regional economy weighted towards government and community services but with significant contribution from manufacturing, trade, business and finance. Greater activity in the private sector notably industry and commerce would give more sectoral balance to the regional economy. Planned developments such as the Pietermaritzburg Airport Expansion fit in well this objective".* The region has a positive population

and economic growth rate, however it is still subject to socio-economic downfalls such as unemployment, poor service delivery and backlogs, demonstrating a need for new projects to stimulate economic growth.

The socio-economic context of both the regional and local receiving environment is considered in relation to the potential positive and negative impacts as a result of the proposed Pietermaritzburg Airport Expansion. The context provided a basis to determining the significance of impacts, and developing applicable and viable mitigation, enhancement and management options.

The proposed development provides opportunity for the airport to move towards becoming a sustainable entity, and therefore has significant benefit to the regional socio-economic context. The sustainability of the airport will enable the Municipality to redirect current subsidies into other sector, thus enhancing government expenditure and consequential the socio-economic environment. The improvement and increase capacity of the airport and associated activities as a result of the proposed development also has the potential to stimulate the local and regional socio-economic environment through increased investment, employment benefits, increased economic activity and growth, and general stimulation of the economy. Therefore the potential cumulative benefits and spinoffs of the proposed development are significant.

However, the proposed development also has the potential to impose negative impacts of the receiving socio-economic environment, particularly due to the noise impact. Not only does the noise impact affect sensitive receptors from a nuisance perspective, but has the potential to have indirect impacts on property values.

The Airport Precinct Plan that has developed to guide planning in the vicinity of the airport provides a structured framework to manage, mitigate and enhance the potential positive and negative impacts associated with the proposed development. The findings of this socio-economic assessment and accompanying specialist assessment have fed into the Precinct Plan to ensure that the identified impacts are including in localized planning going forward. The mitigation, enhancement and management measures that have been specified for the regional and local context outside of the Precinct area are also vital and should be implemented to ensure that the greatest value can be made from the proposed development.

In conclusion, it is recommended that the proposed development be authorized based on the assurance that potential negative impacts on the receiving socio-economic environment are mitigated and managed as far as possible, and that potential positive impacts are enhanced to ensure the greatest value of the proposed development of the regional and local socio-economic context.

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LIST OF ACRONYMS

ACSA	Airports Company South Africa
AMP	Airport Master Plan
APP	Airport Precinct Plan
CAA	Civil Aviation Authority
CBD	Central Business District
CoB	Chamber of Business
CSIR	Council for Scientific and Industrial Research
DBSA	Development Bank of South Africa
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
DUT	Durban University of Technology
ECH	eThembeni Cultural Heritage
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESR	Environmental Scoping Report
GA	General Aviation
GVA	Gross Value Added
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
ICAO	International Civil Aviation Organization
IDP	Integrated Development Plan
INR	Institute of Natural Resources
KSIA	King Shaka International Airport
MM	Msunduzi Municipality
PMB	Pietermaritzburg
PPP	Public Participation Process
S&EIA	Scoping and Environmental Impact Assessment
SANRAL	South African National Roads Agency
SEIA	Socio-Economic Impact Assessment
SIA	Social Impact Assessment
TIA	Traffic Impact Assessment
TMRP	The Markewicz and Redman Partnership
UKZN	University of KwaZulu-Natal

1. INTRODUCTION

Pietermaritzburg Airport (previously known as Oribi Airport) is owned by the Msunduzi Municipality (MM) and serves the city of Pietermaritzburg and surrounds as well as the outer west suburbs of Durban. Outcomes of sustainability assessments conducted for the airport indicate that the airport has operational constraints which restrict the expansion of services[1]. To improve the service provision of the both operators and the public at large, and to effectively meet the increasing growth in passenger and cargo volumes and air traffic movements, the MM has proposed the expansion of the Pietermaritzburg Airport. The proposed expansion takes into account the factors cited above and links it with other future opportunities that have arisen in relation to Pietermaritzburg Airport. These opportunities include the development of industrial, commercial and other complimentary land-uses within the Municipal owned land adjacent to the current Airport operations.

The Socio-Economic Impact Assessment (SEIA) includes analyzing, monitoring and managing the intended and unintended social and economic consequences and impacts, both positive and negative, of the planned development, on the local and regional receiving environment. The purpose of the assessment is therefore to identify and evaluate the potential socio-economic impacts that the proposed expansion is likely to have on the lives and circumstances of people affected. The outcomes of the assessment enable means to reduce, remove and prevent such impacts from occurring. Alongside the identification of adverse socio-economic impacts, the assessment also evaluates means of maximising potential beneficial impacts of the proposed expansion, which may include impacts such as employment and business opportunities, improved standards of living and community upliftment, education and training, among others.

The purpose of this SEIA is to:

- Describe the nature of the receiving socio-economic environment (status and state)
- Identify and describe likely impacts (positive and negative) as a result of the proposed development
- Identify potential mitigation, enhancement and management measures
- Assess the significance of impacts via an accepted assessment methodology for pre- and post-mitigation scenario.
- Provide recommendations regarding management, enhancement and mitigation – these will feed into the EMPr.

It is important that the SEIA integrates the findings and outcomes of other specialist studies to ensure that there is/are:

- identification and assessment of cross cutting issues and cumulative impacts;
- co-ordination between investigations that rely on outputs from other studies;
- linkages between the impacts to the biophysical environment and the resultant consequence for human users; and
- relevance to the socio-ecological contexts where the various elements are interrelated.

[1] Pietermaritzburg Master Plan Report, 2014

In this case, there are also various feasibility and planning investigations that have bearing on the EIA, and vice versa; and therefore vital that they are integrated with the SEIA. Figure 1 shows the relationship between the various specialist investigations, the planning and feasibility studies, and the EMPr.

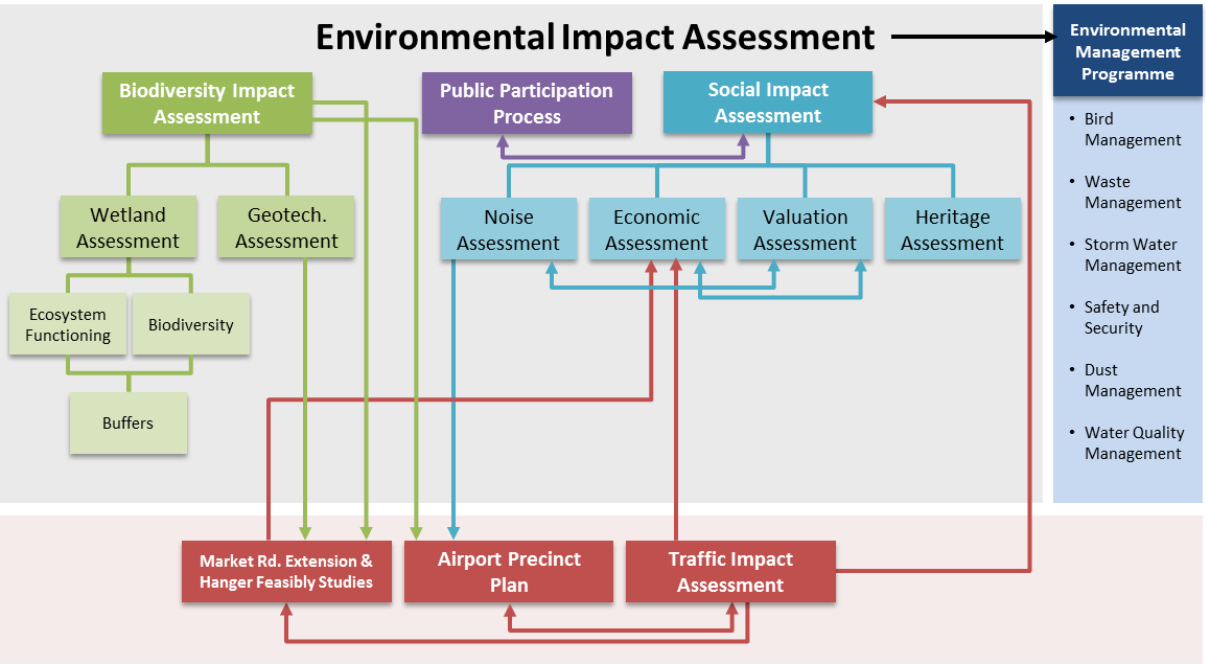


Figure 1: Network of the EIA specialist studies, plans and feasibility studies

The SIA report is structured as follows:

- Chapter 2: Project Context and Description
- Chapter 3: Methodology
- Chapter 4: Social and Economic Environment
- Chapter 5: Impact Assessment and Proposed Mitigation
- Chapter 6: Conclusions and Recommendations

2. PROJECT CONTEXT AND DESCRIPTION

2.1. Development Context

Construction of the Pietermaritzburg Airport was completed in March 1931 when the municipality also received a license to operate from the Civil Air Board[1]. A flying school was opened in 1938, and the Aerodrome was then leased to the Defence Authorities for the duration of the war and for a year afterwards. The City Engineer took over the Aerodrome in 1945 from the Defence Authorities. Over time, concern about the state of the runway led to extensive investment by the Defence Department and the city council, culminating in an official ceremony marking the opening of the Oribi Aerodrome in July 1967. While the Airport provides a service to General Aviation (GA) and there has been significant demand for increase in the GA facilities so this revenue stream will increase, the sustainability of the airport and its contribution to the regional economy[2] depends on the scheduled passenger services and associated "belly" freight.

The Municipality has continued to run the airport but not without subsidizing the provision of this service. This subsidy was estimated to be approximately R 5.5 million in 2007[3]. Various factors have limited the ability to increase the primary revenue stream in the past, notably:

- The short runway which limits the regular use by low cost, short haul aircraft. The passenger aircraft used were historically low capacity twin propeller aircraft.
- The topography of the area (specifically World's view Ridge), which affects the approach from the North-West which is the primary approach given the prevailing wind. The terrain caused the final approach to be offset from the runway, and the height from which landing decision was made to be relatively high. This made it difficult to obtain visual contact, particularly in poor weather conditions.
- The use of ground based Non-directional Beacons and their susceptibility to transmission inaccuracies, especially during thunderstorm activities.

The combination of these factors limited the number of passengers that could be transported per flight and frequent diversions to Durban particularly in summer, reducing passenger confidence in using Pietermaritzburg Airport. It also limited the amount of airlines able or willing to operate from the Airport which reduced competition. This has a negative impact on ticket prices. An analysis of aircraft arrivals at the Airport showed a generally declining trend between January 2003 and March 2010 (Internal feasibility and Economic Assessment Study, 2010).

Further factors identified in the various investigations as limitations to reversing the declining use of the Airport included:

- Need for additional parking.
- Resurfacing of the runway.
- Development of a parallel taxiway.

[1] The history presented in this section is a summary drawn from the historical overview of the airport presented in the 2007 Economic Impact study by Coetzee and Oldham.

[2] Coetzee, C. and Oldham, G. 2007 calculated the total revenue accruing from Airport related activities to be R65.8million (direct, indirect and induced) and that 189 jobs were derived from the operation of the airport. The roughly estimated value add to the GDP was R23.9 million.

[3] Coetzee, C. and Oldham, G. 2007. Economic Impact Study of the Pietermaritzburg Airport. University of KwaZulu-Natal.

- Upgrade of the terminal facilities.
- Amendments to the institutional and business arrangements for managing the Airport.
- Optimization of the unutilized municipal land adjacent to the airport.

The municipality has commissioned various studies over the years to establish how to optimize this asset and reverse the increasing subsidization resulting from declining use of the Airport. These investigations even considered alternative sites for the Airport and selling the facility.

The outcomes of these studies were reviewed in the 2010 Feasibility and Economic Study conducted in 2010. The Municipality made a decision to retain the Airport and implement the recommendations coming out of this investigation. This included the development of a Master Plan for the Airport as an update to the existing plan, dated 1996. The outcomes of the study also served as motivation for securing R40 million from Provincial Treasury to address requirements for improving the sustainability of the Airport.

The investment from Provincial Government and additional private sector inputs resulted in among others, the following improvements in the infrastructure and operations of the Airport which were completed by 2013:

- Upgrade of the terminal building
- Resurfacing of the runway and apron
- Construction of new parking facilities by a private service provider through a concession (the car park houses several car hire services)
- The implementation of the Global Navigation Satellite System (GNNS) system by Airlink
- Further navigational improvements and new runway lighting
- Rebranding of the Airport from *Oribi* to *Pietermaritzburg* coupled with improved signage

These various improvements importantly enabled the use of the Airlink BAE/146/200, 97 seater aircraft with a capacity more than double the Turboprop aircraft previously employed. This has resulted in:

- A significant reduction in the number of flight diversions (65 in 2006 in comparison to 6 in 2015) as safety and reliability issues have been overcome.
- Increase in total passenger use (arriving and departing) - almost doubled from 2006 (77 832) to 129 848 (2015).
- A positive impact on the Net Cash flow of the Airport from a negative position in 2008/9 (-R 2 989 000) to a positive position in 2016/17 (R 2 888 000).

In summary, there has been a significant improvement in the use and sustainability of the Pietermaritzburg Airport.

The following additional factors and trends further support the MMs further optimization of the Airport through the proposed development:

- The emergence of the aerotropolis or airport city concept, which identifies major airports as engines of local economic development, attracting aviation-linked businesses of all types to their environs. These include, among others, time-sensitive manufacturing and distribution facilities; hotel, entertainment, retail, convention, trade and exhibition complexes; and office buildings that house air-travel intensive executives and professionals. While not a

'major' airport, the vacant land surrounding the airport has been identified with several investors expressing interest in:

- Industrial land. There has been considerable interest from industrial developers for the land adjoining the airport which is approximately 17ha and already zoned for industrial use.
- The technology-hub. During the master plan process, the KZN Cabinet approved the establishment of four Technology Hubs in the province, one of which was for Pietermaritzburg. It was agreed that the ideal site would be at the airport, and the master plan makes provision for this. The province has secured funding from the EU for the design and infrastructure costs of establishing the hubs. The funds will be dispersed based on the readiness of each site. The concept plan for the Pietermaritzburg hub has been completed. The municipality has received letters of intent from four prospective tenants, including the DUT who is planning to establish an Aviation Academy, and an aircraft engine manufacturer. One of the prospective tenants is a consortium that proposes to build a multi-sports complex with a velodrome, which is likely to be used for the 2022 Commonwealth Games
- Commercial options on areas within the Airport precinct.
- The high existing demand for increased General Aviation. There is a long standing waiting list of private and commercial operators who are seeking to store their aircraft at Pietermaritzburg Airport. The closure of Virgina Airport may further increase this demand.

- The inconvenience of travel to King Shaka International Airport (KSIA) which has increased the user catchment for Pietermaritzburg Airport.
- The establishment of a new entity to manage the airport and the adjacent precinct. The revenue from this will be ring fenced to improve the sustainability of the airport and reduce the financial burden on the municipal budget.

2.2. Need and Desirability

While the current situation is far improved, the ***need*** remains to further improve the sustainability of the Pietermaritzburg Airport through continued growth in the scheduled flights and GA activity as well as harnessing opportunities presented by vacant unutilized municipal land adjoining the Airport.

The further development is considered as ***desirable*** as it aims to reduce/alleviate current subsidization; generate increased job and economic activity at a local scale and to the broader Municipal GDP. Further, the Airport properties are owned by the municipality and are zoned for airport and related uses. It is considered desirable to optimize this asset.

The MM is considering the development of the Airport more broadly than in just in terms of Air traffic and has commissioned a range of investigations to inform the optimal development of the Airport and adjoining municipal land in relation to the surrounding Airport 'precinct'. These investigations have been drawn from in defining the project description.

2.3. Project Location and Extent

The Pietermaritzburg Airport, formerly known as Oribi Airport, is located within the Msunduzi Local Municipality (MM), in KwaZulu-Natal, South Africa. The MM is approximately 640 square kilometres in extent and located at the centre of the uMgungundlovu District Municipal, about 80 km North West of Durban along the N3. Figure 2 provides an indication of the extent and locality of MM, and Figure 3 indicated the location of the airport in relation to the MM and its local surroundings. The Airport is located in the outskirts of Pietermaritzburg, owned and managed by the local MM and serves the city of Pietermaritzburg and surrounds as well as the outer west suburbs of Durban.

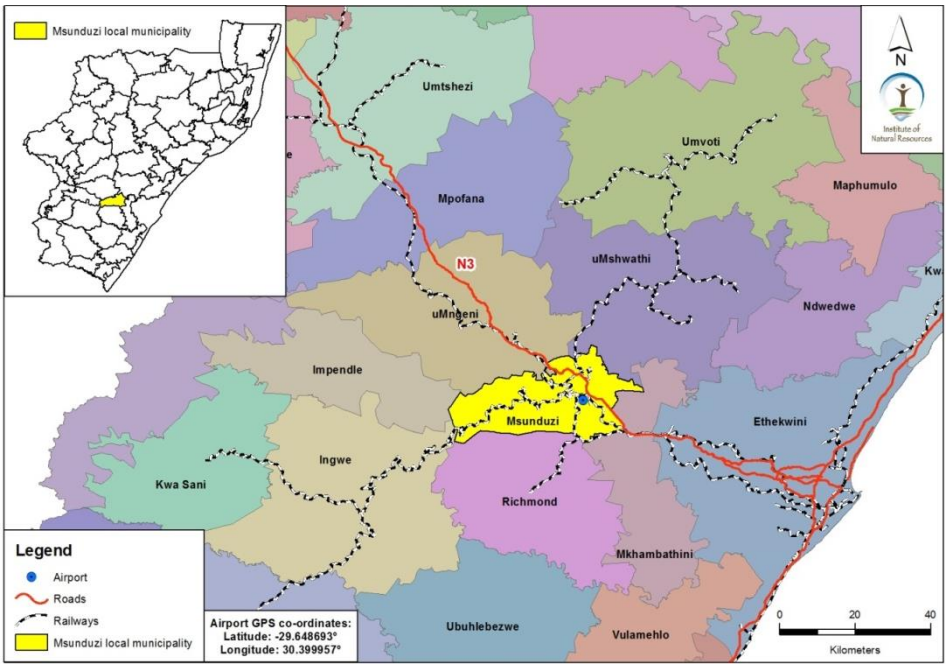


Figure 2: Location of Msunduzi Local Municipality

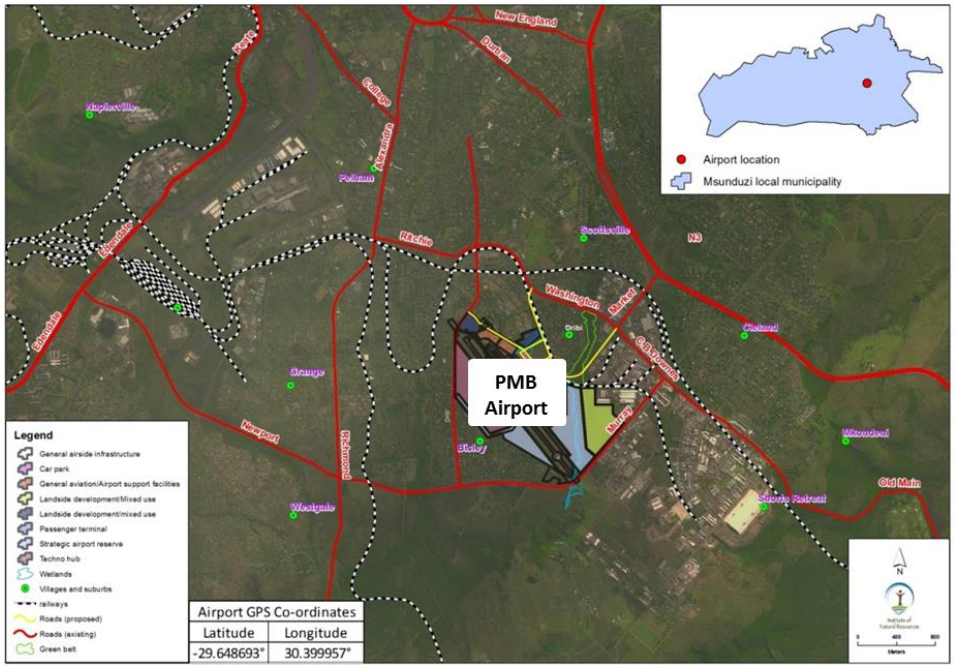


Figure 3: Location of Pietermaritzburg airport in relation to MM

2.4. Airport Passenger Capacity

Phase 1 of the airport's Master Plan defined infrastructure needs required to cater for flights and passengers (combined arriving and departing) to a volume of 250 000 passengers per annum (Airport Master Plan, 2014) (Figure 4). At the time, the prediction was that this capacity would be attained in approximately 2025.

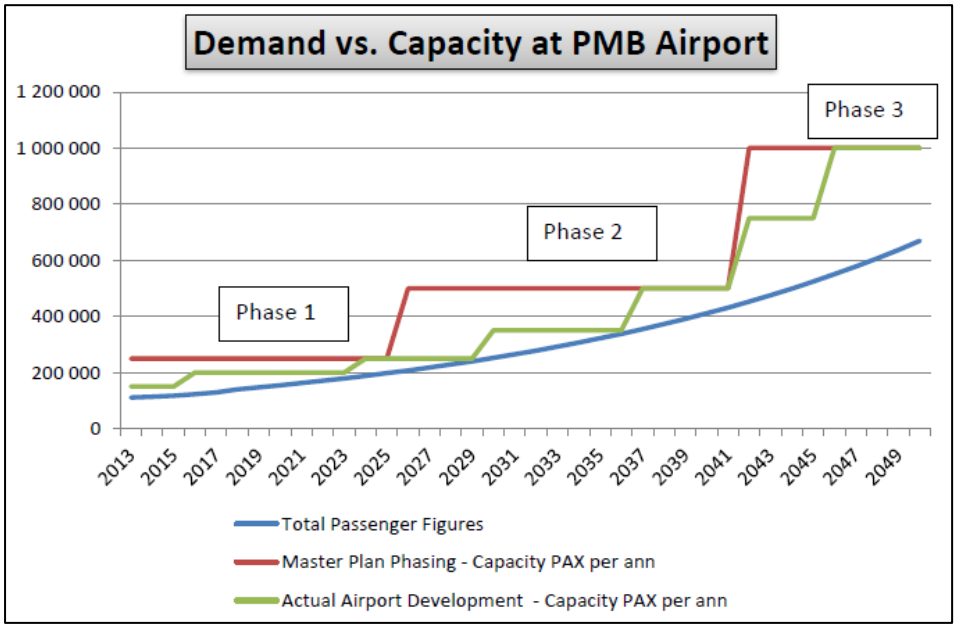


Figure 4: Passenger demand verses capacity at PMB Airport (Source: Airport Master Plan, 2014)

A review of the current airport passenger capacity in relation to the Phase 1 threshold 250 000 (PAX[1]), is used to estimate the potential number of additional scheduled flights that would need to be added to meet the demand. The current scheduled passenger capacity (based on the scheduled flights and aircraft capacity in 2017) is 212 056 as presented in Table 1.

Table 1: Current (2017) scheduled passenger capacity and aircraft used

Flight Departure Time[2] and Capacity										Total capacity/day	Total capacity/annum
PMB to JHB weekday flights					JHB to PMB weekday flights						
06:45	*08:45*	*13:50*	*17:00*	*18:00*	*7:00*	*12:15*	*15:30*	*17:00*	*18:15*	*Per weekday*	*Weekdays*
83[3]	83	37[4]	83	83	37	37	83	83	83	692	179 920
PMB to JHB Saturday flights					JHB to PMB Saturday flights						
08:45		*13:50*			*12:15*					*Per Saturday*	*Saturdays*
83		83			83					249	12 948
PMB to JHB Sunday flights					JHB to PMB Sunday flights						
14:00		*17:00*			*12:15*		*15:30*		*17:00*	*Per Sunday*	*Sundays*
83		83			37		83		83	369	19 188
TOTAL ANNUAL SCHEDULED PASSENGER CAPACITY (2017)											212 056

In 2016, **123 063 passengers** were recorded for scheduled flights (based on Indiza Airport Management's records of the 2016 flight and passenger movements for the Pietermaritzburg Airport), indicating that there is currently excess passenger capacity of 88 993. The current PAX is

[1] Pax: Passengers
[2] All times are listed as the flights departure time, from Pietermaritzburg Airport or O R Tambo International
[3] Based on the aircraft capacity of the AVRO RJ85 (approximately 83 passengers)
[4] Based on the aircraft capacity of the ERJ 135-LR (approximately 37 passengers)

therefore approximately 58% of the current capacity. According to Airlink, the only commercial airline presently operating at the Pietermaritzburg Airport, once the PAX reaches 65% of the capacity, the commercial airline seeks means of expanding their passenger capacity. This is achieved either through increased aircraft capacity or flight frequency (Smith, pers. comm., 2017[1]).

Based on the existing capacity (212 056) as calculated in Table 1, an additional 37 944 passengers/annum capacity is required to meet the Phase 1 demand of 250 000 passengers/annum. This amounts to approximately an additional **20% or one-fifth** of the current capacity, needed to meet the Phase 1 demand. Table 2 below summarizes these calculations.

Table 2: Current capacity vs needed capacity

	Passengers/Annum
Current capacity available (2017)	212 056
Current pax (2016)	123 063
Current excess capacity	88 993
Capacity required to reach 250 000 passenger/annum estimate	**37 944**

As there are currently 58 flights operating to and from Pietermaritzburg Airport per week (on average), an additional 20% capacity would translate to an additional 11 or 12 flights per week. This amounts to an additional 1 or 2 scheduled flights required to be added per day to reach the 250 000 demand estimation (Table 3).

Table 3: Estimate additional flights required to meet 2025 demand

Estimation of number of additional flights needed	
Current number of flights/week (both directions)	58 flights/week
Need approximately (one fifth of current capacity)	11 - 12 additional flights/week
Required to meet 250 000 passenger/annum demand	**1 - 2 additional flights/day***

**These additions would likely be during weekdays, weekend additions would typically be less based on the current flights/day trend.*

Airlink has recently announced the introduction of a scheduled flight between Cape Town International Airport and Pietermaritzburg Airport. The flight additions include a daily flight to and from Cape Town International Airport on weekdays, and a single flight on Saturday and Sundays. The ERJ 135-LR aircraft will be used to service this route, however this may be altered in the future based on the demand trends. Table 4 indicates that this new flight accounts for approximately two-thirds of the additional capacity required to meet the Phase 1 demand.

Table 4: Passenger capacity generated due to Cape Town flight addition

	PMB Departure/Arrival Time	**Total capacity/day**	**Total capacity/annum**
PMB-CPT weekday flight	07:00 (departure)	37	9620
CPT-PMB weekday flight	19:30 (arrival)	37	9620
PMB-CPT Saturday flight	07:00 (departure)	37	1924
CPT-PMB Sunday flight	19:30 (arrival)	37	1924
		TOTAL PASSENGER/ANNUM	**23 088**

Airlink indicated that they plan to replace old technology (Avro RJ 85) with the Embraer EJet E170LR and E190AR type aircraft (Smith, pers. comm.). This change is planned take place within a two year time frame. This is significant in terms of passenger capacity as these aircraft have capacity of

[1] Personal Communication by INR with Christine Smith (Airlink Branch Manager), 10 January 2017

approximately 75 and 110 respectively, which in combination is significantly greater than the ERJ 135-LR and Avro RJ 85 aircraft's capacity of 37 and 83 respectively. Therefore, the existing scheduled flights will have a greater capacity to meet the demand when the existing aircraft are replaced, thus potentially decreasing the need for additional scheduled flights.

Airlink anticipated introducing the Embraer EJet E190AR type aircraft within the next 12 months in effort to phase out the Avro RJ 85 aircraft (Smith, pers. comm.). It is anticipated that the ERJ 135-LR aircraft will continue to be used for off-peak scheduled flights, while the new aircraft will replace the Avro RJ 85 on the peak flights.

2.5. Land Tenure and Use

Expansion is proposed on the existing Airport Property (Remainder of Erf 10 000 and the adjoining properties: Rem of Erf 870, Erf 10159, Rem of Erf 1589, a portion of Erf 1910 all of Pietermaritzburg) as summarised in Table 5 below. Four of the land portions are owned by the MM except for a portion of Erf 1910 which is owned by Transnet

Table 5: Summary of the land parcels

ERF No.								Surveyor General Code																						Area (Ha)
R	E	/	8	7	0			N	0	F	T	0	2	5	8	0	0	0	0	0	8	7	0	0	0	0	0	0	16.1
R	E	/	1	5	8	9		N	0	F	T	0	2	5	8	0	0	0	0	1	5	8	9	0	0	0	0	0	18.1
R	E	/	1	9	1	0		N	0	F	T	0	2	5	8	0	0	0	0	1	9	1	0	0	0	0	0	0	0.45
R	E	/	1	0	0	0	0	N	0	F	T	0	2	5	8	0	0	0	1	0	0	0	0	0	0	0	0	0	0	145.42
R	E	/	1	0	1	5	9	N	0	F	T	0	2	5	8	0	0	0	1	0	1	5	9	0	0	0	0	0	0	12.69

2.6. Institutional Structure

The municipality is in the process of developing four municipal entities, one of which is the Airport Entity. Municipal Entities are established on the same basis as State Owned Enterprises, where the companies established have a majority shareholding from government. In the case of the Airport Entity, it is envisaged that a "mini Airports Company South Africa (ACSA)" will be established to operate and manage the airport. The entity will be managed by an independent Board comprising of Executive and Non-Executive Directors, with Non-Executive Directors in the majority, and the chairperson being a Non-Executive Director. One of the areas of management for the entity will be the development of vacant land in the airport, and in the precinct around the airport. The Technology Hub project will be one of the first development projects that will be managed by the Airport Entity. A Property Development division is proposed in the organizational structure of the new entity, and a process will be developed for the management of the Techno Hub, including a dedicated sub-unit that will manage the marketing of the site, and tenanting and other issues.

2.7. Proposed Infrastructure and Land-use

The project involves the expansion or addition of the following components which are detailed below:

- **Airside Infrastructure**
  - **Runway -** Continuous maintenance of existing runway
  - **Taxiway -** New taxi way of 15m width + shoulders, 256m long
  - **Aprons -** Construction of new apron area 14 000m^2 (200m wide and 700m deep), will be parallel to the runway.
  - **Navigation Aids -** To be upgraded to meet ICAO standards
- **Landside Infrastructure**
  - **Roads -** Main access off Oribi road; Direct link from Gladys Manzini; New access rod to N3 via Market road; Destruction of existing GA precinct to construct an access road linking the existing parking to the proposed road network; Road around the airport for patrolling
  - **Parking areas -** Public parking (12 800m^2) along Pharazyn way towards Oribi road adjacent to the reservoir
  - **Staff and VIP parking -** Yet to be negotiated with Servest
  - **Car Hire facilities -** Will be allocated space in the new parking area
  - **Terminal building -** Requires 2360m^2; Will be expanded in Phase 1 and relocated in phase 2
- **Utilities**
  - **GA Precinct -** 38 250m^2
  - **Cargo facility -** Parallel to the apron in line with the TB
  - **Fire and rescue facility -** Current location and capacity is sufficient; Relocate in phase 2
  - **Control tower -** Sufficient for current ops
  - **Water supply -** Reticulation to the terminal should be upgraded; New supply will be required for the GA; 7.6.2 Engineering Assessment should be done to determine suitability of current configuration in the long term
  - **Waste water -** Existing supply to the terminal needs to be upgraded; Reticulation needed for the GA areas
  - **Stormwater -** Improvements to the current storm water needed; Passenger terminal and fire station often experience flooding due to the slopes (cut off drain required); New storm water management will; be required for GA area.

Full details of the proposed development can be found in the Environmental Impact Report. A visual overview of the proposed development is show in Figure 5.

Figure 5: Layout and extent of the elements comprising of the Phase 1 of the Master Plan

3. METHODOLOGY

3.1. Guidelines for Socio-Economic Impact Assessment

This assessment comprises both social and economic components, and the methodology of this assessment is guided by the key activities of a SIA as described by Barbour (2007). The process should include:

- describing and understanding the details of the proposed intervention including its location, type and scale, as well as the communities that are likely to be affected by the proposal;
- determining the need and scope of the SIA;
- developing an understanding of the social environment status quo through the collection of current and historic baseline data;
- the identification of potential alternatives;
- consultation with I&APs to identify and collect data on social change processes and assessment variables;
- an assessment of the significance in anticipated impacts on the receiving social environment;
- identification of potential mitigation measures and alternatives, and assessing the significance of likely impacts; and
- the development of a Monitoring and Evaluation Programme.

To further guide the SIA process, the following core values and principles should seek to be achieved, as defined by Barbour (2007).

- *"Identify and assess the factors that contribute to the overall quality of life (social wellbeing) of people, not just their standard of living;*
- *Identify and assess the needs of vulnerable, at risk, groups and/or ethnic minorities or indigenous peoples;*
- *Identify and assess impact equity. Social assessments should seek to clearly identify which individuals, groups, organisations and communities stand to benefit from the proposed intervention and those that stand to be negatively affected. In so doing the assessment must identify and emphasize vulnerability and underrepresented groups;*
- *Identify and assess the gender aspects of impacts;*
- *Identify and assess the fit of the proposed development in terms of key legislative, policy and planning requirements;*
- *Acknowledge and value the existence of spiritual worldviews and the existence of sacred places;*
- *Acknowledge and value cultural diversity and differing value systems between and within cultures;*
- *Recognise that social, economic and biophysical systems and impacts are inextricably interconnected. Social assessments therefore, need to identify and understand the impact pathways that are created when changes in one domain trigger impacts across other domains; Acknowledge and incorporate local knowledge and experience into the assessment process;*
- *Identify and assess developmental opportunities and not merely the mitigation of negative or unintended outcomes;*

- *Address poverty reduction and seek to improve the position of the worst-off members in society;*
- *Identify and assess second and higher order impacts and cumulative impacts;*
- *Form an integral part of the development and planning process and inform all stages of the process, from inception to decommissioning and closure; and*
- *Identify and assess alternatives."*

This SEIA has been undertaken using these recommendations as a guideline.

3.2. Baseline Description

3.2.1. Data Gathering and Analysis

The following sources were used to develop a baseline understanding of the socio-economic environment. These include studies conducted for the proposed development, the airports precinct and other studies undertaken as part of the EIA, as well as additional information sources that are relevant to the project type and local and regional context.

- Various reports compiled by The Markewicz Redman Partnership (TMRP) in association with Royal HaskoningDHV (Pty) Ltd and Glen Robbins as part of the Airport Precinct and Management Plan for the Pietermaritzburg Airport and Surrounds.
- The feasibility study compiled for the Techno-Hub
- The Pietermaritzburg Airport Master Plan compiled by Delta Built Environment Consultants.
- The Msunduzi Local Municipality Integrated Development Plan (IDP) Review for 2015/16.
- The KZN Technology Hub Feasibility Assessment – Msunduzi Value Proposition prepared by Urban-Econ
- Studies conducted as part of the EIA process for the proposed expansion of the PMB airport:
    - Heritage Impact Assessment
    - Traffic Impact Assessment
    - Economic Impact Assessment
    - Property Valuation Assessment
    - Environmental Noise Impact Baseline Assessment
    - Public Participation Process (PPP) Report
- Previous studies undertaken for similar projects (i.e. the EIAs conducted from the King Shaka International Airport (KSIA) and the Cape Town Airport Runway Realignment)
- Maps and aerial photographs or the airport surrounds and potential impacts are in the Msunduzi Municipality

During the Scoping Phase of the EIA process, I&APs were consulted either directly and/or through public and focus group meetings. The SEIA process was an integral part of these engagements and thus used the outcomes to compliment data gathering process. The feedback from these engagement processes was therefore reviewed and incorporated into the SEIA. Communication channels between I&APs and the practitioners remained open throughout the EIA process, allowing for an ongoing expansion of the socio-economic understanding.

The above information gathering and review process enabled a comprehensive understanding of the socio-economic receiving environment and potential impacts. This formed the basis for assessing the

significance and likelihood of impacts, as well as enabled the identification of feasible and appropriate mitigation, enhancement and management options.

3.3. Impact Assessment and Mitigation

To determine and evaluate the significance of potential impacts on identified resources and receptors, impact assessment and mitigation is applied in accordance with define assessment criteria. The purpose of this method is to develop and describe measures to be applied in order enhance the potential benefits, and to minimize or avoid any potential harmful effects.

Specialists' expertise based on assessment, desktop analysis and field observations was used to assess potential impacts. To determine the significance of these impacts, the INRs impact rating methodology was used. The subsections to follow provide the methodology adopted, as well as defines key terminology to ensure consistent assessment.

3.3.1. Definition of Key Terminology

- **Project**: The collection of activities and components for which authorization is being applied for, which includes all associated facilities that are required for the Project to proceed
- **Project Site:** The operational area/s of the project activities, including private transport corridors (those exclusively dedicated for the project activities during its operation)
- **Project Footprint**: The area within and surround the project site that is anticipated to be physically influenced/affected by the activities of the project in all phases. This includes areas used temporarily (i.e. land and roads used during the construction phase, as well as private and public areas along transport corridors that are disturbed)

3.3.2. Impact Types and Definitions

Any change to a receptor or resource as a result of a component of the project (or a related project activity) is considered impact. By evaluating baseline data as a platform for assessment, it provides the information required to evaluate and describe the affects that project is likely to have on the socio-economic and biophysical environment. They type/nature of each impact can be categorized as positive, negative, indirect, direct or cumulative, as defined in the Table 6 to follow.

Table 6: Impact Nature and Type

Nature or Type	Definition
Positive	A positive change or improvement on the baseline.
Negative	A negative or adverse change from the baseline, or the introduction of an undesirable new aspect.
Direct impact	Resulting from the direct interaction between the project's activities and the receiving environment.
Indirect impact	Resulting from other activities that are expected to occur as an effect of the project.
Cumulative impact	Impacts which act jointly with others to affect the same components (receptors and/or resources) of the project. This includes impacts from simultaneous and/or planned future impending third party activities).

3.3.3. Assessing Significance

Impacts need to be determined in terms of their 'significance', which is a defined by the impacts' **magnitude** and its' **likelihood** of occurring. 'Magnitude' is defined by the **extent**, **duration** and **intensity** of the impact, and sometime referred to as the 'severity' of the impact. To determine the magnitude of an impact, a set of criteria is used as per Table 7 below. Also defined in the table is a scale of 'likelihood' to be used in determining its significance.

Table 7: Significance Criteria

Impact Magnitude	
Extent	– **On-site:** Within (limited to) the boundary of the projects' development site – **Local:** Affect an area that is within a 20km radius of the projects' development site – **Regional:** Experience at a regional scale (as determined bit administrative boundaries, habitat type/ecosystem) or affect regionally important resources/receptors – **National**: Affect an area and/or resources/receptors that are of national importance or have macro-economic implications.
Duration	– **Temporary:** Intermittent/occasional or brief duration – **Short-term:** Only occurring within the construction phase of the project – **Long-term:** Occurring throughout the life of the project, but ceases upon the projects termination (when it stops operating) – **Permanent:** Result in permanent change to the receiving environment that continues beyond the life span of the project (after it stops operating)
Intensity	**Biophysical Receiving Environment** *The sensitivity of the biophysical resource/receptor determines the intensity of the impact* – **Negligible:** Non-measureable impact – **Low: D**oes not affect the natural processes and functions – **Medium:** Alters the environment but natural processes and functions endure (although in a modified manor) – **High:** Alters natural processes and functions to the extent that they will cease (either temporarily or permanently) *National and/or international standards and limits should be applied, where appropriate, to determine/measure the impact. Quantification of the magnitude of impact and the accompanying rational should be attempted in the specialist studies.* **Socio-Economic Receiving Environment** *The ability of the communities/people affected to adapt their livelihoods to the changes brought about by the project, determines the intensity of the impact.* – **Negligible:** No noticeable change to livelihoods – **Low:** Ability to adapt livelihoods with relative ease and maintain baseline conditions – **Medium:** Ability to adapt livelihoods with some difficulty and maintain baseline conditions with a degree of support – **High:** Affect does not enable livelihoods to adapt to changes or maintain baseline conditions
Likelihood - the likelihood that an impact will occur	
Unlikely	The impact is **unlikely** to occur.
Likely	The impact is **likely to occur under most conditions**.
Definite	The impact **will** occur.

The significance rating matrix (Table 8) is adopted after defining the magnitude and likelihood of the impact, as a means of determining the significance of the impact. The significance colour scale is adopted to provide a visual representation of the magnitude of negative and positive ratings (Table 9).

Table 8: Significance Rating Matrix

Significance				
Magnitude		**Likelihood**		
		Unlikely	**Likely**	**Definite**
	Negligible	Negligible	Negligible	Minor
	Low	Negligible	Minor	Minor
	Medium	Minor	Moderate	Moderate
	High	Moderate	Major	Major

Table 9: Significance Colour Scale

Negative Ratings	Positive Ratings
Negligible	Negligible
Minor	Minor
Moderate	Moderate
Major	Major

Table 10: Significance Definitions

Significance Definitions	
Negligible significance	No effect on the receiving environment (resource/receptor/people) imposed by an activity of the project, or where the anticipated effect indistinguishable from the baseline or is considered to be insignificant (negligible or unnoticeable).
Minor significance	Evidence of an effect with a sufficiently small magnitude (with or without mitigation) that is within the accepted standards and/or the receiving environment is of low value/sensitivity.
Moderate significance	An effect that is within the accepted standards and limits. Emphasis must be placed on demonstrating that the significance of the impact has been reduced, as far as reasonably possible. 'Moderate' impacts do not necessarily need to be reduced to 'minor' impacts, but rather be managed efficiently and effectively as 'moderate' impacts.
Major significance	An impact that exceeds accepted limits or standards, or where large magnitude impacts affect components of the receiving environment that are highly valuable/sensitive. The intention of the EIA process is avoid major residual impacts, particularly such impacts which are long-term or cover an extensive area. However, such impacts may not be able to be mitigated even after all reasonable options have been exhausted, in which case such negative factors need to be weighed against positive factors in order to make a decision.

A statement of the **degree of confidence** in the assessment must be qualified once the significant of the impact has been determined. The degree of confidence is expressed as 'low', 'medium', or 'high' as determined based on the associated uncertainties (whether or not there is sufficient information to adequately assess the impact).

3.3.4. Mitigation Measures and Residual Impacts

The EIA process is required to identify feasible and practical mitigation measures where significant impacts are evident. Mitigation measures are implemented through compliance with the Environmental Management Programme (EMPr). After the initial determination of an impact's significance, the significance is re-determined taking into consideration the effective implementation of the mitigation measure, resulting in a significance rating for the residual impact.

3.3.5. Identification of Mitigation Measures

Identified feasible and practical mitigation measures need to be incorporated into the project design as a means of avoiding/reducing negative impacts or enhancing positive impacts as a result of the project activities. Such mitigation measure need to be agreed upon with the client as they are likely form the basis of any conditions of approval defined by the competent authority.

3.4. Limitations and Assumptions

This study, and the specialist studies it draws on, is based on a number of assumptions due to limitations that were encountered. These limitations and assumptions are detailed in the sub-sections to follow.

3.4.1. Data Gathering and Accuracy

This assessment was largely based on secondary data gathered through a desktop analysis, and complimented by specialists' field observations, interviews and surveys conducted by specialists, and consultation with I&APs conducted as part of the PPP. Due to the extensive amount of baseline information available and the in-depth consultations conducted, socio-economic surveys and/or primary field work was deemed unnecessary.

- This report therefore depends on the accuracy of previous studies, municipal and census records, and the assessments undertaken by specialists'.
- The census data use to understand the baseline socio-economic environment is based on the 2011 census data, which although five years out of date, was the most recent and reliable data available. In some cases, municipal data was available for 2015 or 2016.
- The assessment is based on the available information at the time of compilation
- Where specific information and detail reading elements of the proposed development have no yet been defined (i.e. the commercial/mixed use), the assessment cannot adequately determine the potential impacts.
- The lack of historical records in some cases made it difficult to create comparisons. For example, the property valuation assessment did not have 'before' and 'after' data to benchmark against.
- Due to the relatively short time frame of assessments, this does not allow for longer terms measurements/observations which would enhance the value and accuracy of measurements and results. This was apparent with the noise baseline assessment, where observations were limited to 2 months of the year. Results may have difference in other seasons where climatic conditions may have influence the observations. Despite this limitation, observations were contextualized given the weather conditions using expert knowledge and guidelines.
- The planning documents and feasibility studies (i.e. the Airport Master Plan, Precinct Plan and Techno Hub Study) are a high level and therefore do not provide adequate information to conduct all assessments with a high level of confidence.

3.4.2. Socio-Economic Impact Assessment

Due to the subjective nature of socio-economic elements, impacts are difficult to measure objectively and are therefore inferred rather than measured. An understanding of the specific socio-economic context as well as social processes in general is therefore key in drawing valid inferences. Human sciences are both subjective and objective in nature, making them difficult to measure in real terms. For example, determining 'nuisance' is perceived differently by I&APs.

It is important to note that socio-economic impacts are typically interrelated and multifaceted, making it difficult to consider impacts in isolation. This highlights the need for a socio-economic impact assessment where the significance of impacts is contextualized as far as possible.

4. SOCIAL AND ECONOMIC ENVIRONMENT

The following is a collation of background information that describes the nature, status and condition of the socio-economic characteristics of the potentially affected receiving environment. This understanding is necessary to contextualize issues identified and highlight those of potentially high significance.

The areas potentially affected by the proposed development is categorized into two, the regional (Msunduzi Municipality) and the local (airport and its precinct, and areas along the flight path) areas of influence.

The MM is likely to experience impacts of a more indirect nature, predominately economic impacts. The local area of influence is the Pietermaritzburg airport and its surrounding suburbs, as well as the suburbs along the commercial/scheduled flight path which are directly impacted as a result of noise generated by aircraft on their approach and departure from the airport. The area surrounding the airport is inclusive of the area referred to as the Airport Precinct, for which a management plan has been developed that encompasses the proposed development.

4.1. Regional Socio-Economic Environment

The MM is located in the Umgungundlovu District Municipality, and is home to the Capital and second largest city on KwaZulu-Natal, Pietermaritzburg. Situated approximately 45 minutes' drive from Durban, the MM is astride the N3 corridor, one of the busiest development corridors in the country, which connects the Durban and Gauteng economic hubs. The MM is one of seven local municipalities in the District, and contributes 8% and 70% to the Gross Value Added (GVA) of the KZN province and District Municipality respectively. The MM is not a key tourism hub, hosting an array of events, but its capital status has resulted in it being a political and administrative hub for the province.

The MM consists of 37 wards, coving an area of approximately 590.6 km^2, and predominantly urban to peri-urban in nature, with some rural residential areas. The table below summarises the key statics of the MM.

Table 11: Municipal summary of key statistics

	2011 (Census) [1]	**2016**[2]	**State**
Total Population	618 536	679 039	Increase
Number of Households	163 993	180 469	Increase
Average Household Size	3.6	3.8	Increase
Population Growth Rate	1.12% p.a	2.00% p.a	Increase
Male: Female	45.45 : 54.55		
Female Headed Households	45.2%	45.9%	Increase
Unemployment	33%		
Flush Toilets Connected To Sewerage	51.6%	49.3%	Decrease
Weekly Refuse Removal	53.2%	47.4%	Decrease

[1] Msunduzi Local Municipality. (No Date). Integrated Development Plan (IDP) Review for 2015/16. Msunduzi Local Municipality IDP Office. Pietermaritzburg.

[2] http://www.municipalities.co.za/locals/view/88/Msunduzi-Local-Municipality#demographic

	2011 (Census) [1]	2016[2]	State
Piped Water Inside Dwelling	47.9%	41.7%	Decrease
Electricity For Lighting	91.9%	96.1%	Increase

The MM is subject to several advantageous components, such as:

- Its strategic location along the N3 corridor and in close proximity to the Durban Port and the King Shaka International Airport (KSIA)
- Its good transport networks (road, air and rail)
- Is an administrative and service centre for the inland region
- Is home to leading tertiary institutions such as the UKZN and the Durban University of Technology (DUT)
- Is well equipped with services (commercial, community and infrastructure)
- Has an established business base with an integrated Chamber of Business (CoB)
- Its manufacturing basis which includes textiles, agriculture (timber, beef, dairy, agri-processing), aluminium, construction material, clothing and leather goods, motor components, and steel.
- It being a tourist destination which drives the increase of hotels and restaurants
- Its assortment of development projects and planned growth

4.1.1. Population and Demographics

As indicated in the recent census (2011), the average annual population growth rate in the MM of 1.21%, having risen from 552 837 people in 2001 to 618 536 people in 2011. Based on the 2016 municipal records, the population has further grown to 679 039. There has been an increase in the number of households (130 292 to 163 993 to 180 469 in 2001, 2011 and 2016 respectively), however the household size has decreased from 4.0 (2001) to 3.6 (2011) and 3.8 (2016) persons per households. As indicated in the table above, there are more females than males in the MM, which is a trend that has strengthened since 2001.

The majority of the MMs population (68.4% in 2011 and 64.7% in 2016) is within the economically active age bracket (15 to 64 years), while approximately a quarter of the population (26.6% in 2011 and 31.5% in 2016) is under the age of 15, and the remaining are over the age of 64. Although the dependency ration of people within in 15 to 64 age cohort has decreased, it still remains high at 46.2% (2011) and 54.7% (2016). The graphs to follow demonstrate the racial, gender and age dynamics of them.

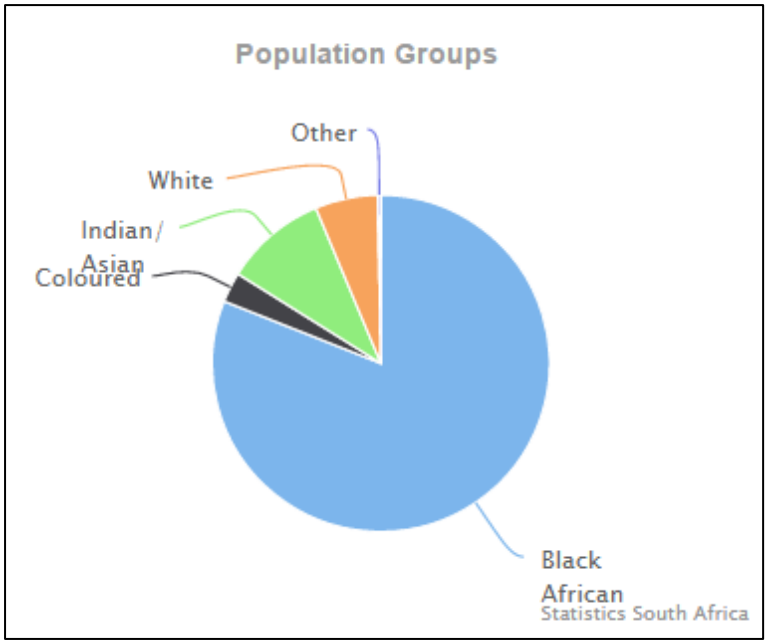


Figure 6: Population groups in the MM (Source: StatsSA)

Black African: 81.1%, Coloured: 2.9%, Indian/Asian: 9,8%, White: 6%, Other: 0,3%

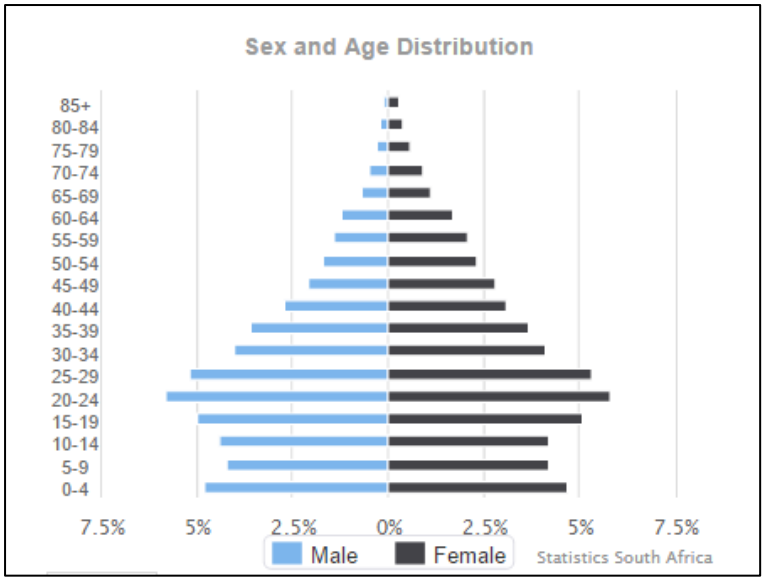


Figure 7: Age and gender dynamics in the MM (Source: StatsSA)

One of the main concerns in the MM is the prevalence of HIV/Aids. It has been recorded that the uMgungundlovu District Municipality, in which the MM falls, had the highest prevalence of the highest prevalence of HIV/Aids in the province and country in 2010[1]. The HIV/Aids prevalence rate in the MM was 42.3% (2010).

[1] According to the annual Department of Health anti-natal survey undertaken at state hospitals

In terms of education in the MM, there has been positive change between 2011 and 2011, with a decrease in the percentage of adults of the age of 20 with no schooling (record of 5.5% in 2011 and 4.3% in 2016). In line with this trend, there has also been an increase in the percentage of adults with a matric qualification, having risen from 24.5% in 2001 to 33.7% in 2011, and a further increase to 40.5% in 2016. In addition, those who have obtained higher qualifications have also increased from 9.2% to 13.1% and 14.5% in 2001, 2011 and 2016 respectively. Despite these positive trends, the number of children of school-going age that are attending school has decreased from 66 789 in 2001 to 62 737 in 2011.

As demonstrated in the graph to follow, isiZulu is the most predominately spoken language in the MM, followed by English. Other prominent languages include Afrikaans, isiXhosa and Sesotho.

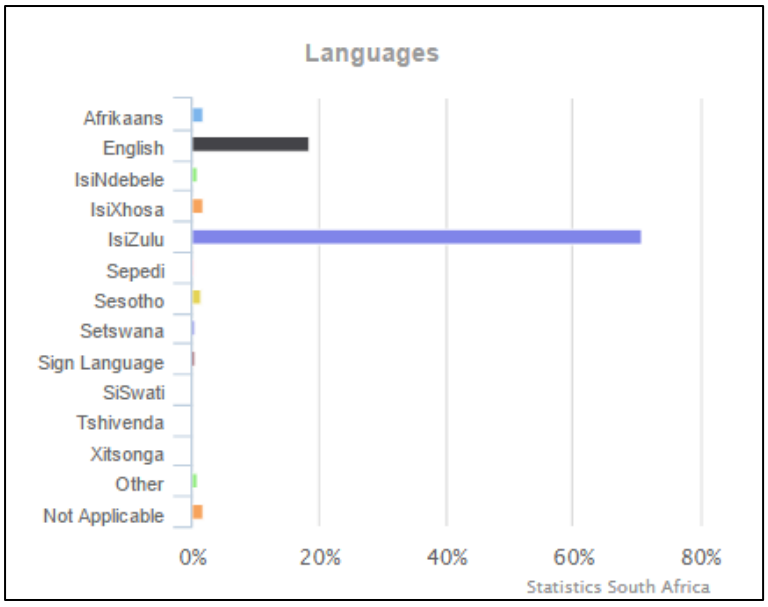


Figure 8: Language breakdown in the MM (Source: StatsSA)

Table 12 provides an overview of the MM's population dynamics, highlighting in strengths and weaknesses, and potential opportunities and threats.

Table 12: Msunduzi Municipality population SWOT analysis[1]

KEY ISSUES RELATING TO POPULATION	
• A growing population with a growing number of households, but with a decreasing average household size. • A population that is predominantly within the economically active age groups, and one where people within the working age groups are less dependent on those who are employed. • A population that is improving in levels of skills development and literacy shown by the improving levels of schooling and post schooling qualifications. • A population with the highest level of HIV/Aids infection in the province. • A population with a relatively high level of child headed households.	
STRENGTHS	**WEAKNESSES**
• A stabilising population growth rate. • A relatively low number of child- headed households • The majority of the population in the economically	• High number of economically vulnerable households • Places of residence some distance from work opportunities.

[1] Msunduzi Local Municipality. (No Date). Integrated Development Plan (IDP) Review for 2015/16. Msunduzi Local Municipality IDP Office. Pietermaritzburg

active age cohorts	• High levels of unemployment.
OPPORTUNITIES • The majority of the population in the economically active age cohorts • Good levels of education amongst adults • Improving levels of literacy and tertiary training.	**THREATS** • High levels of HIV/Aids • Increasing in migration

4.1.2. Economy

In 2014, the MMs GDP showed signs of positive growth following the 2010 period of negative growth (3.85% for 2010). The census indicates that there has been a decline in the unemployment level, the percentage of unemployed economically active adults having decreased from 48.2% in 2001 to 33% in 2011. This trend is mirrored by the youth (15-34 years) unemployment rate, which has decreased from 58.2% to 43.1% in 2001 and 2011 respectively.

Figure 9 to follow indicates the key economic sectors that drive the MM and the percentage that they contribute to the GDP, according to the 2012 Treasury statistics. The dominate sectors are Community Services, Finance, Transport, Trade and Manufacturing.

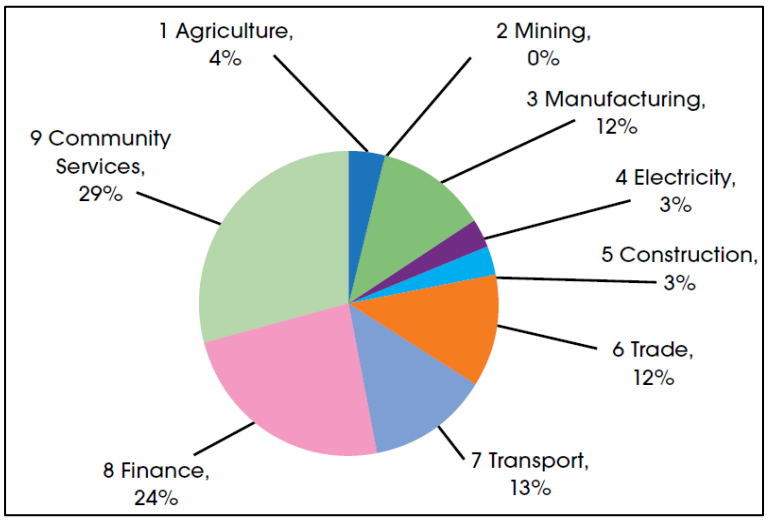


Figure 9: GDP per sector for the Msunduzi Municipality (2012)

In terms of the Gross Value Added (GVA), which is a measure of the value of goods and services produced in an area, the Municipality's GVA comprises of tertiary (69%), manufacturing (25%) and agricultural (6%) activities. The tertiary sector is driven by retail trade and business services, and a large portion of the manufacturing component is reliant on the commercial agricultural capacity of the surrounding municipalities. The main economic sectors contributing to the GVA are general government (19%), business services (14%), wholesale and retail trade (10%), and Transport and communication (9%). The Information Communication and Technology (ICT) is also a key sector with a growing at a rate of 7.5%, and is positively impacted by the 3.8% growth rate of the electrical machinery and apparatus sector. Alongside recent major developments (such as the Victoria Country Club Golf Estate, Liberty Midlands Mall, the Golden Horse Casino and Hotel, and 'Motor City'), property development is also on the rise in the MM, with developments ranging from residential estates to light industrial, hotel and conferring facilitates, commercial enterprises, and logistics and warehousing.

As previously indicated, the MM is fortunate in that it has a number of economic advantages, namely: locational (its central location and its situation along the N3 corridor – a primary logical corridor linking two key economic hubs, Durban and Gauteng); natural/geographic (highly fertile land); human capital (array of good schools and tertiary education facilities); and institutional (capital city of the province). Table 13 below provides an overview of the economy's dynamics and opportunities in the MM.

Table 13: Msunduzi Municipality Economy SWOT analysis[1]

KEY ISSUES RELATING TO THE ECONOMY	
• A positive GDP and GVA for the municipal economy with an upward trend curve. • Unemployment figures, although relatively high, are improving and showing a downward trend. • The Municipality has a number of sectors that have a competitive and comparative advantage and require further support and assistance from the Municipality and other government sectors. • LED Studies for the Municipality show that there are opportunities in agriculture, agri-process, wood and wood products, tourism, logistics, ICT, and manufacturing to varying degrees. This is summarized as follows: - **Agriculture -** adding value to local produce taken from the surrounding rural areas and municipalities. - **Tourism -** Increasing events and improving business tourism numbers. - **Logistics -** growing Msunduzi as a logistics centre for breaking bulk between inland and the coast as well as supply chain management services, especially the cold chain with links to Dube Trade Port. - **Manufacturing -** linked to agriculture and tourism, for example agricultural chemicals, and to automotive components, as well as wood and wood products	
STRENGTHS	**WEAKNESSES**
• Economic growth is positive. • Unemployment is on the decline. • The number of unemployed youth is on the decline. • The economy has well- established secondary and tertiary sectors. • The percentage of unemployed youth is on the decline. • The Municipality is the provincial capital.	• Limited space available for industrial expansion. • Labour residing long distances from places of employment. • The need to review the LED strategy.
OPPORTUNITIES	**THREATS**
• Adding value to agricultural produce. • Increasing events in the Municipality. • The development of the logistical potential of the Municipality's location. • Expanding manufacturing in the areas of agricultural chemicals, automotive components, and wood products.	• The impacts of the on-going Global financial crisis. • Globalisation and competition with manufacturers with lower overhead costs.

Employment and Labour

Employment figures for the MM demonstrates that majority of employment is of a formal nature, accounting for approximately 167 000, while informal employment accounts for approximately 32 500 based on the 2015 figures (Table 14). Formal employment rates grew by 1.5% between 2005 and 2015, however this rate is too slow to absorb the growing labour force, which is evident in the fact that unemployment rate is 2015 was 30%.

The majority of formal employment is generated by the community services sector, followed by the trade, finance and manufacturing sectors. The informal employment is dominated by the trade sector, with other main contributors being community services, construction and transport sectors.

[1] Msunduzi Local Municipality. (No Date). Integrated Development Plan (IDP) Review for 2015/16. Msunduzi Local Municipality IDP Office. Pietermaritzburg

Total remuneration derived from the formal sector in MM in 2015 was approximately R23.5 billion (Table 14). The majority of this is generated through the community services sector (almost 40%), with other main contributors being the manufacturing, finance and trade sectors. This demonstrates that the manufacturing sector plans a relatively important role in generating relatively high paid jobs, although it on contributes to approximately 13.5% of the formal sector employment.

Table 14: Msunduzi Municipality's formal and informal employment, and labour remuneration in the formal sector (2015) (Source: Global Insight)

	Formal		Informal		Labour Remuneration	
Sector	Number	% total	Number	% total	R1000s	% total
Agriculture	7,320	4.4	0	0.0	342,554	1.5
Mining	301	0.2	0	0.0	83,000	0.4
Manufacturing	22,136	13.3	2,236	6.9	4,397,140	18.6
Electricity	1,389	0.8	0	0.0	902,523	3.8
Construction	8,843	5.3	4,336	13.3	844,029	3.6
Trade	25,446	15.2	15,070	46.3	2,519,753	10.7
Transport	7,668	4.6	3,528	10.8	1,574,894	6.7
Finance	24,097	14.4	1,983	6.1	3,541,482	15.0
Community Services	51,021	30.5	5,416	16.6	9,381,388	39.8
Households	18,793	11.3	0	0.0	23,586,763	100.0
Total	*167,014*	*100.0*	*32,569*	*100.0*		

Expenditure

Household expenditure per sector is an important reflection of economic activity in the area. Table 15 below demonstrates the expenditure amount and percentage per sector in the MM in 2015. It is evident that accommodation, food, transport and taxes are the highest expenditure sectors.

Table 15: 2015 expenditure per sector in Msunduzi Municipality (Source: Global Insight)

Sector	R1000s	% total
Accommodation	4,821,527	13.6
Domestic Workers	825,526	2.3
Food	5,616,258	15.9
Beverages	1,691,076	4.8
Clothing	1,632,828	4.6
Household	882,633	2.5
Personal	467,244	1.3
Transport	4,740,840	13.4
Comm./Education	2,240,191	6.3
Recreation	715,649	2.0
Restaurants	432,883	1.2
Smoking	535,688	1.5
Furniture	360,234	1.0
Medical	2,162,856	6.1
Miscellaneous	435,708	1.2
Taxes	4,908,906	13.9
Finance	2,586,271	7.3

Other	337,665	1.0
	35,393,983	*100.0*

4.1.3. Infrastructure

Trends in the access to basic services varies as access to piped water and electricity having increased between 2001 and 2011, while the percentage of households with flush toilets and refuse removal has decreased. Such decreases could be attributed to the population growth of the municipality. Table 16 below indicates the infrastructure trends in the municipality between 2001 and 2011 in the MM.

Table 16: Infrastructure trends in the Msunduzi Municipality

Infrastructure Type	2001[1]	2011[1]	2016[2]
Piped water inside dwelling	38.3%	47.9%	41.7%
Flush toilet connected to sewerage	52.3%	51.6%	49.3%
Electricity for lighting	85.8%	91.9%	96.1%
Weekly refuse removal	59.5%	53.2%	47.4%

In terms of housing backlog, the Department of Human Settlement estimated there is a need for approximately 6 800 houses.

4.2. Local Socio-Economic Environment

The overview of the local socio-economic environment is categorized into three areas: the Airport, the suburbs surrounding the airport (inclusive of the Airport Precinct), and the 'extended flight path zone' (the suburbs in the Pietermaritzburg area that are potentially impact by the commercial/scheduled flight path). The context of these three areas is provided in the sub-sections to follow.

4.2.1. Pietermaritzburg Airport[3]

Pietermaritzburg Airport (previously known as Oribi Airport) is owned by the MM and serves the city of Pietermaritzburg and surrounds as well as the outer west suburbs of Durban. It is is located at 29°38'44.47" S and 30°23'45.06" E off Oribi Road in the Suburb of Oribi. Construction of the Airport was completed in March 1931 when the municipality also received a license to operate from the Civil Air Board[4]. A flying school was opened in 1938, and the Aerodrome was then leased to the Defence Authorities for the duration of the war and for a year afterwards. The City Engineer took over the Aerodrome in 1945 from the Defence Authorities. Over time, concern about the state of the runway led to extensive investment by the Defence Department and the city council, culminating in an official ceremony marking the opening of the Oribi Aerodrome in July 1967. While the Airport provides a service to General Aviation (GA) and there has been significant demand for increase in the GA facilities so this revenue stream will increase, the sustainability of the airport and its contribution

[1] IDP 2015/16 Review
[2] http://www.statssa.gov.za/?page_id=993&id=the-msunduzi-municipality
[3] Source: Delta Built Environment Consultants, 2014
[4] The history presented in this section is a summary drawn from the historical overview of the airport presented in the 2007 Economic Impact study by Coetzee and Oldham.

to the regional economy depends on the scheduled passenger services and associated "belly" freight (Coetzee and Oldham, 2007). The Municipality has continued to run the airport but not without subsidizing the provision of this service, which was estimated to be approximately R 5.5 million in 2007.

Since the initial construction of the airport, the surrounding land has naturally developed. The airfield site, contained within the airfield boundary fence, covers an area of approximately 89ha, however, there is significant area of undeveloped municipal owned land available which falls directly alongside the airfield, totaling to an area of approximately 157.45ha.

Figure 7 illustrates the existing infrastructure at the airport including the airside, landside infrastructure, the terminal building, and other facilities and utilities. The capacity and condition of the existing facilities, infrastructure, utilities and roads at the airport were some of the key influential factors for the expansion of the airport. The details and state of the existing airport infrastructure is as follows:

- **Airside infrastructure**
    - *Runway:* The portion of the runway that represents the full structural pavement strength is 1 597m, with a stopway of 190m, giving a total length of 1 787m. This equates to an ICAO classification 2C airport. The stopway is, however, an area beyond the runway which can be used for deceleration in the event of an aborted take-off and should provide capable support without causing structural damage to the aircraft. SA Airlink utilises the stopway when departing from Runway 34 to gain distance for take-off for their Jetstream 41.
    - *Taxiway:* The gradient of the main taxiway, connecting the apron to runway is steep and undesirable, and a limited number of jets can be catered for on the runway and taxiway at a time.
    - *Apron areas:* The insufficient parking/apron area is a safety concern for the commercial aircraft as it can only accommodate one plane at a time for departure, passengers cannot board while another plane is preparing for departure. Its current position of the apron area and taxiway in front of the terminal building is a development constraint for expansion.
    - *Navigation Aids, Visual aids and Signage:* Recently added are the VOR/DME, NDB's, GNSS Let-down procedure and airfield ground lighting, PAPI's at thresholds, which has improved airport's efficiency.
- **General Aviation**
    - There are existing development plans, which provide for expansion of the current GA area. The uncertainty about the future of Virginia Airport, *Pietermaritzburg* Airport may attract some of GA business. This has a significant impact on the planning of the general aviation site and most probably parking for small aircraft, which will be demand driven.
- **Landside Infrastructure**
    - *Access Roads:* The airport is located approximately 6km south of the CBD of Pietermaritzburg, and is 3.5km from the N3 freeway and 2km from the R56. Direct access into the airport is through Pharazyn Road off Oribi Road.
    - *Parking Areas:* Servest Parking is responsible for the facility which houses the seven car rental firms and the private shuttle service. The location of the current

designated drop-off and collection area is viewed as being unsuitable by some users; however, the preferred area is restricted and defined by the concession terms.

- **Terminal Building**
  - The terminal building covers an area of about 1 200m^2 in public amenities including check-in counters, arrival and departure lounges, a VIP lounge, a cargo office, an airport management office, an ATM, a coffee shop and ablution facilities. The layout and facilities within the terminal building were upgraded as part of the capacity of the terminal building has been deemed insufficient based on the growth in passenger numbers at the airport.
- **Other facilities and utilities**
  - The other facilities and services at the airport site which were assessed include: control tower; fire and rescue facility; fuel; car hire facility; hangars; utilities (electricity, water, sewerage, communication).

Figure 10: Existing infrastructure layout (Source: Delta Built Environment Consultants, 2014)

4.2.2. Airport Surrounds

The Pietermaritzburg Airport and its surrounding areas (inclusive of the Airport Precinct which is defined below) falls with the *Central Business District (CBD), Ashburton and Eastern Areas* Area Based Management (ABM) region of the MM. CBD functions as the primary market area for the MM and a place of power concentration (economic, political and financial), investment, and rates revenue generation. The region also provides social interaction and integration opportunities, is a

tourism destination and acts as a gateway to the surrounding tourist destinations. The Capital City status has contributed to the economic and development growth and stability of the region.

The CBD, Ashburton and Eastern Areas ABM is the main employer with the Municipality's working population, with a large portion being employed in governments departments, while other in the industrial sector, particular in areas such as Willowton, Pelham, Mkhondeni and Northdale. The ABM is also home to the major education institutions in the Municipality, namely the University of KwaZulu-Natal (UKZN) and Durban University of Technology, which are in the Scottsville area, and the UNISA and FET College/s which are in the central (CBD) areas. Although the ABM's land use is dominated by thornveld and grasslands, the region is predominantly used for residential purposes. The area is also home to important transport corridors as it accommodates a large proportion of the N3, which also connects provincial corridors, and hosts the city's airport and railway station. The Goodgl Earth image below Figure 11 to follow demonstrates the location of the airport (red outline) in relation to the Pietermaritzburg CBD and the main transport routes.

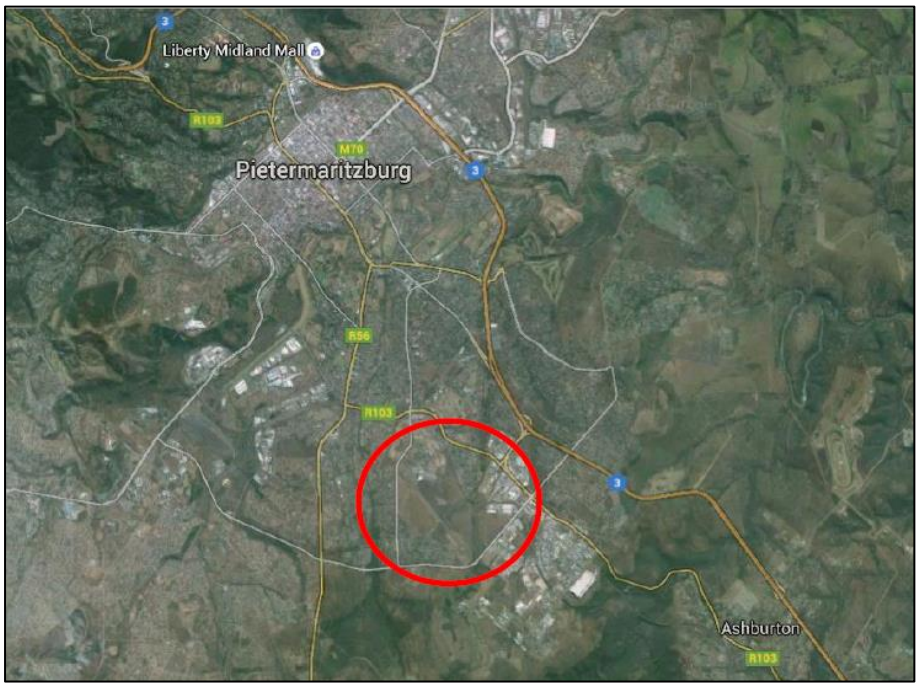


Figure 11: Location of the airport in relation to the Pietermaritzburg CBD (Source: TMRP, 2016)

The area surrounding the airport is characterised by different types of land-use, namely low and middle income residential areas (Oribi Heights, Oribi Village, Bisley and Scottsville Extension), industrial areas (Mkondeni and Shortts Retreat) and open space/reserve and agricultural areas (Bisley Nature Reserve and Ukulinga Agricultural Research Centre).

There are several schools in the surrounding area, such as crèches and day cares (i.e. Humpty Dumpty Playshool, Cotton Tail Day Cottage Care Centre, Kalinka Edu Care), and a primary school (Bisley Park Primary). There are also several churches such as the Faith Baptist Church, Faith in Action Church Ministries and the NCF/One life Church. In addition, the area is home to two sporting clubs (the Maritzburg Racing Pigeon Combine and a Vintage Sports Car club).

In terms of commercial entities within the residential areas (therefore excluding the car hire services etc. that operate within the airport boundary, and the industrial sector), there are several shops (such as Emilys Supermarket and Emilys Liquors) and service providers (Hair Dynamix, Ma Nails and

Hair Bar). From a tourism perspective, there are various small scale businesses such as lodges and BnBs (e.g. Acacia Park Lodging, Kings Hill BnB, Tudor Lodging, Kwa Ntofo Ntofo BnB) and transport/tour agencies (TM Tours, Here2There shuttle service). There are also several informal, small scale business entities within the residential areas.

Figure 12 to follow provides an aerial overview of the area surrounding the airport, indicating the suburbs and key localities.

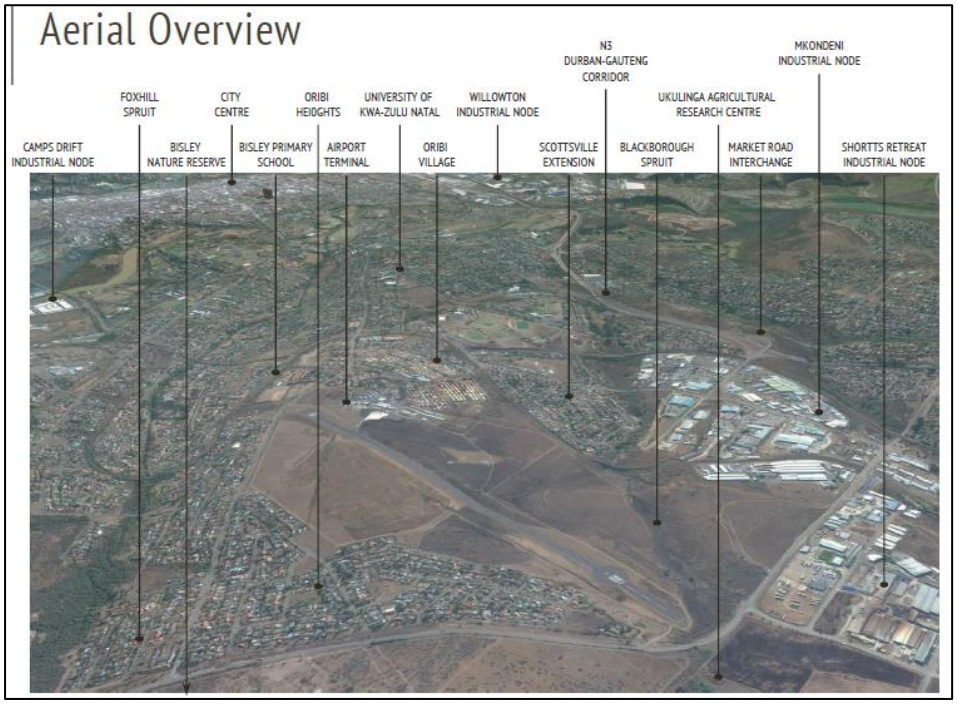


Figure 12: Aerial View of the Airport and its surrounds (Source: TMRP, 2016)

The following photographs provide a visual overview of the airport and its surroundings (photographs sourced from TMRP, 2016).

Roads

Environment and Open Space

Economic Typologies

Oblique Aerials

Pietermaritzburg Airport

Housing Typologies

Airport Precinct

The Airport Precinct (Figure 13) includes the airport and portions of the surrounding residential neighbourhoods (Scottsville Extension, Oribi Village, Bisley and Oribi Heights) and industrial areas (Shortts Retreat and Mkondeni). The Precinct is 495ha in size and is located 2km from the main national transport route (N3) and 5km south-west of the Pietermaritzburg (CBD) (TMRP, 2016).

The Airport Precinct Plan (APP) of 2016[1] was commissioned by the Municipality in line with the Aerotropolis of Airport City concept, which seeks to optimize their role of the airport through links to the immediate/local context and the broader regional economy.

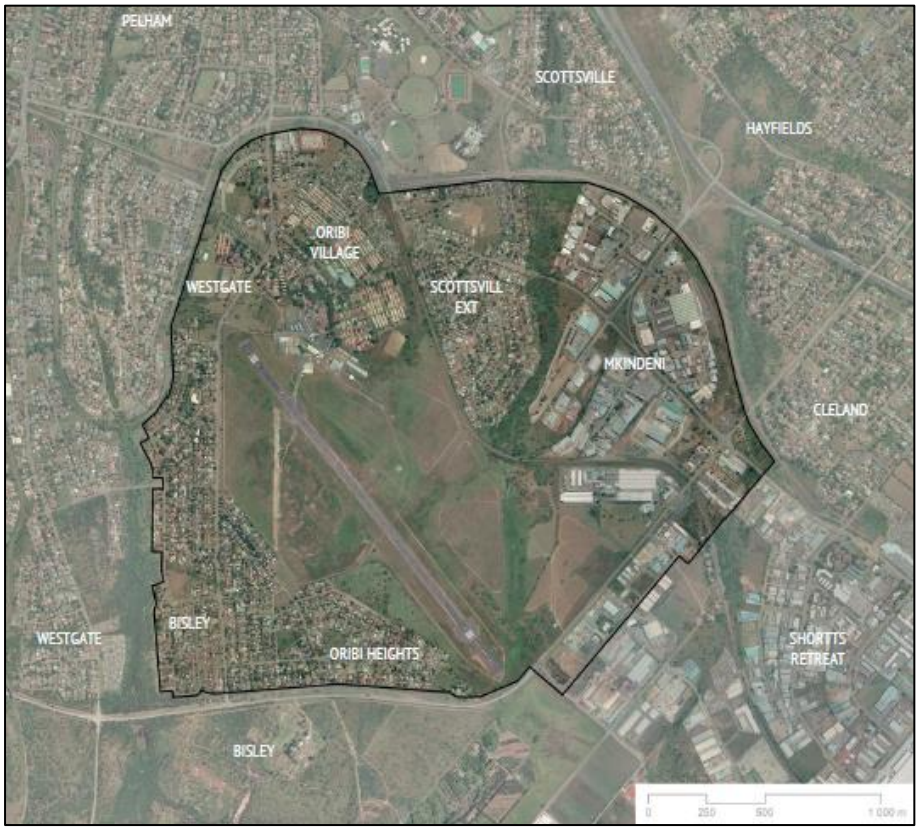
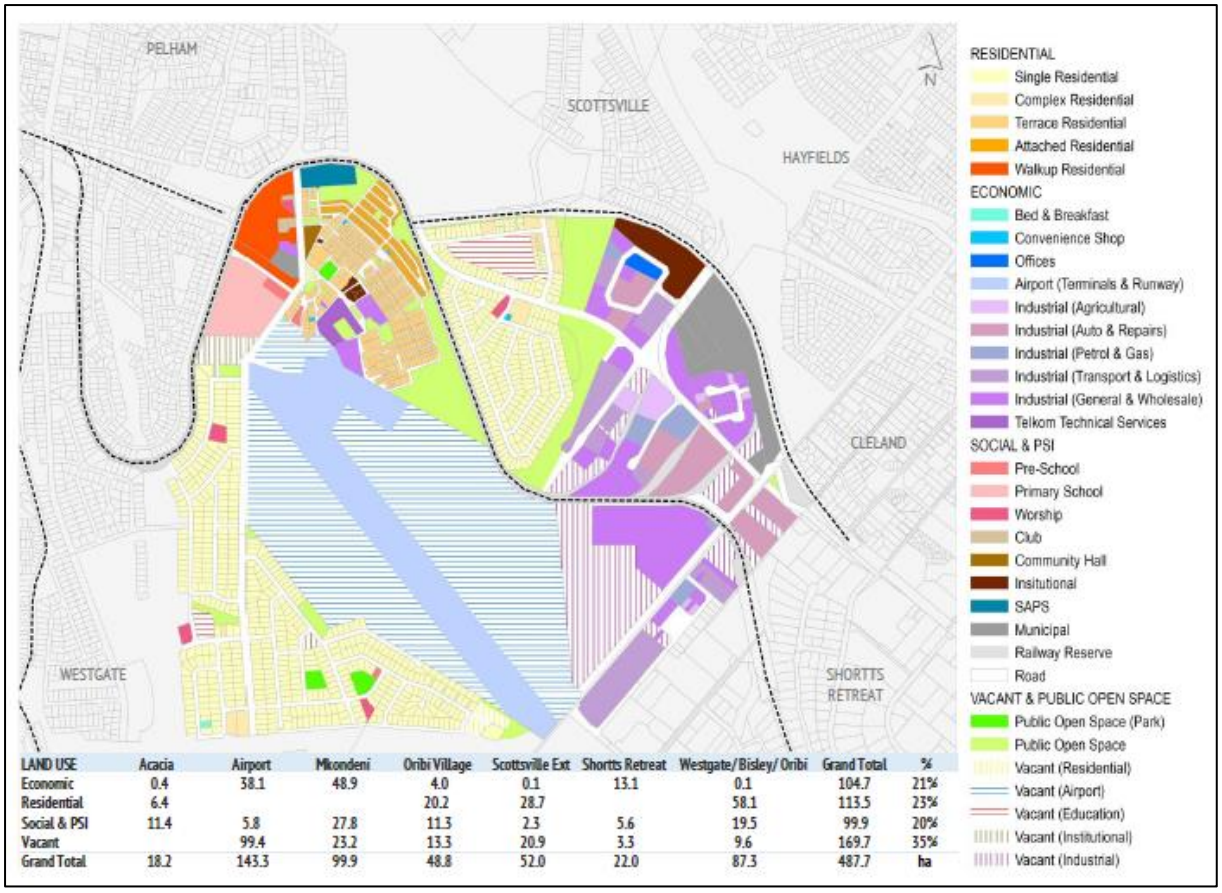


Figure 13: Aerial photograph indicating the Pietermaritzburg Airport Precinct (Source: TMRP, 2016)

Land Use

Figure 14 to follow provides a detailed overview of the land-use within the Precinct, demonstrating the types of residential areas, economic areas, social facilities, and vacant and public space.

[1] Airport Precinct and Management Plan for the Pietermaritzburg Airport and Surrounds, 2016



LAND USE	Acacia	Airport	Mkondeni	Oribi Village	Scottsville Ext	Shortts Retreat	Westgate/Bisley/Oribi	Grand Total	%
Economic	0.4	38.1	48.9	4.0	0.1	13.1	0.1	104.7	21%
Residential	6.4			20.2	28.7		58.1	113.5	23%
Social & PSI	11.4	5.8	27.8	11.3	2.3	5.6	19.5	99.9	20%
Vacant		99.4	23.2	13.3	20.9	3.3	9.6	169.7	35%
Grand Total	18.2	143.3	99.9	48.8	52.0	22.0	87.3	487.7	ha

Figure 14: Land-use within the Airport Precinct (Source: TMRP, 2016)

What follows is a narrative and visual overview of the areas within the Precint (TMRP, 2016).

- **Residential**: Accounts for approximately 23% of the Precinct and is cluster into four distinct areas:
    - *Oribi Village*: A former military barracks and low income housing area (original built to house for soldiers during World War ll), is now predominately an urban residential area (mix of terraced/row residential housing and attached residential units), managed by the Provincial Human Settlement Department.
    - *Oribi/Bisley/Westgate*: Mainly sub-urban single detached residential land-use types, with three duplex/cluster complexes in the southern portion near Gladys Manzi Road. The average property size is approximately 1 000m^2.
    - *Scottsville Extension*: Mainly sub-urban single detached residential units, with seven cluster/duplex complexes. The average property size is approximately 1 000m^2.
    - *Westgate*: The main land-use type is a residential complex, Acacia Park, which is a social housing cluster managed by the Msunduzi Housing Association. The complex contains 300 units and houses approximately 1 200 people. There is also a small cluster in single residential properties in the area, situated along Oribi Road.
- **Economic**: Accounts for approximately 21% of the Precinct and comprises of three distinct economic clusters.
    - *Mkondeni*: A mixed use industrial areas, dominated by agri-industry, general industrial and wholesale, and auto and repairs businesses. There is also evidence of

informal trading operations in public areas, whole typically trade in food and refreshments.
    - *Oribi Village*: The land area is not well defined and consists of various small businesses making use of existing building stock. Formal operations include the KZN Department of Labour Sheltered Employment Centre, a private electric contractor storage yard, and Telkom Technical Services.
    - *Shortts Retreat*: An industrial area characterised by auto repair and transport, and logistics businesses.
- **Social facilities**: Accounts for approximately 8% of the Precinct.
    - *Clinic*: A mobile clinic in Oribi Village
    - *Clubs*: Pigeon Racing and Vintage Sports Cars clubs located in Acacia
    - *Community Hall*: One hall is evident, however it has been stripped of its materials and likely no longer in use
    - *Fire station*: Located along Oribi Road in the Acacia area
    - *Institutional*: A physically challenged centre (Abercare) in Orbi Village, and a Road Traffic Inspectorate Testing Centre in Mkondeni
    - *Market*: A municipal fresh produce market is locate in the Mkondeni area
    - *Places of Worship*: Scattered throughout the residential areas and of Christian denomination
    - *Police*: A garaging and motor repairs compounds located in Oribi Village
    - *Public Spaces*: Scattered throughout the area, however there are no play parks or public sports fields/facilities
    - *Schools*: One primary school in Bisley and three pre-schools/crèches in Acacia, Westgate/Bisley/Oribi and Oribi Village.
- **Vacant/Public Open Space:** Accounts for 35% of the Precinct and has either been set aside for future use as part of the Town Planning Scheme or classified as public open space or road verges
    - *Public Open Space*: Mainly along the Blackborough Spruit, creating a 'green corridor' between the Scottsville Extension residential area and the Mkondeni industrial area, and the undeveloped land surrounding Oribi Village. There are three formal parks in the Precinct, however are not in a usable condition.
    - *Vacant Zoned Land:* Of the current vacant land that has the potential to be developed, 100ha of this lies within the airport boundary. Outside of the boundary, there are two sites currently zoned for education facilities (one in Westgate/Bisley/Oribi in Massey Road, and the other in Scottsville Extension in Croft Road). There are also two vacant sites zoned for institutional purposes (on Oribi Road in Acacia, and on Long Road in Westgate/Bisley/Oribi), and five sites for special residential (three off Washington Road, and two off Gladys Manzi Road).

Infrastructure

There are various infrastructure types within and adjacent to the Precinct, which are described below.

- **Road network**: As indicated, the Precinct area is in close proximity to the national road network (N3), as well as connected to with main roads that link the area to the city and national routes. Not all of the main roads fall within the Precinct area; however they have strong bearing on the airport and its precinct and are therefore detailed. Within the precinct and its surrounds, the classification of roads ranges from urban principal, major and minor arterials, and urban collector and local streets. Figure 15 demonstrates the road network within and surrounding the Precinct, and the approximate (two-way) peak hour traffic volumes (TMRP, 2016). Traffic activity is most intense during the typically commuter peaks periods (weekdays mornings and evenings), as well as on Saturday mornings (McGuigan, 2016).

Figure 15: The Existing Road Network adjacent to the Airport Precinct (Source: TMRP, 2016)

- **Rail network:** The Precinct vicinity contain three rail lines (TMRP, 2016):
  - The main Johannesburg to Durban line which use mostly used to transport significant quantities of freight, while also provided a scheduled passenger service. There is a station in Mkondeni, however it typically unused.
  - A feeder/haulage line which was traditionally used to service local industry with a station in Bisley, and runs parallel to the Richmond Road.
  - The siding with is adjacent to the airport Precinct, however due to it not being used
- **Public transport network**: The main form of public transport is taxis (combi taxis), with the Current Public Transport Record indicating three drop-off points, namely: Oribi Road Terminus, Oldfield–Discount Steel, and Oribi Airport-Pharazyn. Taxis operate along Washington and Oribi Roads, but not along Gladys Manzi Road (between Oribi and C B Downes roads). There is only one taxi rank in the area, which is located that the Oribi Road/Juno Street intersection in Oribi Village.
- **Non-motorised transport facilities**: In general, to condition of formal non-mortised transport facilities (for pedestrians, cyclist and horses) are poor and minimal. Such facilities are therefore classified as either discontinuous, non-existent, non-maintain or in disrepair.

- **Parking**: Parking facilities are generally adequate, with sufficient parking in residential and industrial areas cater for demand. The bus bay (intersection of Oribi and Juno roads) is used as a taxi rank and can typically accommodate five taxis at a time.
- **Access**: Access to the airport is by means or Oribi Road, which is classified as Class 4 urban collector street. The access is somewhat remote from the main national and provincial road network, limiting the airport access ease. Currently the access is considered adequate; however congestion during peak traffic hours creates delays and therefore limits easy access.
- **Bulk water supply**: The Precinct and adjacent areas are supplied water from the Bisley Reservoir by means of Bisley Break pressure Tank (BPT) via a 250 mm diameter steel pipe, and the Balancing Reservoir supplies the Bisley Reservoir (which has a capacity of 23 Ml) via 560 mm diameter steel pipe. The Bisley Reservoir supplies the Oribi Reservoir via a 300 mm diameter steel pipe. There is one operational fire hydrant in the area which feeds of the Bisley reticulation (located approximately 500m from the northern end of the airport runway); however its use is hindered by its inadequate pressure.
- **Bulk sanitation**: The Precinct falls into three sewer catchments, namely the Scottsville Mall, Foxhill South 1 and Blackburrow catchments. The first two drain into the Foxhill interceptor sewer, while the other drains into the Blackburrow Spruit interceptor, both of which are installed with flow monitoring equipment. All sewage drains to the Darvill Waste Water Treatment Works, which is currently being upgraded to increase its capacity.
- **Stormwater drainage:** The current drainage system is governed by the Msunduzi Stormwater Management Plan, which provides stipulations for runoff management.

Property Ownership and Values

As evident in Figure 16 to follow, the largest land owner in the Precinct is the MM, owing approximately 39% of the land, the most of which is within the airport boundary. Of the remaining area, 31% is privately owned (either residential, commercial, mixed use or industrial), 11% belongs to the National Government (mainly Oribi Village), and 8% is unknown.

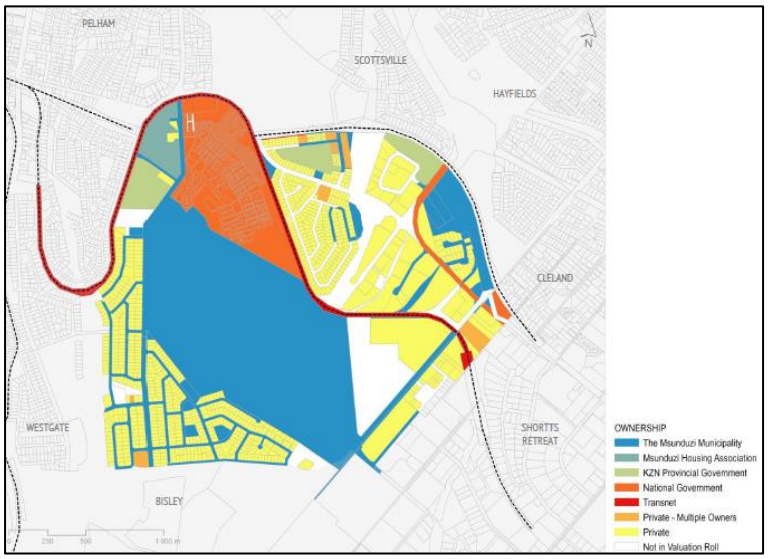


Figure 16: Property ownership in the Airport Precinct (Source: TMRP, 2016)

In terms of property values, the total municipal value of properties in the Precinct is R 1 462 billion, over which 77% is held by the private sector. Figure 17 provides a visual overview of the property values per m^2 in the area.

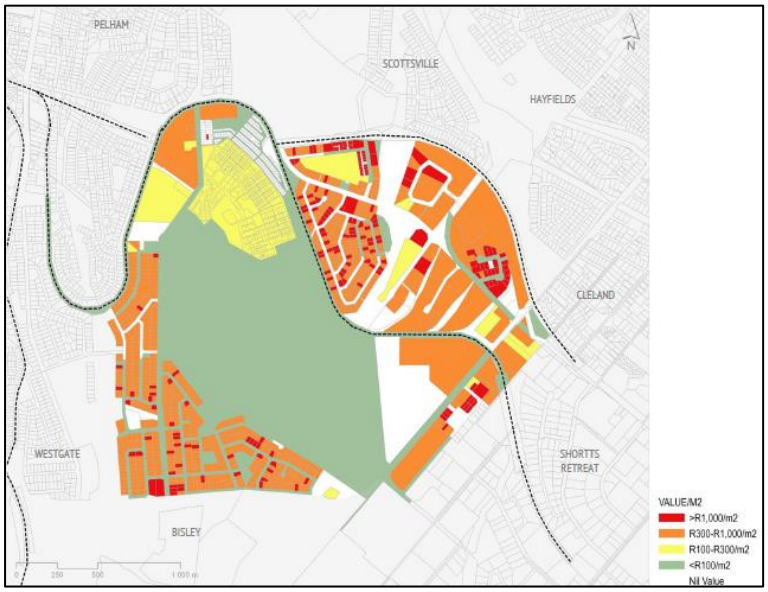


Figure 17: Municipal property values per m^2 in the Airport Precinct (Source: TMRP, 2016)

The airport precinct currently contributes 3% in property rates to the MM, which amount to approximately R21 million per annum. Of this, the industrial properties in Mkondeni and Shortts Retreat contribute 37%, the residential areas (Scottsville Extension and Westgate/Bisley/Oribi) contribute 35%, and the airport contributes less than 1%.

Heritage Resources

The MM is rich in historical, archaeological, cultural and architectural history, totalling 646 recorded heritage sites and 32 heritage zones (Msunduzi EMF, 2010), some of which are within the airport boundary and the Precinct. Figure 18 to follow indicates the location of archaeology sites, heritage resources, and zones of architectural and historical significance within and surrounding the airport.

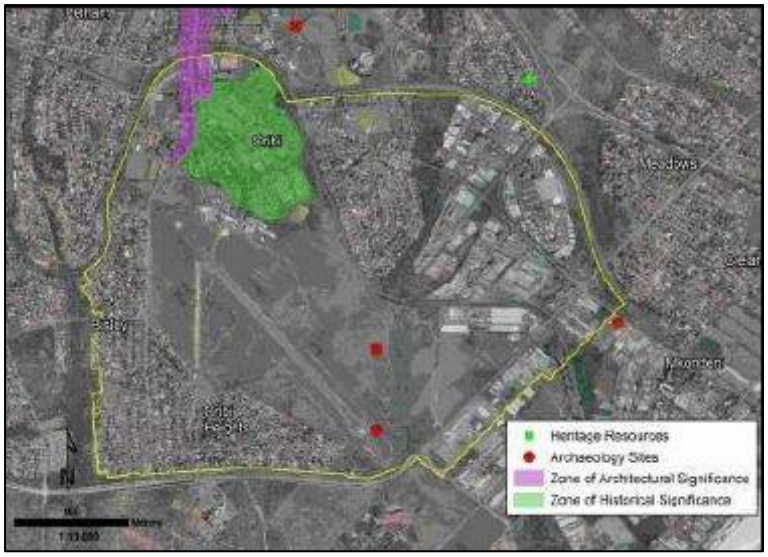


Figure 18: Heritage resources within and surrounding the airport (Source: TMRP, 2016)

The Pietermaritzburg Aero Club (Figure 19) is a well-known facility located adjacent to the existing airport terminal building, and is classified as medium to high heritage significance. The club house is over 60 years and has been continually used for its purpose, holding much social, historic and cultural value. Currently, the heritage resource has not been graded but protected as a grade IIB heritage resource, and therefore required permission from Amafa Kwazulu-Natal (The Provincial Heritage Resources Authority) before alternation or demolition (van Schalkwyk, 2016).

Figure 19: The north-western side of the original clubhouse building with extensions to the west (Source: van Schalkwyk, 2016)

4.2.3. Extended Flight Path

Several suburbs within the MM are potential impacted due to their location along the commercial/scheduled aircraft flight path. These suburbs along the 'extended flight path' are potentially impacted due to the topography of the area, resulting in their elevation being higher than other parts of Pietermaritzburg, and therefore being exposed to aircraft noise.

These areas, classified as the 'extended flight path zone' for the purposes of this assessment, are located in the more upmarket suburbs of Pietermaritzburg, extending to the southern part of Hilton (De Klerk, 2016). These suburbs include Worlds View, Wembley, Athlone and Clarendon which are

the established and more affluent “leafy suburbs” of Pietermaritzburg. The location of these suburbs in the MM and in relation to the airport is shown in yellow in Figure 20, followed by a brief overview of the potential impacted suburbs.

Figure 20: Location of potentially impacted suburbs along the extended flight path (marked in yellow) in relation the Pietermaritzburg Airport

An overview of the potentially impacted suburbs and their property prices is as follows (De Klerk, 2016)

- **Athlone**: A residential suburb situated alongside the N3 national route (to the north) and Old Howick road (to the south), and bordered by Wembley. The property values are at the top end of the range in comparisons to its surrounds, with property prices averaging R2 842 000.
- **Clarendon**: A predominately residential area with a strip commercial development along Roberts Road, and the Hilltops Office Park at the top of the hill in Villiers Road. The average property price in the suburb is approximately R1 587 000.
- **Wembley**: A more prestigious, older residential suburb of Pietermaritzburg, characterised by typically larger property sizes and limited through traffic. In the southern portion of the suburb, there is a commercial strip development along Taunton Road. The average property price is approximately R2 189 000, with wide variance between the northern and southern portions of the suburb. This variation is likely due to a combination of factors including property size, exposure to traffic noise and general privacy.
- **Worlds View**: An isolated residential suburb in between Pietermaritzburg and Hilton, bordered by the N3 route (and Old Howick Road) and plantations. The average price of properties in the suburb is R1 657 000.

5. IMPACT ASSESSMENT AND PROPOSED MITIGATION

The purpose of the impact assessment is to define how potential impacts induced as a result of the proposed project are likely to impact the socio-economic receiving environment. This assessment also includes proposed means of enhancing positive impacts and mitigating negative impacts, in order to benefit the receiving environment. Each impact has been assessed using the INRs impact rating methodology, indicating in which phase/s of the proposed project they will occur.

5.1. Impacts Identified for the Project

The potential socio-economic impacts of the proposed developed are linked to the sensitivity of the receiving environment, and the footprint and outputs of the proposed development. Such impacts may occur during the construction and/or operation phases. These impacts were identified through engagement with I&APs and specialist assessment.

The list below provides an overview of the anticipated socio-economic impacts followed by an in-depth assessment of the impacts and their significance, and well as mitigation, enhancement and management measures.

- Impact on the local and regional economy
- Impact on the sustainability of the airport
- Impact on traffic operations, access, and safety
- Aircraft induced noise
- Impact of aircraft noise on property values
- Impact on archaeological and heritage resources

This assessment also includes an evaluation of cumulative impacts as well as the no-go option, demonstrating the positive and negative implications of the option.

5.2. Low Significance Impacts

There are a range of socio-economic impacts that likely are imposed on the receiving environment as a result of the proposed development. However, in this context, some of these impacts are of very low or unlikely significance, and therefore did not require in-depth assessment and management. Such impacts and their contextualization are provided below.

5.2.1. Air quality

With any construction activities, air quality impacts are typically experienced in the form of nuisance effects as a result of dust generation. Such impacts must be managed and monitored during the construction phase of the proposed development to limit impacting the local receiving environment. It is also important that disturbed/exposed areas are rehabilitated after use to prevent future dust generation. It is unlikely that the facilities of the proposed development will result in negative air quality implications during the operational phase as the nature of the facilities do not differ from the current context.

5.2.2. Bird strike economic impact

The bird strike rates have the potential to induce a negative economic impact in terms of the cost implications as a result of flight delays and aircraft repairs. Based on communication with Airport Management and Airlink (the only current commercial airline operating at the Pietermaritzburg Airport), bird strikes do currently have a negative economic impact. There are informal bird management measures in place; however the formalization by means of the management plan would aid the mitigation of negative impacts. There is also the potential to adopt more effective management options to further mitigate future impacts.

5.2.3. Health and safety

As with any development, safety and health risks are likely to be imposed on the local community as a result of temporary or permanent influx of persons (contractors, labour, etc.). Efforts should be made by local authorities and developers to prevent such impacts from occurring.

5.2.4. Infrastructure and services

The proposed development is anticipated to occur in phases, over an approximate 10 year period. As a result, there is unlikely to be an intense influx of people and activities occurring in the local area. Importantly, the Airport Precinct Plan includes an *Infrastructure Framework* which details that current infrastructure and services (water, sanitation, storm water, energy and ICT) and provides guidance on upgrades based on future demands. The Infrastructure Framework indicates that – *"Upgrading of existing bulk infrastructure supplying services to the Precinct and/or the reticulation within each of the sub precincts should keep pace with the demands of existing and new development in order for the precinct to be a competitive investment location and in order to protect existing economic development and provide an appropriate infrastructure platform for the "work live play" vison. In addition consideration should be given in all instances of new infrastructure and upgrading of existing infrastructure to the construction of green infrastructure"* (TMRP, 2016, Pp 26).

5.2.5. Local employment of labor and contractors

During the construction and operational phases of the proposed development, it is important that, where feasible, employment, skills development and business opportunities are offered to the local community. It is a municipal guideline that with all developments in the Municipality, 70% of contractors and labour during the construction phase must be sourced from the developments' local area. This acts as a means of positively impacting the local receiving socio-economic environment.

5.2.6. Open spaces

Open/public spaces are important social assets and should therefore be considered in planning going forward, particularly considering the loss of open space that will occur as a result of the proposed development. Like any development well-managed open space protects the natural green infrastructure, preserving important environmental and ecological functions. The Msunduzi

Municipality Environmental Management Framework (EMF) identifies conservation priorities throughout the municipality, and wetland areas are regarded as sensitive areas which have to be preserved protected and free from intensive development.

Conservation zones relating to sensitive areas and habitats have been identified for protection. In addition, buffer zones between residential and airport related land uses have been provided. A significant portion of the land parcel with the wetlands has been set aside as strategic reservation in order to ensure the protection of a healthy system. An open space buffer of 30m has been assigned, primarily to protect the sensitive riparian systems and open land. The reserve is primarily an important riparian corridor along, and around the water bodies. It serves as a physical link to and between significant sources of biodiversity (from the Bisley nature reserve south of the airport extending all the way up to Msunduzi River past the Hayfields reserve) to prevent local species extinctions in the MM Area. This indicative buffer will be refined through specialist investigations in the EIA process.

To provide further guidance on public spaces and corridors in the airport precinct, the Airport Precinct Plan (TMRP, 2016) detailed a *Public Space and Landscape Framework*. The Precinct Plan indicates that *"A discernible public space network and high quality landscaping throughout the precinct is critical to the creation of a brand identity for the area, as well as, for the comfort and convenience of its residents, users and visitors. Public space is the "glue" that integrates various sub precincts, neighbourhoods and blocks and its quality and useability as an attribute for the competitiveness of the area as a "live, work, play" precinct cannot be underestimated."* (TMRP, 2016, Pp 20)

5.2.7. Pollution

Generation of pollution (solid, natural, effluent, noise and air) is a typical implication any new development, and has the potential to negatively impact the local social environment during the construction and operational phases. Guidelines must therefore be used to manage, monitor and mitigate pollution.

5.2.8. Traffic noise

Currently, the areas surrounding the airport are exposed to traffic noise either due to general traffic along main the urban roads (i.e. Oribi and Washington Roads) and/or heavier vehicle traffic in the industrial areas (i.e. Gladys Manzi and C B Downes Roads). The proposed development includes improvement and expansion to the local road network, with the intention of improving traffic flows and therefore resulting in less congestion. The traffic impact assessment undertaken (McGuigan, 2016) suggests that additional traffic volumes as a result of the proposed development are likely to occur on main roads and intersections in the precinct area, which already experience high volumes particularly during peak hours. Therefore, the traffic induced noise impact is likely to remain isolated to main routes, with little to no impact on quieter residential areas, as is the current situation. It should also be noted that traffic noise was not raised as a significant concern by I&APs during the public consultation process, but focus was rather on congestion, access and safety, which were assessed in the traffic impact assessment (refer to sub-section 5.3.2: Impact on traffic operations, access and safety).

5.2.9. Vibration

During the construction phase, it is anticipated that little high vibration activities (such as pilling or blasting) will be required for the construction of the proposed development elements. The movement of heavy construction vehicles will be isolated to main roads, and will not generate additional noticeable vibration on the receiving environment. In addition, the construction of facilities will occur in phases, meaning that activities will be isolated and limited in their intensity.

Ground-Bourne vibration impacts during the operational phase are also deemed insignificant. Movement of aircraft and support equipment occurs along smooth surfaces and does not generate vibrations that will affect sensitive receptors, as is currently the case.

A potential concern is typically regarding vibrations caused as a result of aircraft take-off and landing, which is generated through low-frequency noise energy. Some local I&APs highlighted this as a potential concern due to the expectation that aircraft induced vibration could affect the structural integrity of buildings. However, numerous studies have been conducted in similar cases to investigate the validity of such concerns and perceptions (Desia, 2016). These studies have revealed that aircraft sounds levels, even those in close proximity to an airport, are of insignificant magnitude to result structural damage to buildings. Even in cases where audible and visual (i.e. vibration of windows) evidence is noted, the magnitude of the vibration generate by aircraft is insufficient to cause damage. Such studies were even conducted based on older aircraft, which have much higher noise and low-frequency energy level output than modern aircraft. Furthermore, noise induced vibration may only begin to occur on light building structures when the noise level reaches approximately 85dB(A). Based on the findings of the baseline noise impact assessment, even the areas that are subject to greatest exposure to take-off and landing aircraft noise do not experience noise levels of that magnitude (Shrives and Simpson, 2016).

5.2.10. Visual impact

Due to the type, style and/or the location of the elements of the proposed development, visual impacts are deemed of little concern. This was reiterated by the fact that during the public consultation process, visual impacts on the areas surrounding the proposed development were of little concern to I&APs. Based on the sub-precinct guidelines provided in the Airport Precinct Plan (TMRP, 2016), non-of the proposed facilities will be designed above 3 stories (the mixed used/commercial sites cannot exceed 3 stories, all other facilities are 2 or less stories). If rezoning is done for the airport, a visual impact assessment may be required.

5.3. Socio-Economic Impacts, Assessment and Mitigation

5.3.1. Impact on the local and regional economy

Through the economic impact assessment, the specialist assessed the potential impact that the proposed development is likely to have on the local and regional economy (Oldham, 2016). This assessment is broken down into two categories, as follows, and considered all elements of the proposed development (road network expansion, airport landside and airside infrastructure, and the mixed use/commercial and industrial zone, and the Techno Hub):

i. **The direct and indirect effects on employment and income** that is likely to be generated as a result of the implementation of the proposed development during the construction phase.
ii. **Investment in and stimulation of the economy** as a potential result of the proposed development.

These two impact categories are elaborated on and a summary of the impacts generated per element of the proposed development (Table 17 and Table 18), followed by impact mitigation and enhancement measures that should be adopted.

The Pietermaritzburg Airport Sub-precinct project (includes the airport landside and airside infrastructure, and the mixed use/commercial and industrial zone) has great potential to stimulate economic growth and create jobs in the uMgungundlovu region but there is much that can go amiss with this project.

The initial impact from Phase 1 of the Airport Expansion Project will be derived from a new road system, connecting the Airport to the N3 highway, investment in airside and landside infrastructure, including a new General Aviation zone, at the Airport and basic infrastructure, and bulk services, for the Techno Hub.

Over a period of 10 years it is estimated that this will increase regional gross domestic product by R763 million, income from remuneration by R426 million and create 5092 jobs. These benefits will be spread over 10 years but not continuously. In other words, implementation is likely to be ‘lumpy”. The total impact for the 10 year period would be a growth rate of approximately 1.5 percent.

The major economic impact should arise from investment in buildings and facilities in the Techno and new development zones at the Airport. For the Techno Hub a Concept Plan implies CAPEX of R1.35 billion. At this stage there very little information as to where these business and institutional investors will come or the nature, scale or timing of projects. Thus, it is impossible to make any reliable prediction or estimate of the impact on GDP or employment in the next 10 years.

In the long term sustainable economic growth derives from the operation phase when investment projects become viable. The vision is of a fully operational Techno Hub and a range of economic activities in the Business zones. It is doubtful that much of this vision will be achieved in Phase 1 of the Airport Expansion Project and, therefore, no attempt is made to quantify these benefits,

Capital funding may be the Achilles heel of the Airport project. Not only are hundreds of R millions needed for public investment but even greater amounts from private funding for the Techno Hub and Airport projects. None of the Airport or Techno Hub studies and plans give much attention to this issue.

Successful implementation of this complex project requires a management structure able drive the process forward. Once basic infrastructure and services are installed a major marketing initiative will be required to attract private sector investment. Failure to involve private business raises the spectra of a white elephant.

Thus, in the light of the above qualification, it may be concluded that benefits to the local and regional economy, in terms of job creation and economic growth, could be significant but will be derived from a range of diverse investments and take time to materialize. There are major possible impediments to successful implementation of the project stemming from failure to raise capital

funding, a lack of effective co-ordination and management and ineffective marketing of investment opportunities to the public and private sectors.

Mitigation and Enhancement Measures

The reason why the evaluation of the Project, in terms of its economic impact on the region, is given as of moderate significance with a medium level of confidence in the forecast, is that because planning is at an initial stage, a number of key issues and proposals have not been decided. The following measures relate to actions and decisions necessary from Msunduzi Municipality to enhance the impact of the Project or mitigate some of the adverse factors.

- Finalise a land disposal policy with regard to leasing or selling land within the Airport Precinct.
- Approve an incentive package for potential investors in the Techno Hub and Airport Precinct.
- Establish responsibility and provide funding for a campaign to market and create awareness of investment opportunities in the Airport Precinct and Techno Hub.
- Remove some of the uncertainty surrounding the capital funding of the Project by including it in the Integrated Development Plan (IDP) and Capital Budget as well as actively seeking alternative sources of funding.
- Planning should, as soon as possible, move on from high level planning to the identification of specific projects suitable for the designated new development zones.
- Accelerate planning approval and funding for the Market Road Extension
- Finalise planning for an extended General Aviation zone creating opportunities for private investors requiring additional hangar space.
- Promote aeronautical and aviation related activity at the Airport in order to raise revenue and reduce, or eventually eliminate, the Municipal financial subsidy of the airport.

Table 17: Significance of direct and indirect effects on employment and income (construction phase)

Component	Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence
Road network extension	Direct	+ve	Local	Short Term	High	Medium	Likely	Moderate	Medium
With enhancement	*Direct*	*+ve*	*Local*	*Short Term*	*High*	*Medium*	*Likely*	*Moderate*	*High*
Airport landside and airside infrastructure (including mixed use commercial and industrial zone)	Direct	+ve	Regional	Medium Term	Medium	Medium	Likely	Moderate	Medium
With enhancement	*Direct*	*+ve*	*Regional*	*Medium Term*	*Medium*	*Medium*	*Likely*	*Moderate*	*High*
Techno Hub	Direct	+ve	Regional	Long Term	Low	Medium	Likely	Moderate	Medium
With enhancement	*Direct*	*+ve*	*Regional*	*Long Term*	*Low*	*Medium*	*Likely*	*Moderate*	*High*

Table 18: Significance of investment in and stimulation of the economy

Component	Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence	Comment
Road network extension	Direct	+ve	Regional	Long Term	Medium	Medium	Likely	Moderate	Medium	Connectivity, Access to Airport, Travel costs
With enhancement	*Direct*	*+ve*	*Regional*	*Long Term*	*Medium*	*Medium*	*Likely*	*Moderate*	*High*	

Component	Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence	Comment
Airport landside and airside infrastructure	Direct	+ve	Regional	Long Term	Medium	Medium	Likely	Moderate	High	Stimulate Aeronautical Activity: Commercial and General Aviation
With enhancement	*Direct*	*+ve*	*Regional*	*Long Term*	*Medium*	*Medium*	*Likely*	*Moderate*	*High*	
Airport landside and airside infrastructure	Direct	+ve	Local	Short Term	High	High	Definite	Major	High	Stimulate Private Investment in General Aviation Zone
With enhancement	*Direct*	*+ve*	*Local*	*Short Term*	*High*	*High*	*Definite*	*Major*	*High*	
Airport landside and airside infrastructure	Direct	+ve	Regional	Long Term	Low	Low	Likely	Minor	Medium	Stimulate Private Investment and Economic Activity in new Business Zones
With enhancement	*Direct*	*+ve*	*Regional*	*Long Term*	*Low*	*Low*	*Likely*	*Minor*	*High*	
Techno Hub	Direct	+ve	Regional	Long Term	Low	Medium	Likely	Moderate	Low	Investment in Techno Hub and stimulation of economy
With enhancement	*Direct*	*+ve*	*Regional*	*Long Term*	*Low*	*Medium*	*Likely*	*Moderate*	*Medium*	

5.3.2. Impact of the sustainability of the airport

Through the economic impact assessment (Oldham, 2016), the specialist assessed the potential impact that the proposed development is likely to have on sustainability of the airport. Currently the operating budget for Pietermaritzburg Airport is subsidised by the Msunduzi Municipality. Operating expenditure exceeds revenue by about R2 million be annum. The economic impact assessment undertook to determine the impact of that the proposed development is likely to having on addressing the sustainability of the airport.

This assessment is Msunduzi Municipal accounts for financial year 2014/15 show an Airport deficit of R5 million. This is subsidized from rates and general revenue. The Airport accounts are an integral part of the municipal accounting system and include an arbitrary allowance for depreciation and other extraneous items.

A true picture of the Airport financial situation will not be obtained until income and expenditure are “ring fenced” and accounted for using sound business principles. This will occur if a municipal entity, or some other form of independent management, is established.

A financial model, projecting future trends in income and expenditure, predicts that the upward trend in aeronautical revenue will eliminate an operational deficit, and the need for a subsidy, within 5 years. This prediction is based on continuous growth in commercial aviation passenger numbers, as estimated for Phase 1 of the Airport Master Plan.

There is a qualification to this conclusion. Additional operational expenses will be incurred as the Airport Project progresses. Management of the operational budget will be challenged by the incorporation of new Business zones and the Techno Hub. This may prolong the need for a subsidy. The Techno Hub economic incentives to investors will be beneficial in the long run but in the short run intensify the necessity for a subsidy. Over a period of ten years, however, as new income streams from leases materialize the need for a subsidy should steadily diminish.

Long term financial sustainability will depend on policies and decisions made by Msunduzi Municipality. The future economic success of the airport project depends on attracting new inward investment from research and educational institutions, as well as national and international companies. The right management structure needs to be set in place to attract investment funding.

Both the aeronautical and business aspects of the airport precinct should, in the long term, be financially viable and not a drain on municipal resources in the form of subsidies.

Enhancement Measures

In order to enhance the sustainability of the airport, it is recommended that there be an approval of a proposal to establish a separate Management Entity to take ownership and control of the Airport Precinct, including the Techno Hub.

Table 19: Significance of the impact of the sustainability of the airport on the Municipality

	Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence	Comment
Airport Sustainability		+ve	Local	Long Term	Medium	Medium	Likely	Moderate	Medium	Elimination of the Municipal Subsidy of Airport
With enhancement		*+ve*	*Local*	*Long Term*	*Medium*	*Medium*	*Definite*	*Major*	*High*	*Management Entity*

5.3.3. Impact on traffic operations, access and safety

A traffic impact assessment (TIA) for the airport precinct was undertaken by Royal HaskoningDHV (McGuigan, 2016) under contract to VNA who were responsible for the feasibility investigation into the Market Road extension. The outcomes of the TIA also fed into the Precinct Plan. As the impact of Phase 1 traffic is linked to the traffic flow and associated infrastructure within the broader precinct, the recommendations of the TIA have been costed and included within the Precinct Plan. The Airport Precinct Plan (section 7.4) lists and prioritizes infrastructure upgrades in terms of:

- Regional road infrastructure
- City transport infrastructure
- Local infrastructure

The assessment was based on the quantification of the change in the traffic operational quality as a result of the additional traffic generated by the proposed Phase 1 development. The TIA:

- Assessed this change based on the quantification of the current situation (established through traffic counts) against modelled scenarios using increased volumes based on the addition of the Phase 1 increase in combination with anticipated average/accepted traffic growth rates.
- Scenarios were modelled for different future scenarios (timeframes) as per the terms of reference established by the Msunduzi Municipality Roads Transport Planning Department. The 2021 scenario relates to the Phase 1 development.

A spatial overview of the key roads and intersections considered within the TIA is depicted in Figure 21.

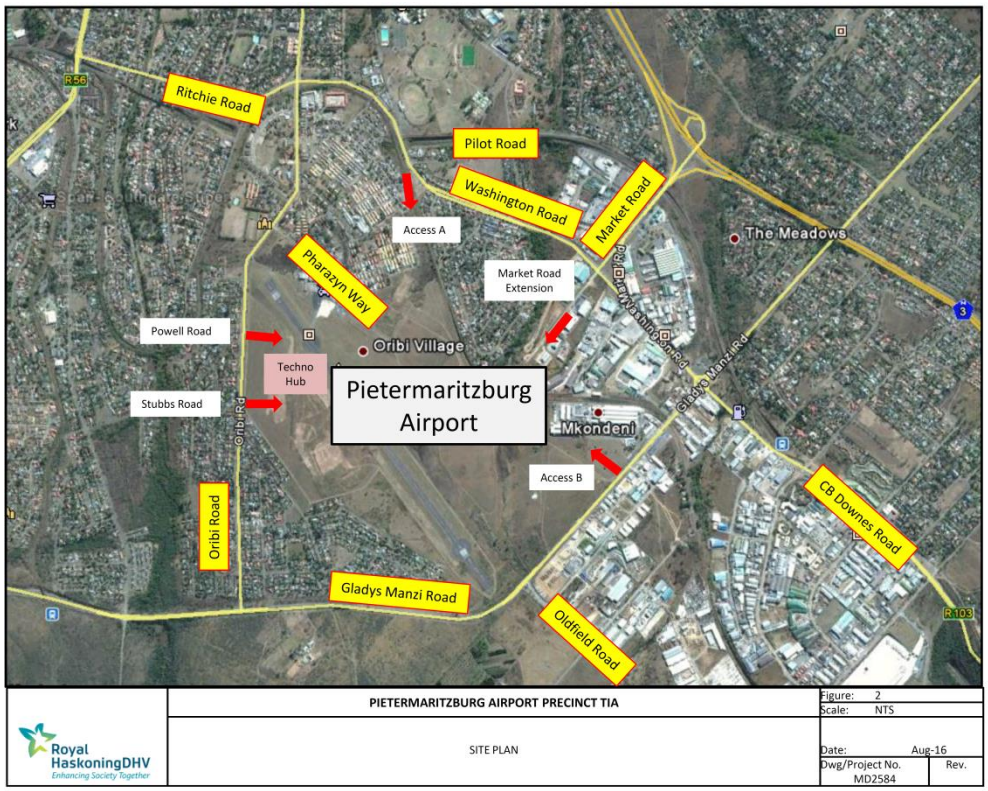


Figure 21: Road and intersections assessed as part of the traffic impact assessment (Source: McGuigan, 2016)

The baseline assessment of the TIA concluded that:

- There is congestion on several roads in the precinct area, but that only the section of Washington between Gladys Manzi Road and Market Road would require an upgrade to accommodate the cumulative impact of general and Phase 1 expansion. This upgrade was established as a need under the current situation.
- The configurations of several intersections are currently inadequate and contributing to queues/congestion in peak hours. The increased traffic will exacerbate the situation and reconfiguration of several intersections are required to address this issue, namely:
    - Washington/Oribi/Ritchie Road intersection
    - Washington/Market/Market Extension intersection
    - Washington/CB Downes/ Gladys Manzi intersection
- The configurations of the following intersections are currently acceptable but will become inadequate with the additional demand associated with proposed expansion. They will require configuration and in most cases to be signal controlled:
    - Gladys Manzi/Oldfield Road Intersection
    - Gladys Manzi/Oribi extension Intersection
- New intersections
    - Washington Road/Access A intersection will require signal control and configured appropriately
    - Gladys Manzi/Access B intersection will require signal control and configured appropriately
    - Oribi Road/Techno-Hub intersections will operate effectively beyond Phase 1, but will require monitoring

Impact Assessment

The understanding generated through the TIA has been used to assess the following issues:

Accessibility: This entails ensuring that convenient and efficient access to the proposed development is secured in the interests of entrenching the viability of the project.

Table 20: Significance of the impact of traffic accessibility

Issue	Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence
Accessibility	Direct	+ ve	Regional	Permanent	Medium	High	Definite	Major	High
With mitigation: the proposed development is the mitigation so the impact assessment is the same	*Direct*	*+ ve*	*Regional*	*Permanent*	*Medium*	*High*	*Definite*	*Major*	*High*
No-Go Option	*Direct*	*- ve*	*Regional*	*Long Term*	*Medium*	*High*	*Definite*	*Major*	*High*

Currently there is one access to the Airport and adjacent land via Pharazyn Way – off Oribi Road. This requires that users need to travel through residential and industrial areas to access the Airport. Poor access is therefore currently a negative issue. The expansion will increase the access to four options, namely:

- Direct access from the N3 via the proposed Market Road extension.
- Via the new access road off Washington Road
- The new access road off Gladys Manzi
- Existing access of Oribi Road

This is a positive significant positive impact in terms of accessibility and the marketing of the airport and other proposed commercial uses (shops, hotel, industrial etc.).

Given that poor access is currently a problem for the airport, in the event the Phase -1 development does not take place i.e. No-go option, the impact under this scenario will be negative.

Traffic Operations: All affected elements of the existing road network (road, intersections, signage, calming/management) are tested to determine how the additional traffic affect use of the infrastructure in terms of traffic flow.

Table 21: Significance of the impact of traffic operations

Issue	Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence
Traffic operations (flow)	Direct	- ve	Local	Permanent	Medium	Medium	Definite	Moderate	High
With mitigation – proposed improvements to roads (Section of Washington Road between Gladys-Manzi and Market Road – and upgrades to the various intersections)	*Direct*	*+ ve*	*Local*	*Permanent*	*High*	*High*	*Definite*	*Major*	*High*
No-Go Option	*Direct*	*- ve*	*Local*	*Permanent*	*Medium*	*Medium*	*Definite*	*Moderate*	*Moderate*

The assessment shows that the additional traffic volumes will extend the capacity of a considerable portion of the core infrastructure (one section of road and several intersections) beyond their limits. The impact is therefore of moderate negative significance the local scale (Airport precinct). The available mitigation is the proposed new access routes and the upgrades to certain road sections

and intersections. Given that congestion and poor flow are currently issues, implementation of these upgrades will improve the current level of traffic flow – i.e. a positive impact. The significance will be higher because it will improve a current negative situation. The situation will be further improved through the combined implementation of other transport projects such as the RBT programme and SANRAL upgrades to the N3-Market road extension.

In the event that the proposed improvements are not undertaken, the current congestion would remain - the negative impact would remain.

Safety: Public, pedestrian and motorist safety underscore any recommendations which emerge from the traffic impact study. This was raised as a specific concern in certain areas, of the Airport precinct where there are large numbers of pedestrians, including school children.

Table 22: Significance of the impact of traffic safety

Issue	Type	Status	Extent	Duration	Intensity	Magnitude	Probability	Significance	Confidence
Traffic and Pedestrian Safety	Direct	- ve	Local	Permanent	Medium	Medium	Likely	Moderate	Likely
With mitigation – proposed improvements to roads/intersections, implementation of Public Transport and Non-motorised transport options, inclusion of safety measures/systems	*Direct*	*+ ve*	*Local*	*Permanent*	*Medium*	*Medium*	*Likely*	*Moderate*	*High*
No-Go Option	*Direct*	*- ve*	*Local*	*Permanent*	*Medium*	*Medium*	*Likely*	*Moderate*	*Moderate*

Existing congestion and lack of adequate pedestrian and safety infrastructure coupled with high levels of pedestrian use – particularly in the vicinity of Oribi Village represent a current negative impact. Increased traffic from the proposed expansion would exacerbate this issue. Given that this is currently a negative issue, implementation of the proposed mitigation would not only address the impact from additional traffic, but also address the current negative situation. The mitigation would therefore turn a negative into a positive.

In the case of the No-go option, the likelihood of the mitigation being implemented is reduced and the negative impact would not be addressed i.e. remain negative.

5.3.4. Aircraft induced noise

Noise has been identified as one of the most significant environmental aspects of an airport. In order to monitor the current baseline and measure the efficacy of future noise emission reduction strategies, a specialist study (Environmental Noise Impact Assessment) was conducted. The study evaluated aircraft noise impacts in the vicinity of the Pietermaritzburg Airport and in impacted suburbs along the commercial/scheduled flight path. The assessment was undertaken by IMA Trader 20 cc (IMA) and documented in the Environmental Noise Impact: Baseline Assessment and Impact Prediction Report (Shrives and Simpson, 2016).

The aim of this assessment was to:

- Determine current environmental sound levels in areas surrounding the airport and along the typical commercial aircraft flight paths while the aircraft flies over and in-between flight times.
- Evaluate and compare background ambient sound levels versus aircraft peak noise impacts, using SANS 10103:2008 as a guideline with respect to impacts on various districts (at sensitive receptors).
- Determine whether the aircraft impact on the existing baseline noise environment and at sensitive receptors along the flight path exceed any relevant environmental guidelines.
- Consider the impact of projected passenger demand growth scenario up for Phase 1 Airport Master Plan, based on the context of the baseline measurements.

The projected impact assessment is guided by relative aircraft sound power levels (Effective Perceived Noise Level in Decibels – EPNdB) from the US Federal Aviation Authority (FAA) and does not constitute a formal modelling exercise, which was deemed unnecessary *at this stage*.

The key findings from the assessment are as follows:

- The overall noise environment (L_{Aeq}) is quieter at noon than in the morning or the evening, even including aircraft noise. This shows the influence of road traffic during commuting hours.
- Spatially, the suburbs of Hilton and Worlds View are quietest, Bisley is the noisiest and Clarendon and Wembley are moderately affected by noise compared with the other suburbs.
- The monitoring points at the north end of the runway are the most impacted. This is typically when the aircraft is at its lowest height above the ground and initiating maximum forward thrust (take-off) or reverse thrust (approach and landing).
- During the survey, it was noted that the 'peak aircraft' noise only persists for an average of 20 - 30 seconds (out of 15-min measurement runs) but varies slightly at each location dependent upon extraneous factors such as wind direction, cloud cover and blanket noise from other sources.
- This study remains valid providing the commercial aircraft operator does not deviate significantly from the two most frequently used aircraft type (ERJ 135 LR and AVRO RJ 85) on the Pietermaritzburg to Johannesburg route. The AVRO ('Quad-jet') is the larger and noisier of the two aircraft, but both aircraft are required for economic reasons. Passenger demand requires that the AVRO is typically used for the first flight out (morning) and the last flight in (evening), with the ERJ being more common in-between.
- In respect of 'compliance' with the SANS land-use district guidelines, the L_{Aeq} result is not closely related to aircraft noise at most sites (as it peaks for only a fraction of the time-weighted average); thus, such terminology should be avoided. Hence, a combination of factors was used to assess the 'aircraft impact' on each receptor location, which showed clearly that Bisley is the most significantly impacted suburb related to aircraft noise. This is directly related to proximity to the north end of the runway, which is most frequently used for take-off and approach owing to the common southeasterly wind field over Pietermaritzburg.
- Whilst aircraft are certainly audible for short periods in other suburbs, elevated L_{Aeq} (above guideline values) are related to a range of sources, from road traffic to barking dogs. The

contribution of aircraft flyover is not regarded as the primary factor causing elevated L_{Aeq}, unless it was specifically observed as such by the noise specialist. Thirty seconds constitutes only 3% of the 15-minute L_{Aeq} monitoring period, which was centered on the flyover time, so the overall influence on longer-term L_{Aeq} parameters remains negligible.

- Given the mixed urban[1] land-use that is impacted by the flights, there are no perfect flight times for the commercial aircraft. All commercial flights will impact one or more of the receptors. Domestic households are more sensitive during morning and evening, whilst schools and crèches are more sensitive during working hours.
- These jet aircraft noise events have already been occurring for five years and no formal complaints have been received to date (ATNS, 2016). The general lack of response until the Scoping Phase of this EIA suggests that the noise events are acceptable to most, who have become acclimatized to typical urban sounds. They are not harmful to health at the levels recorded and should not disturb sleep given that the standard operating hours all fall with SANS daytime classification (6.00am to 10.00pm).
- The passenger demand growth estimates described in the Airport Master Plan: Phase 1 suggest that one or two extra flights will be required per day (refer to Appendix A: INR Summary of 'Passenger Demand and Flight Projections').
- One of these flights has recently been confirmed to be that which will depart to Cape Town at 7.00am and arrive from Cape Town at 7.30pm weekdays, with only one outbound and one inbound flight across each weekend (7.00am Sat and 7.30pm Sun). This Cape Town flight will use the smaller and quieter of the two commercial aircraft currently operating from Pietermaritzburg Airport (ERJ 135 LR). Given the low observed noise impact of this aircraft, combined with the take-off and approach times being within the existing peak periods (morning and evening), it is suggested that this impact will be largely indiscernible and should not cause further nuisance.
- The other proposed change would involve accommodation of a 20% growth in the current capacity (across all flights, including the Cape Town flight by 2025). Intensive discussion with Airlink suggested that the best prediction that can be made at this stage is replacement of the current AVRO RJ 85 with the ERJ 170/190 Series. The latter will facilitate greater passenger carrying capacity, but are also more economical having only two engines versus four.
- After examination of the sound power emissions from the larger of two replacement aircraft (ERJ 190), it is anticipated that noise emissions from this fleet modernization could increase take-off noise (model and load dependent), but will reduce approach and landing noise (all models and loads) close to source and relative to the older, existing aircraft. The differences are small (≤ 5 dB at source), so whether this constitutes any perceived difference at receptors will be largely dependent on extraneous factors (road traffic noise, weather, aircraft operational procedures, etc.). These impacts will continue to occur in the existing peak flight times as dictated by passenger demand.
- Given that future passenger predictions are uncertain, higher confidence can be ascribed to replacement of existing aircraft to absorb passenger demand, since this is motivated by fleet

[1] 'Mixed urban' in this context refers to all types of developed land use that comprise the cityscape, including commercial, industrial and residential, etc.

modernization - economic advantages, which bring associated environmental benefits of more modern aircraft.

The overall predicted sound level impact (net evaluation) has been presented spatially in Figure 22 using coloured symbols to indicate the comparative noise nuisance at each site. The method of evaluation of the data to produce the overall impact output map took into account all of the following criteria:

- L_{Aeq}, L_{Amin}, L_{A90}, L_{A10}, L_{Amax}
- Personally observed 'instant peak aircraft noise'
- Field observations and log sheet information
- Interviews with local residents/school staff where relevant

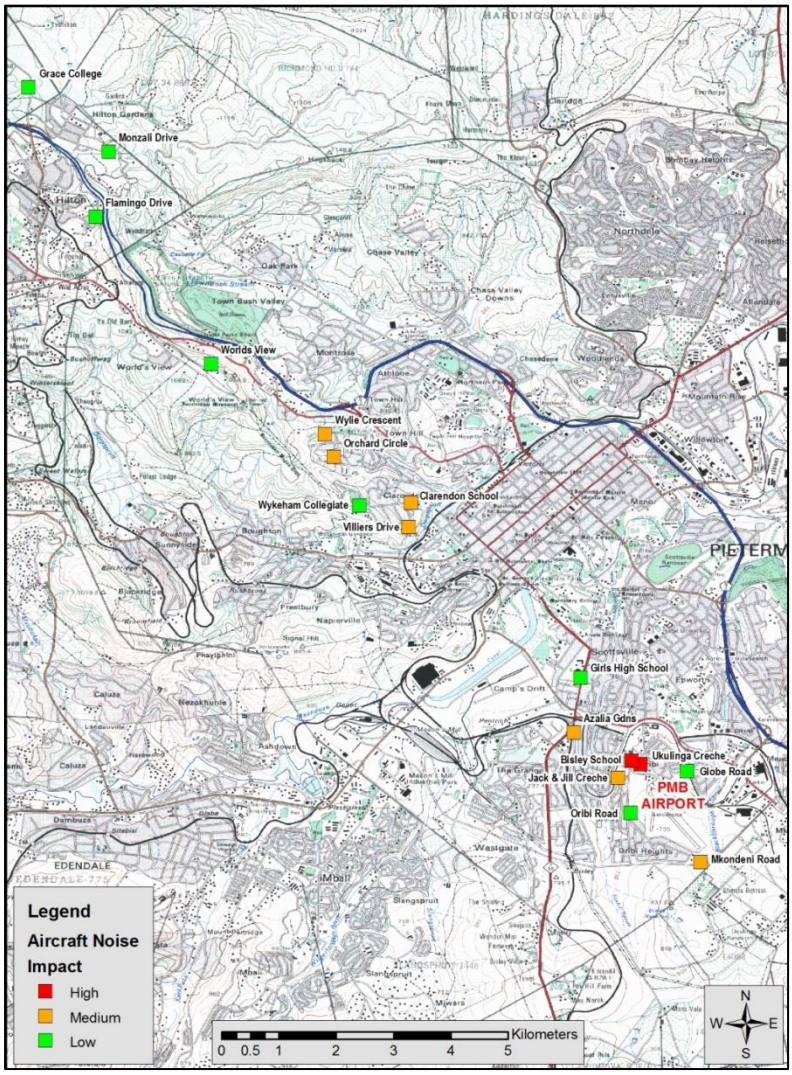


Figure 22: Spatial representation of integrated aircraft noise impact assessment at monitoring locations

Impact Assessment and Recommendations

The following is recommended from impact assessment in the context of baseline results, as opposed to aircraft-specific modelling:

- Environmental noise in the Bisley area, close to the north end of the runway is of concern to schools and crèches. This should be tackled through sound attenuation measures on public buildings. These measures could include double-glazing of windows and sound insulation in the ceiling. Such measures have proven effective in the abatement of aircraft noise from best international practice.
- Should the commercial fleet be changed to types of aircraft with significantly higher overall sound level output, the frequency of flights increased, flight times extend beyond the current time bracket or the flight paths change significantly in the future, then the noise impacts must be re-evaluated around the airport precinct through further measurement against this baseline.
- On review of findings from the baseline survey, a decision was taken by the Environmental Assessment Practitioner as to whether further investigation through aircraft-specific modelling is required. From the Technical Workshop (INR, 2016), it appears that none of the original triggers for modelling were found. A majority of participants, including representatives from the CAA, ATNS, INR, Airlink and Municipality decided that aircraft specific noise modelling may cause more confusion than it resolves. This decision was taken considering the small size of the airport, that no extension of the runway is being considered at this stage (which limits its use to relatively similar aircraft) and considering the limited ability of noise modelling to simulate a complex receptor environment (experience gained at King Shaka International Airport). A large portion of the mixed urban noise sources would need to be incorporated for the model to predict realistically, based on the baseline measurements and observations.
- Alternately, a post-expansion comparative survey at significant impact sites may be considered more useful. Since noise created by aircraft is an event (to the ground-based observer) that has already been established spatially, this survey could be limited to sites in close proximity where current impacts from the runway are significant. The basis for this recommendation is that aircraft type and flight plans are not affected significantly by the initial phase of the Airport Expansion Master Plan, whilst flight events are not currently of a harmful magnitude or duration, being very brief compared with other noise sources observed.
- It is planned and gradually being confirmed that all commercial aircraft type will be changed to more modern and quieter1 aircraft than the current AVRO RJ 85 'Quad-jet'. Reduction of sound energy at source can reduce event-based impacts at all receptors (ICAO, 2007). The contribution of the aircraft flyover at the majority of sites is very small compared with other constant noise sources; road traffic being the most significant contribution to high L_{Aeq} values during this survey, both in the foreground and background. It is only where the flyover actually interferes with speech communication that sound attenuation is required on buildings; i.e. in close proximity at Bisley School and the crèche(s).
- Apart from the (now definite, as at January 2017) introduction of a Cape Town flight using the ERJ 135 LR (described earlier), further flight scheduling cannot be determined accurately at this stage (INR, 2017). However, in order to minimize noise impacts through disturbance,

[1] Worst-case (ERJ 190): 4 dB lower on approach (all models); ≤ 5 dB higher on take-off (model and load dependent) - at source; e.g. edge of runway. ERJ 170 is lower in all respects, being a smaller aircraft. Fleet mix yet to be confirmed and subject to variation in operational requirements.

aircraft being introduced should be equivalent to or quieter than the AVRO RJ 85 in all possible flight modes and should be limited to before and after school hours (8.00am to 3.00pm). Noise nuisance should be minimized over Bisley as the primary impact zone, where sensitive receptors such as the school and crèche(s) are situated. Various aviation operational procedures can also facilitate this to some extent (e.g. approach angles), although passenger safety is always the primary concern (ATNS, 2016).

Three scenarios are considered in the following in determine the impact significance, based on assumptions and limitations that a central to this study; i.e.:

1. **Proposed Expansion:** describes the Airport Expansion Master Plan Phase 1 project / growth, which focuses largely on the modernization of the aircraft fleet from a noise perspective, with introduction of two possible new aircraft models to replace older existing models and increase passenger capacity. It also covers the introduction of the Cape Town Flight using the ERJ 135 (confirmed as at January 2017) and the possible introduction of another Jhb-bound flight (not confirmed iro aircraft model, although scheduling is likely to remain during peak demand – morning and evening).
2. **With Mitigation:** describes the above, using all possible and practical mitigation options appropriate for the Pietermaritzburg Airport as guided by the ICAO 'Balanced Approach to Aircraft Noise Management' (refer to Appendix 1 for the full suite of viable mitigation options). The approach is centred on a balance of four key elements as listed below, with accompanying mitigation options that are viable for this case, some of which are already partially and/or informally in place, or have been included in the Airport Precinct planning process:
    - Reduction at source
        - Change in the type of aircraft
        - Noise performance trends of the fleet mix operating at the airport
        - Regular assessment of the Nosie performance of aircraft
    - Land-use planning and management
        - Change in land use zoning
        - Planning over time
        - Prevent encroachment of incompatible land use
        - Mitigate noise impact on receiving environment (building codes, noise insulation programmes, land acquisition and relocation, transaction assistance, real estate disclosure, noise barriers)
        - Financial mitigation (capital improvements planning)
    - Noise abatement operational procedures
        - Noise preferential runways
        - Noise abatement departure and approach procedures
        - Ground-based operational procedures
    - Operating restrictions
        - Partial restrictions
3. **No-Go Option:** effectively describes continuance of the *status quo* iro aircraft type and scheduling. However, it is important to note that whilst this option must be considered for EIA purposes, is practically impossible to maintain the airport precinct and aircraft fleet

unchanged in perpetuity. As mentioned earlier, the AVRO is already out of production and safety regulations will ultimately dictate that these units must be superseded by a more modern aircraft (one which is currently in production), regardless of actual growth in passenger demand. The latter will influence which models supersede the AVRO, although this is also constrained by the physical characteristics of the airfield (runway, infrastructure, etc.) and its geographical location (topographical setting and socio-economic pressures).

Whilst 17 sites were measured across most parts of the flight schedule in the baseline survey, a spatial zoning and temporal pattern becomes apparent, which should be considered alongside the impact tables presented below. To avoid duplicity, suburbs (sites) are grouped as follows for impact assessment:

1. **Zone 1:** Hilton and Worlds View (four sites – distant: 10 km and more NW of runway);
2. **Zone 2:** Clarendon and Wembley (five sites – intermediate: between 6 and 9 km NW of runway);
3. **Zone 3:** Pelham and Scottsville Extension (two sites – nearby: between 2 and 3 km NW of runway);
4. **Zone 4:** Bisley (three sites – close proximity: within 1 km NW of runway);
5. **Zone 5:** Mkondeni and Oribi (three sites – close proximity: within 1 km NE, SE and SW of runway).

Table 23: Summary of impact significance of aircraft noise on suburbs

Suburb		Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence	Comment
ZONE 1 (Hilton and Worlds View)	Proposed Expansion	Direct	-ve	Local	Long-term	Low	Low	Likely	Minor	Medium	Aircraft at high altitude; noise impacts discernible but low. More flight events = higher probability
	With mitigation	*Direct*	*-ve*	*Local*	*Long-term*	*Low*	*Low*	*Likely*	*Minor*	*Low*	*As above and flight paths or approach unlikely to change w/ mitigation*
	No-Go Option	*Direct*	*-ve*	*Local*	*Long-term*	*Low*	*Low*	*Definite*	*Minor*	*High*	*Environmental noise impact remains as per baseline – low impact in these areas*
ZONE 2 (Clarendon and Wembley)	Proposed Expansion	Direct	-ve	Local	Long-term	Medium	Medium	Likely	Moderate	Medium	Aircraft discernable during approach in these suburbs; *impact dependent upon road traffic and flight path*. More flight events = higher probability
	With mitigation	*Direct*	*-ve*	*Local*	*Long-term*	*Medium*	*Low*	*Likely*	*Minor*	*Low*	*ERJ quieter approach than AVRO; take-off already completed;* ***reduction at source & operational procedures***

Suburb		Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence	Comment
	No-Go Option	*Direct*	*-ve*	*Local*	*Long-term*	*Medium*	*Medium*	*Definite*	*Moderate*	*High*	*AVRO has moderate noise impact over these suburbs, exacerbated by landing gear in this zone*
ZONE 3 (Pelham and Scottsville Extension)	Proposed Expansion	Direct	-ve	Local	Long-term	Low	Low	Likely	Minor	Medium	Background noise is dominant in these suburbs; one or two new events / minor changes in aircraft unlikely to be detected
	With mitigation	*Direct*	*-ve*	*Local*	*Long-term*	*Low*	*Low*	*Likely*	*Minor*	*Low*	*New aircraft fleet and scheduling not yet confirmed in detail; noise impacts remain minor*
	No-Go Option	*Direct*	*-ve*	*Local*	*Long-term*	*Low*	*Low*	*Definite*	*Minor*	*High*	*Background noise is dominant in these suburbs; aircraft present but often obscured by road traffic*
ZONE 4 (Bisley)	Proposed Expansion	Direct	-ve	Local	Long-term	High	High	Likely	Major	Medium	Measured aircraft noise impact interferes with speech communication; more events = more impact
	With mitigation	*Direct*	*-ve*	*Local*	*Long-term*	*Moderate*	*Medium*	*Likely*	*Moderate*	*Low*	*ERJ quieter approach than AVRO; largest models have noisier take-off; minimization through:* ***fleet mix, sound attenuation (insulation) & op. proc.***
	No-Go Option	*Direct*	*-ve*	*Local*	*Long-term*	*High*	*High*	*Definite*	*Major*	*High*	*Measured aircraft noise impact interferes with speech communication*
ZONE 5 (Mkondeni and Oribi)	Proposed Expansion	Direct	-ve	Local	Long-term	Moderate	Medium	Likely	Moderate	Medium	Background noise often dominant in Mkondeni; aircraft noise does not propagate towards Oribi (E & W); new events / minor changes in aircraft can impact S end of runway

Suburb		Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence	Comment
	With mitigation	*Direct*	*-ve*	*Local*	*Long-term*	*Low*	*Low*	*Likely*	*Minor*	*Low*	*ERJ quieter approach than AVRO; largest models have noisier take-off; minimization through:* ***fleet mix, noise abatement (barriers) & op. proc.***
	No-Go Option	*Direct*	*-ve*	*Local*	*Long-term*	*Moderate*	*Medium*	*Definite*	*Moderate*	*High*	Background noise is dominant in Mkondeni; aircraft noise does not propagate towards Oribi; aircraft movements can impact S end of runway

In summary of this investigation, with stated *degrees of confidence*, there are no fatal flaws identified from either the baseline or the minor changes in aircraft required by obsolescence and passenger demand. Whilst new flight events are undesirable to sensitive receptors, significant impacts were measured almost exclusively in the Bisley area, immediately adjacent to the north end of the runway. Flyover impacts can be mitigated to some extent through adoption of various measures described above using the 'Balanced Approach to Aircraft Noise Management' guideline (ICAO, 2007).

A detailed appraisal of each possible element and its applicability (or not) to this project has been developed (Appendix 1), based on discussion with the specialist consultant during a further workshop. However, in rank order, it is evident that 'Reduction at source' is most effective, followed by 'Noise abatement and operational procedures'. 'Land-use planning and management' will take a long time to change existing urban land-use patterns in the absence of major economic incentives, whilst 'Operating restrictions' are already as tight as possible (limited from 6.00am to 10.00pm). The Airport must be managed to provide a net socio-economic benefit at the minimum practical environmental cost.

5.3.5. Impact of aircraft noise on property values

Mills Fitchet Africa Pty Ltd undertook a property valuation assessment to determine the current and potential impact of the increase of aircraft induced noise impacts on property values along the commercial/schedule flight path (De Klerk, 2016). As indicated in the noise impact section above, the areas that are exposed to the significant noise disturbance induced by commercial aircraft are categorized into two zones, namely; the airport surrounds (including the suburbs directly surrounding the airport) and the extended flight path (suburbs in the northern western portion of Pietermaritzburg that are at higher elevations).

The methodology applied to quantify the impact on property values in the surrounding areas and those affected by noise levels along the flight paths, included the following processes:

- Background research and literature review

- Interviews with estate agents and property professionals
- Property value analysis

Based on the flight paths and affected areas around the airport as demarcated, it is understood that *the extent of the affected areas before and after the proposed airport expansion* are essentially the same, however, the proposed airport expansion could increase the impacts on these areas due to the potential increase in the frequency of commercial flights, rather than broaden the affected areas, and on the assumption that no alternative flight paths have been identified.

The outcomes of the Baseline Noise Impact Assessment was also used to determine which suburbs are exposed to significant noise impacts, and used to imply the impact on property prices in the case of an increase in the frequency of commercial flights.

The following property value impacts are currently induced by aircraft noise (nuisance factor).

- **Current impact on property values in the airport surrounds zone**
    - According to the some of the estate agents that were interviewed, the market has effectively "priced in" the effects of being near the airport, and this also appears to be evident form the sales data, which indicates a fairly consistent price range of between R859,250 and R1,062,167 for properties in this area, with the properties further from the airport tending toward the upper end of this scale and with average values between 6.72% and up to 12.08% higher. It was noted that this could also be attributed to larger stands and house sizes in the more outlying suburbs.
    - The feedback from the estate agents and property brokers was mostly positive, with more anticipated benefits for the local economy and commuters than negative impacts.
    - This view also relates to the findings of the media review where "the available literature suggests that the estimated NDI (Noise Deprecation Index) would be higher in more affluent areas than in less affluent ones."
    - In terms of the results of our investigation and based on the current frequency of flights and aircraft noise levels, there is little or no negative impact on the property prices in the Airport Surrounds zone, and most people are positive about the perceived benefits and spin-offs from the proposed airport expansion project.
    - *Conclusion:* Receiving environment less sensitive to noise from airport activities, currently nominal negative impacts, market has allowed for impacts of proximity to airport in house prices.

- **Current impact on property values in the extended flight path zone**
    - The Extended Flight Zone area covers the more upmarket northern suburbs of Pietermaritzburg and extends to the southern parts of Hilton. This area is impacted by noise from aircraft approaching Pietermaritzburg Airport as they make their final approach to land and less frequently when they take-off in a northerly direction.
    - The exposure to aircraft noise varies according to the altitude as well as other factors such the ambient noise from the N3 national road and local traffic, etc.
    - According to the noise impact assessment by IMA Trader 20 cc, Clarendon which is "directly under the take-off flight path on *suburban elevated terrain before aircraft have climbed to a significant attitude*" was therefore identified as an area that is

more exposed to aircraft noise. This area overlaps with Wembley (it would appear that the southern part of Wembley and Clarendon are essentially the same geographic area).

- Four active estate agents were canvassed in this area. Two estate agents ranked the noise rating as *Mild* and *Average* respectively, one estate agent was of the opinion that property prices have depreciated by as much as 20% in the Wembley area, while another estate agent was concerned that property values could be negatively affected along the flight path over Hilton College Road to World's View if the noise levels and frequency of flights increased substantially. However, these impacts were not substantiated by the agents.
- Our property transfer search indicated lower values for Clarendon, which seems to relate to the findings of IMA Trader 20 cc. The average property price for the Clarendon sample is R1,587,308 compared to that of the Wembley Out Zone of R2,189,067, a difference of around 38%. This could also be attributed in some measure to the fact that the properties in the Wembley sample are larger on average, 2,694m² compared to 2,129m², and is also dependant on the size and quality of improvements, and other value forming attributes.
- In general therefore, **there are a few areas in the higher lying parts of Clarendon and Wembley where aircraft noise is having a negative impact on property values**.
- *Conclusions:* Receiving environment more sensitive to noise from aircraft flying overhead, currently fairly significant impacts to property values in higher lying areas, where discounts of around 20% are estimated.

- **Current impact on property values of industrial and commercial properties**
  - In terms of the feedback and the results of our research, the general consensus is that there are currently no negative impacts from aircraft noise on the industrial area of Mkondeni in the Airport Surrounds zone, nor on the commercial office node in VCCE in the Extended Flight Path zone.
  - The estate agents and property brokers that were canvassed are on the whole very positive about the benefits of the proposed airport expansion project on commercial and industrial properties.
  - Conclusions: Receiving environment not sensitive to aircraft noise. No negative impacts due to current aircraft noise.

The following property value impacts are likely to be induced by aircraft noise (nuisance factor), based on the anticipated introduction of additional commercial scheduled flights (therefore during the operational phase), which may also be further mitigated by the introducing quieter aircraft.

- **Potential impact on property values in the airport surrounds zone**
  - Overall, the opinion of those estate agents canvassed in this area is positive, and it would appear that one could expect property values to stay much the same (normal price escalation aside), or increase if the airport expansion plan provides more amenities, and generates more business and work opportunities and in the immediate local area.

  - However, if aircraft noise levels and the frequency thereof increase to nuisance levels [i.e. above around 65dB(A)], then one could expect to see a negative impact on property values.
  - There may also be some nodes that are negatively impacted by other factors such as increased traffic, higher ambient noise levels, and other un-desirable effects of urbanisation and densification of the area that may result in reduced property values.
  - *Conclusions*: If noise levels increase substantially, the will most likely be a negative impact on property values in specific nodes in this zone.

- **Potential impact on property values in the extended flight path zone**
  - In terms of the effects of the airport expansion on the extended flight path area and the greater Midlands region, there is generally optimism about having more flight options, better access to and from the airport, more business opportunities, and generally being more connected with the rest of the world. This in turn could attract more people to reside and work in the area, and would most likely have a positive impact on property values in general for the area.
  - However, should the frequency of flights increase and with similar or higher aircraft noise outputs, the situation in the Extended Flight Path zone could worsen, and in particularly in the higher lying areas of Wembley and Clarendon, with fairly substantial negative impacts on property values.
  - The increased flights are unlikely to negatively affect property values in the outlying areas as aircraft are normally at a high altitude and as a result the noise levels are marginal.
  - *Conclusions*: The receiving environment is sensitive to aircraft noise and will most likely respond negatively to increased noise and frequency, with a resultant decrease in property values in those parts directly under the flight paths that are most affected. However, given the nominal increase in the number of flights and expected noise levels, the overall impact is likely to be low.

The significance of aircraft noise induced potential impacts on the property values of affected suburbs is provided in Table 24 to follow, indicating significance with and without mitigation, as well as for the 'no-go' option. The suburbs have been clustered into zones, in line with those defined in the noise impact assessment above. The following conclusions are made:

- *Proposed expansion impact on airport surrounds zone (Zones 3, 4 and 5)*: In Bisley, Orbi, Scottsville Extension and Pelham, the market is less sensitive to noise as properties priced accordingly.
- *Proposed expansion impact along extended flight path zone (Zones 1 and 2)*: Impact on elevated areas of Wembley and Clarendon suburbs due to the sensitively of the market in those areas; Worlds View and Athlone are not directly under flight path and on opposite slope
- *Mitigation*: Appropriate mitigation measures as per the ICAO Balanced Approach to Noise Management guideline (refer Appendix 1)
- *No-go option*: If project does not go ahead, then no change to current property values are anticipated due to increased aircraft noise

Table 24: Summary of impact significance of aircraft noise on property values per suburb

Suburb		Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence
ZONE 1 (Athlone and Worlds View)	Proposed Expansion	Direct	-ve	Local	Long Term	Low	Low	Likely	Negligible	Medium
	With mitigation	*Direct*	*-ve*	*Local*	*Long Term*	*Low*	*Low*	*Likely*	*Negligible*	*Medium*
	No-Go Option	*Direct*	*-ve*	*Local*	*Long Term*	*Negligible*	*Negligible*	*Unlikely*	*Negligible*	*High*
ZONE 2 (Clarendon and Wembley)	Proposed Expansion	Direct	-ve	Local	Long Term	High	High	Likely	Moderate	High
	With mitigation	*Direct*	*-ve*	*Local*	*Long Term*	*High*	*High*	*Likely*	*Moderate*	*High*
	No-Go Option	*Direct*	*-ve*	*Local*	*Long Term*	*Negligible*	*Negligible*	*Unlikely*	*Negligible*	*High*
ZONE 3 (Pelham and Scotts. Ext.)	Proposed Expansion	Direct	-ve	Local	Long Term	Low	Low	Likely	Minor	High
	With mitigation	*Direct*	*-ve*	*Local*	*Long Term*	*Low*	*Low*	*Likely*	*Minor*	*High*
	No-Go Option	*Direct*	*-ve*	*Local*	*Long Term*	*Negligible*	*Negligible*	*Unlikely*	*Negligible*	*High*
ZONE 4 (Bisley)	Proposed Expansion	Direct	-ve	Local	Long Term	Low	Low	Likely	Minor	High
	With mitigation	*Direct*	*-ve*	*Local*	*Long Term*	*Low*	*Low*	*Likely*	*Minor*	*High*
	No-Go Option	*Direct*	*-ve*	*Local*	*Long Term*	*Negligible*	*Negligible*	*Unlikely*	*Negligible*	*High*
ZONE 5 (Oribi)	Proposed Expansion	Direct	-ve	Local	Long Term	Low	Low	Likely	Minor	High
	With mitigation	*Direct*	*-ve*	*Local*	*Long Term*	*Low*	*Low*	*Likely*	*Minor*	*High*
	No-Go Option	*Direct*	*-ve*	*Local*	*Long Term*	*Negligible*	*Negligible*	*Unlikely*	*Negligible*	*High*

5.3.6. Impact on archaeological and heritage resources

eThembeni Cultural Heritage (ECH) undertook a heritage impact assessment (van Schalkwyk, 2016) to consider all cultural resources as defined under the South African Heritage Resources Act No 25 of 1999. The Act defines a heritage resource as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

South Africa's heritage resources are both rich and widely diverse, encompassing sites from all periods of human history. Resources may be tangible, such as buildings and archaeological artefacts, or intangible, such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical, scientific, social, spiritual, linguistic, economic or technological values; their representivity of a particular time period; their rarity; and their sphere of influence.

The integrity and significance of heritage resources can be jeopardized by natural (e.g. erosion) and human (e.g. development) activities. In the case of human activities, a range of legislation exists to ensure the timeous identification and effective management of heritage resources for present and future generations.

Upon assessment of potential impacts imposed by the proposed development, the following conclusions were made:

- In the area of the proposed project, there was no evidence of the following heritage resources types:
    - Ecofacts
    - Places to which oral traditions are attached or which are associated with living heritage
    - Historical settlements and townscapes
    - Landscapes and natural features
    - Graves and burial grounds
    - Public monuments and memorials
    - Movable objects excluding any object made by a living person
    - Battlefields
- **Archaeology Sites**: Vegetation density is moderate to high on the undeveloped portions of the proposed development area, limiting soil surface visibility. However, it is highly unlikely that significant archaeological remains, or other heritage resources such as structures or ancestral graves, are present.

  The KwaZulu-Natal Museum (KZN Museum) archaeology data base records the occurrence of three sets of Early and Middle Stone Age artefacts at the southern end of the "aerodrome":

    - **2930CB 008**: Drain on the left of the road to Mkondeni near aerodrome, thus on the road parallel to the runway. No description of site.
    - **2930CB 050**: An assiduous surface-collection found scattered over an area of about 25 acres at the southeast corner of Oribi aerodrome.
    - **2930CB 131**: *See sketch map in site record file in Natal Museum*.

  Archaeologists currently explain artefacts in these contexts to be part of down-slope colluvial wash along pre-existing drainage lines and consequently out of primary context. The ubiquitous occurrence of these classes of artefacts identified in the greater Pietermaritzburg area, largely out primary context, render them of low to negligible scientific value.

- **Palaeontology:** The project area is underlain primarily by Pietermaritzburg and Vryheid Formation shales of the Permian Ecca Group and Dwyka tillites. The upper contact between these two formations is difficult to map as shales within these are almost indistinguishable. Whilst King (1948) reported *Glossopteris* flora within these deposits at isolated localities the presence of intrusive dolerite sills within the development footprint precludes the presence of any significant fossil remains (G. Botha *et. al.* 2002). Consequently no further palaeontological assessment is considered necessary.
- **Buildings and structures:** None will be affected by the proposed development.

It is unlikely that any of the modern terminal buildings, hangars and associated structures within the proposed development area has any heritage significance; however, if any of these buildings is older than sixty years, including those within the Oribi Village precinct, the developer will require a permit from Amafa aKwaZulu-Natali (the Provincial Heritage Resources Authority) for their alteration or destruction. Neither the Pietermaritzburg Aeroclub clubhouse or the Oribi Village Precinct will be affected by this phase of the proposed developments.

The following mitigation measures are recommended:

- Msunduzi Municipality, as the authority responsible for the management of local heritage resources in terms of NHRA Section 8, should apply to Amafa for the declaration of the Pietermaritzburg Aeroclub as a Grade IIB heritage resource. In terms of such grading, internal changes to a building are allowed, but external alterations require a permit from Amafa. The Pietermaritzburg Aeroclub will automatically be subject to zoning scheme controls as soon as its grading is confirmed by Amafa.
- Protocol for the identification, protection and recovery of heritage resources during construction and operation, as detailed in the heritage impact assessment report (van Schalkwyk, 2016).

Table 25: Significance of impact on archaeological and heritage resources

	Type	Status	Extent	Duration	Intensity	Magnitude	Likelihood	Significance	Confidence
Proposed expansion	Direct	-ve	Local	None	Negligible	Negligible	Unlikely	Negligible	High
With mitigation	*Direct*	*-ve*	*Local*	*None*	*Negligible*	*Negligible*	*Unlikely*	*Negligible*	*High*
No-go option	*Direct*	*-ve*	*None*	*None*	*None*	*None*	*Unlikely*	*None*	*High*

5.3.7. No-Go Alternative

The no-go alternative would have varying implications on the positive and negative impacts identified in the sub-sections above. However, such impacts cannot be viewed in isolation and the potential positive implication of the no-go alternative on one impact may result or be at the expense of a negative implication on another.

The greatest cost of the no-go alternative would be loss of opportunity for the economy, both in terms of stimulating the regional and local economy, as well as the loss of employment opportunities. In addition, if the proposal were to not go ahead, it would be unlikely that the airport would be able to be a sustainable entity, and therefore continue to negatively implicate the Municipality. Currently, the MM subsidizes the airport but evidence shows that the proposed development has the potential to enable the airport sustainability within the next 10 years. The benefit of both the investment and employment opportunities, as well as the decrease need for Municipal subsidization, would stimulate the socio-economic development of the region. This opportunity would be lost of the no-go option is selected. *It is reiterated that the stimulation of the economy and the sustainability of the airport is strongly dependent in investment in the proposed development, which is currently larger unknown.*

A potential positive implication of the no-go alternative would be on the aircraft noise impact and consequential impacts on property values and nuisance disturbance along the flight path and areas surrounding the airport. If the proposed development does not go ahead, the capacity of the current airport facilities would limit the number of additional scheduled flights operating at the airport, and therefore limit the noise and property implications of affected areas. However, even with the no-go alternative, the current airport facilities do have capacity to add additional flights and therefore would be inaccurate to presume that the no-go alternative would result in no future aircraft noise induced impacts. It is also unlikely that the no-go alternative would result in a reduction of the current noise and property value impact, meaning that the option with neither implicate a positive or negative implication, but rather remain in its constant state. The proposed development would

offer the opportunity for implementation of appropriate noise management mitigation procedures, which potentially would not occur if the development does not go ahead. Similarly, the expansion of the road network proposed would also benefit the local and regional traffic operations, access and safety. Without the expansion, the traffic conditions would likely be exacerbated from the current negative situation, whereas the proposed development has the potential to increase capacity, safety and operations, particularly if recommended mitigation options are implemented.

6. CONCLUSION AND RECOMMENDATIONS

6.1. Overview

The proposed expansion of the Pietermaritzburg Airport, as per Phase 1 of the Airport Master Plan, will serve to increase the capacity and sustainability of the Airport. In context of the receiving socio-economic environment, the proposed development has a number of both positive and negative potential impacts which range in significance.

The local socio-economic environment in which the development is proposed is complex, with a range of land use types and activities evident. These areas consist of a mixed of low, medium and high income residential areas, scattered commercial activities, a prominent industrial zone, and open space/recreational areas.

The area that are currently affected by existing operations, and will potentially be impacted by the proposed developed, include the airport itself and its surrounding residential and industrial areas, as well as extends to more wealthy suburbs along the commercial/scheduled flight path (northern suburbs of Pietermaritzburg. Therefore the currently and potentially impacted areas range from low-medium incomes residential areas and industrial areas, to open spaces and medium-high residential areas, with scattered portions of commercial activities.

On a broader scale, the regional socio-economic environment also demonstrates a mix of land use types, activities, demographics and economies. The Msunduzi Municipality is one of the larger economic contributors in the province, driven by its capital status, location and mix of economic activities, among others. According to Oldham (2016), *"There is diverse regional economy weighted towards government and community services but with significant contribution from manufacturing, trade, business and finance. Greater activity in the private sector notably industry and commerce would give more sectoral balance to the regional economy. Planned developments such as the Pietermaritzburg Airport Expansion fit in well this objective".* The region has a positive population and economic growth rate, however it is still subject to socio-economic downfalls such as unemployment, poor service delivery and backlogs, demonstrating a need for new projects to stimulate economic growth.

The socio-economic context of both the regional and local receiving environment is considered in relation to the potential positive and negative impacts as a result of the proposed Pietermaritzburg Airport Expansion. The context provided a basis to determining the significance of impacts, and developing applicable and viable mitigation, enhancement and management options.

6.2. Impact Summary

As a result of the proposed development and the socio-economic context, the following potential impacts have been identified:

- Positive impact on the local and regional economy in terms of the direct and indirect effects on employment and income, and investment in and stimulation of the economy
- Positive impact on the sustainability of the airport
- Impacts on traffic in terms of operations (flow), access and safety
- Negative impacts of aircraft induced noise on the receiving environment
- Negative impacts of aircraft induced noise on property values

- Negligible impact on archaeological and heritage resources

The significance of each positive or negative impact is summarized in Table 26, and the magnitude, likelihood and significance of the impact without and with mitigation or enhancement is detailed. Table 27 provides a summary of the mitigation, enhancement and management recommendations.

Table 26: Summary of potential impacts on the receiving socio-economic environment

Impact	Status	Magnitude	Likelihood	Significance	Confidence
Impact 1: Direct and indirect effects on employment and income (construction phase)					
- Road network extension	+ve	Medium	Likely	Moderate	Medium
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
- Airport landside and airside infrastructure	+ve	Medium	Likely	Moderate	Medium
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
- Techno Hub	+ve	Medium	Likely	Moderate	Medium
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
Impact 2: Significance of investment in and stimulation of the economy					
- Road network extension	+ve	Medium	Likely	Moderate	Medium
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
- Airport landside and airside infrastructure: Aeronautical Activity	+ve	Medium	Likely	Moderate	High
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
- Airport landside and airside infrastructure: General Aviation Zone	+ve	High	Definite	Major	High
with enhancement	*+ve*	*High*	*Definite*	*Major*	*High*
- Airport landside and airside infrastructure: New Business Zones	+ve	Low	Likely	Minor	Medium
with enhancement	*+ve*	*Low*	*Likely*	*Minor*	*High*
- Techno Hub	+ve	Medium	Likely	Moderate	Low
with enhancement	*+ve*	*Medium*	*Likely*	*Moderate*	*Medium*
Impact 3: Sustainability of the airport					
- All proposed developments	+ve	Medium	Likely	Moderate	Medium
with mitigation/enhancement	*-ve*	*Medium*	*Definite*	*Major*	*High*
Impact 4: Traffic operations, access and safety					
- Access	+ve	High	Definite	Major	High
with mitigation	*+ve*	*High*	*Definite*	*Major*	*High*
- Traffic Operations (flow)	-ve	Medium	Definite	Moderate	High
with mitigation	*+ve*	*High*	*Definite*	*Major*	*High*
- Safety	-ve	Medium	Likely	Moderate	Likely
with mitigation	*+ve*	*Medium*	*Likely*	*Moderate*	*High*
Impact 5: Aircraft induced noise					
- Zone 1 (Hilton and Worlds View)	-ve	Low	Likely	Minor	Medium
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*Low*
- Zone 2 (Clarendon and Wembley)	-ve	Medium	Likely	Moderate	Medium
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*Low*
- Zone 3 (Pelham and Scottsville Extension)	-ve	Low	Likely	Minor	Medium
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*Low*
- Zone 4 (Bisley)	-ve	High	Likely	Major	Medium
with mitigation	*-ve*	*Medium*	*Likely*	*Moderate*	*Low*
- Zone 5 (Mkondeni and Oribi)	-ve	Medium	Likely	Moderate	Medium
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*Low*
Impact 6: Impact on property values					
- Zone 1 (Athlone and Worlds View)	-ve	Low	Likely	Negligible	Medium
with mitigation	*-ve*	*Low*	*Likely*	*Negligible*	*Medium*
- Zone 2 (Clarendon and Wembley)	-ve	High	Likely	Moderate	High
with mitigation	*-ve*	*High*	*Likely*	*Moderate*	*High*
- Zone 3 (Pelham and Scottsville Extension)	-ve	Low	Likely	Minor	High
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*High*
- Zone 4 (Bisley)	-ve	Low	Likely	Minor	High
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*High*
- Zone 5 (Oribi)	-ve	Low	Likely	Minor	High
with mitigation	*-ve*	*Low*	*Likely*	*Minor*	*High*
Impact 7: Impact on archaeological and heritage resources					
- All proposed developments	-ve	Negligible	Unlikely	Negligible	High
with mitigation	*-ve*	*Negligible*	*Unlikely*	*Negligible*	*High*

Table 27: Summary of mitigation/enhancement measures

Impact	Mitigation/Enhancement
Impact 1: Direct and indirect effects on employment and income (construction phase) **Impact 2:** Significance of investment in and stimulation of the economy	- Finalise a land disposal policy with regard to leasing or selling land within the Airport Precinct. - Approve an incentive package for potential investors in the Techno Hub and Airport Precinct. - Establish responsibility and provide funding for a campaign to market and create awareness of investment opportunities in the Airport Precinct and Techno Hub. - Remove some of the uncertainty surrounding the capital funding of the Project by including it in the Integrated Development Plan (IDP) and Capital Budget as well as actively seeking alternative sources of funding. - Planning should, as soon as possible, move on from high level planning to the identification of specific projects suitable for the designated new development zones. - Accelerate planning approval and funding for the Market Road Extension - Finalise planning for an extended General Aviation zone creating opportunities for private investors requiring additional hangar space. - Promote aeronautical and aviation related activity at the Airport in order to raise revenue and reduce, or eventually eliminate, the Municipal financial subsidy of the airport.
Impact 3: Sustainability of the airport	- Approval of a proposal to establish a separate Management Entity to take ownership and control of the Airport Precinct, including the Techno Hub.
Impact 4: Traffic, access, safety and facilities	- The proposed extension of the Market Road and additional two accesses (Accesses A and B) will provide good accessibility for the Airport Expansion. - The upgrading of the section of Washington Road between Gladys Manzi and Market Roads to four lanes with accompanying turning lanes is warranted at present and we recommend that this be implemented as soon as practicable. - Major capacity improvements are necessary to the three Washington Road intersections under review, viz: Gladys Manzi Road, Market Road and Oribi Road. - The addition of a fourth leg to both Oribi Road intersections with Powell and Stubbs Roads, to accommodate the proposed Techno Hub, will require signalisation of the intersections when the Techno Hub is approaching full development. - It is recommended to closely monitor the progress of both the Techno Hub development as well as the Airport Expansion, and their cumulative impact on the intersections of Gladys Manzi with Oldfield Road and Oribi Roads. This monitoring also applies to the existing intersection of Oribi Road and Pharazyn Way. These intersections will operate satisfactorily in the short to medium term but will require signalisation and associated reconfiguration when warranted by traffic volumes. - Public transport facilities to be provided. - Pedestrian and non-motorised transport facilities will have to be provided.
Impact 5: Aircraft induced noise **Impact 6:** Impact on property values	- All possible and practical mitigation strategies as guided by the ICAO 'Balanced Approach to Aircraft Noise Management'. The approach is centred on a balance of four key elements as listed below, with accompanying mitigation options that are viable for this case, some of which are already partially and/or informally in place, or have been included in the Airport Precinct planning process: • Reduction at source o Change in the type of aircraft o Noise performance trends of the fleet mix operating at the airport o Regular assessment of the Nosie performance of aircraft • Land-use planning and management o Change in land use zoning o Planning over time

Impact	Mitigation/Enhancement
	○ Prevent encroachment of incompatible land use ○ Mitigate noise impact on receiving environment (building codes, noise insulation programmes, land acquisition and relocation, transaction assistance, real estate disclosure, noise barriers) ○ Financial mitigation (capital improvements planning) • Noise abatement operational procedures ○ Noise preferential runways ○ Noise abatement departure and approach procedures ○ Ground-based operational procedures • Operating restrictions ○ Partial restrictions
Impact 7: Impact on archaeological and heritage resources	- Msunduzi Municipality, as the authority responsible for the management of local heritage resources in terms of NHRA Section 8, should apply to Amafa for the declaration of the Pietermaritzburg Aeroclub as a Grade IIB heritage resource. In terms of such grading, internal changes to a building are allowed, but external alterations require a permit from Amafa. The Pietermaritzburg Aeroclub will automatically be subject to zoning scheme controls as soon as its grading is confirmed by Amafa. - Protocol for the identification, protection and recovery of heritage resources during construction and operation, as detailed in the heritage impact assessment report (van Schalkwyk, 2016).

6.3. Conclusion

The proposed development provides opportunity for the airport to move towards becoming a sustainable entity, and therefore has significant benefit to the regional socio-economic context. The sustainability of the airport will enable the Municipality to redirect current subsidies into other sector, thus enhancing government expenditure and consequential the socio-economic environment. The improvement and increase capacity of the airport and associated activities as a result of the proposed development also has the potential to stimulate the local and regional socio-economic environment through increased investment, employment benefits, increased economic activity and growth, and general stimulation of the economy. Therefore the potential cumulative benefits and spinoffs of the proposed development are significant.

However, the proposed development also has the potential to impose negative impacts of the receiving socio-economic environment, particularly due to the noise impact. Not only does the noise impact affect sensitive receptors from a nuisance perspective, but has the potential to have indirect impacts on property values.

The Airport Precinct Plan that has developed to guide planning in the vicinity of the airport provides a structured framework to manage, mitigate and enhance the potential positive and negative impacts associated with the proposed development. The findings of this socio-economic assessment and accompanying specialist assessment have fed into the Precinct Plan to ensure that the identified impacts are including in localized planning going forward. The mitigation, enhancement and management measures that have been specified for the regional and local context outside of the Precinct area are also vital and should be implemented to ensure that the greatest value can be made from the proposed development.

In conclusion, it is recommended that the proposed development be authorized based on the assurance that potential negative impacts on the receiving socio-economic environment are mitigated and managed as far as possible, and that potential positive impacts are enhanced to ensure the greatest value of the proposed development of the regional and local socio-economic context.

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Appendix 1

- **VIABLE AND POTENTIAL NOISE MITIGATION OPTIONS FOR THE PIETERMARITZBURG AIRPORT**

ICAO's Balanced Approach to Aircraft Noise Management

"The balanced approach to noise management consists of identifying the noise problem at an airport and then analyzing the various measures available to reduce noise through the exploration of four principal elements, namely reduction at source (addressed in Part II of this Annex), land-use planning and management, noise abatement operational procedures and operating restrictions, with the goal of addressing the noise problem in the most cost-effective manner. All the elements of the balanced approach are addressed in the Guidance on the Balanced Approach to Aircraft Noise Management (Doc 9829)". (ICAO Annexure 16 Volume, 2011[1])

The guideline document provides the following detail on the concept of a *Balanced Approach to Aircraft Noise Management.*

- *"Approach to address aircraft noise problems where they occur -at individual airports- in an environmentally responsive and economically responsible way.*
- *Remedial measures are target specific and tailored for an individual airport.*
- ***Safety must always be the overriding consideration in civil aviation operations***
- *Section 1.4 [of Doc 9829] gives a background of what is meant by "Balance Approach" it acknowledges noise as a problem but also considers other important elements in the civil aviation industry when scouting for mitigation measures.*
- *Concept:*
    - *Based on 'best practice' cost benefit analysis techniques*
    - *Aimed at achieving maximum environmental benefit in the most cost-effective manner*
    - *May be necessary to combine measures to achieve objectives*
    - *Must consider interdependencies:*
        - *Between different elements [reduction at source, land use planning and management, noise abatement operational procedures, operating restrictions]*
        - *Between noise and emissions [note: emissions was not assessed as part of this study]"* (ICAO Doc 9829, 2008[2])

In addition, ICAO Annexure 16 Volume 1 stipulates that:

[1] International Civil Aviation Organisation. (2011). Annexure 16 to the Convention on International Civil Aviation: Environmental Protection, Volume 1: Aircraft Noise. ICAO International Standards and Recommended Practices. Sixth edition. July 2011

[2] International Civil Aviation Organisation. (2008). Doc 9829 AN/451: Guidance on the Balanced Approach to Aircraft Noise Management – Part 1: Balanced Approach to Noise Management. Second edition.

- *"Aircraft operating procedures for noise abatement shall not be introduced unless the regulatory authority, based on appropriate studies and consultation, determines that a noise problem exists.*
- *Aircraft operating procedures for noise abatement shall be developed in consultation with operators that use the aerodrome concerned."*

The approach guideline provides four elements (reduction at source, land-use planning and management, noise abatement operational procedures, and operating restrictions) and accompanying potential noise management options. This guideline has been used by the consultants, in consultation with relevant stakeholders[1], to determine which mitigation and management option are viable for the Pietermaritzburg Airport. What follows is detail of this assessment per element, indicating which options are viable or not, as well as which are already in place. A brief overview of each element is provided before the assessment tables, as per the ICAO Doc 9829: Guidance on the Balanced Approach to Aircraft Noise Management.

1. Reduction at Source

- *"Aircraft noise is generated by a number of different 'sources', though the dominant one is still the main engines, on approach airframe noise is now becoming important.*
    - *Aircraft noise (at source) has been controlled since the 1970s*
    - *By the setting of noise limits for aircraft in the form of Standards and Recommended Practices (SARPs) contained in Annex 16 Vol I*
    - *New technologies by manufacturers have significantly reduced noise*
    - *Noise certification based on aircraft performance (airframe and engine)"* (ICAO Doc 9829, 2008)

Reduction at Source Mitigation Option	Applicability for PMB Airport	Viable Option
- Change in the type of plane (with a lower noise output)	- Airlink have confirmed that they will introduce lower noise output aircraft in the near future - Ongoing introduction of new technology	Yes
- Noise performance trends of the fleet mix operating at the airport	- Use of various of aircraft types - Consider using lower noise output aircraft during times of high impact (e.g. morning flights that affect Bisley Park Primary School could make use of lower noise output aircraft than other times) - Airlink is likely to introduce the Embraer EJet E170LR and E190AR types to replace the Avro RJ 85 in due course over the next few years.	Yes – already in plan where feasible (i.e. have to use bigger aircraft during peak hours)
- Regular assessment of the noise performance of aircraft	- Regular assessments to ensure that noise output is not increasing - Regular serving is conducted on all aircraft, however formal noise output monitoring is not always conducted	Yes – suggest formalize of noise output monitoring
- Hush kits	- Not relevant for PMB Airport o Hush kits could be placed onto Chapter 1 and Chapter 2 aircraft, but are not available for the newer (Chapter 3 and up) aircraft so are not relevant in the PMB airport context	No

[1] These stakeholders include representatives from the South African Civil Aviation Authority (CAA), noise specialists, Airlink, the Pietermaritzburg Airport, the Msunduzi Municipality, and Air Traffic Navigation Services (ATNS)

2. Land-Use Planning (LUP) and Management

- *"Land use planning covers a wide range of measures aimed at improving the noise climate around airports. The most effective long-term options include the definition of noise zones in which there are restrictions on residential property development, and these are used widely in Europe.*
    - *An effective means to ensure that the activities nearby airports are compatible with aviation*
    - *Land-use zoning around airports"* (ICAO Doc 9829, 2008)

LUP and Management Mitigation Option	Applicability for PMB Airport	Viable Option
- Change in land use zoning	- This forms part of the Land-use Framework developed as part of the Airport Precinct Plan - Actual noise contours would be needed in order to confirm the Land Use Framework and to make any additional comments/ recommendations to land use zones in the vicinity.	Yes – included in Airport Precinct Plan. Noise contours are needed
- Planning over time	- This forms part of the Land-use Framework developed as part of the Airport Precinct Plan - Included in the Airport Precinct Plan - *"Soundproofing may be required for new residential and/or sensitive development along the flight path i.e. old age home/crèches. Mitigation measures to be determined once the noise impact study forming part of the EIA is completed"* - Encourage compatible land use (i.e. commercial and industrial use) - Take into account additional noise contributors (i.e. population and traffic growth) o *Note: traffic noise has not been modelled* - Legislation/guidelines (or the like) to achieve compliance with land use criteria - Planning instruments could include: o **Comprehensive planning**: consider existing developing and coordinate future planning. The responsible authority should take into account aviation noise measures. ▪ Airport Precinct Plan has been developed o **Noise zoning**: Allows land parcels to be zoned for development and use constrictions based on noise exposure levels. ▪ Can only be done once noise contours prepared o **Subdivision regulations**: Subdivision regulations/guidelines may be necessary to guide developments in noise impacted areas, to minimize impact on new developments but not affect existing ones. This could include the reduction in the exposure of the building (orientation of the building), open-space requirements and density transfer, and designing of building to minimise impact of exterior noise. This could be assisted by legally notifying prospective owners of the existing and anticipated noise impact. ▪ Dependant on noise zoning (above) o **Transfer of development rights**: This concept enables some of a property's development rights to be transferred to another property (away from the airport) where the rights can be used to intensify the amount of	Yes – included in Airport Precinct Plan. Noise contours are needed

LUP and Management Mitigation Option	Applicability for PMB Airport	Viable Option
	allowable development. The landowner could be compensated for the transferred rights either though the airport purchasing the rights or the sale at the new location. The airport could resell or hold the right, depending on the legal requirements and/or market conditions. ▪ Not appropriate as MM does not have the necessary management processes in place ○ **Easement acquisition**: This enables the right to make use of the property for limited purposed in exchange for an agreed-upon value. This could be done through two types of easements i) where noise is permitted to affect the property and ii) to prevent the establishment or continuation of noise-sensitive uses on the property. ▪ Not appropriate as MM does not have the necessary management processes in place	
- Prevent encroachment of incompatible land use	- Consider shift in land use and zoning in long term planning to prevent encroachment of incompatible land use - This forms part of the Land-use Framework developed as part of the Airport Precinct Plan	Yes – included in Airport Precinct Plan.
- Relocate or locating of new airport in an appropriate place (away from sensitive receptors and land use types)	- Not financially viable and there is no appropriate alternative site within the municipality for the airport location	No
- Mitigate noise impact on receiving environment	- Mitigation instruments could include ○ **Building codes**: Define structural construction techniques and material standards to reduce interior noise exposure, and update as new standards are introduced, to guide design and sound insulation of new developments. ○ **Noise insulation programmes**: Noise insulation for residential structures and sensitive receptors that cannot be removed from the area of impact (i.e. double glazing), as well as for commercial buildings (such as offices and hotels). It should be noted that it is easier and more effective to insulate structures from the onset. ○ **Land acquisition and relocation**: Land acquisitions (purchase and relocation) by the airport operator/authority and land with developments that are not compatible with the airport-induced noise levels. The acquired land can be cleared to act as a buffer, sold with easements that control future developments or redeveloped to a compatible land use type. ○ **Transaction assistance**: Technical or financial assistance to a landowner who is trying to sell a property in an areas that is highly impacted by aircraft noise (i.e. paying realtors fees). This could also include, in extreme cases, the airport purchasing the property from the land owner and reselling at a later stage (the properties are typically noise-insulated prior to resell and are sold with an easement). ○ **Real estate disclosure**: Disclosure of noise impact on real estate to inform potential buyers of the nature of properties. However, this is not always desired by property owners as it could decrease the value of their property; however it may open potential to buyers and aid the rezoning of highly impacted areas.	Yes

LUP and Management Mitigation Option	Applicability for PMB Airport	Viable Option
	○ **Noise barriers**: Appropriate for noise sensitive receptors that are in close proximity to airport ground operations (including immediate take-off and landing). Noise barriers can man-made or in the form of vegetation, earthen berms, etc. However, such barriers may not mitigation in-flight noise and are more appropriate and effective for ground noise.	
- Financial mitigation	- Financing instruments can include: - **Capital improvements planning**: Infrastructure and service availability can promote development as well as steer the type of development to types that are more appropriate and less sensitive in an airport environment. - **Tax/Economic incentives**: *Not think this is appropriate for this case (i.e. offer tax benefits to enable land owners to insulate buildings)* - **Noise-related airport charges**: *This is a municipal owned and managed airport and therefore cannot be applied. This could be charged to the airline but do not want to discourage opeartions.*	Yes – where appropriate

3. Noise Abatement Operational Procedures

- *"Using defined, or 'noise preferential' routes (NPR's) are one way of minimising exposure to noise for people living near airports. Such routes are chosen because they direct aircraft, where possible, over less densely populated areas, such as heath and farmland.*
  - *Take-off and climb procedures that alleviate noise at some noise-sensitive locations around the airport*
  - *Aimed at reduction and/or redistribution of noise around the airport*
  - *Enable full use of modern aircraft capabilities*
  - *Potentially a cost effective measure"* (ICAO Doc 9829, 2008)

Noise Abatement Operational Procedures Mitigation Option	Applicability for PMB Airport	Viable Option
- Noise preferential runways	- Restricted as there is only one runway at PMB airport - The direction of the runway use is restricted e.g. temperature of day, happening of KSIA (who use the PMB VoR), not having parallel runway which causes delays - The proposed parallel taxiway may assist in the reduction of current noise levels ○ Fewer runway delays mean they could use the south runway (3-4), which would mean less impact on the sensitive receptors (schools, residential areas, etc.) in the Bisley area. ○ Could be a tactical management of the noise (i.e. take-off in northerly direction more often) ○ As aircraft would not have to taxi such long distances to get on and off the runway, there would be less noise production during this time	Yes
- Disperse noise footprint (preferential routes, dispersed flight tracks)	- Not feasible as the flight path is restricted and no alternatives are available, as determined by a study undertaken by ATNS	No
- Operate according to RAF procedures	- Already operate accordingly to the RAF procedures	Already in place

Noise Abatement Operational Procedures Mitigation Option	Applicability for PMB Airport	Viable Option
- Displace thresholds	- Runway already short therefore this is not possible	No
- Noise abatement departure and approach procedures	- Use of appropriate and feasible noise abatement procedures to optimise ground noise distribution while ensuring that safety is the main priority o Ensure that procedures put in place do not have negative impacts for other areas (i.e. reduction in initial take-off noise may result in increased noise at a later stage of the take-off) o The implementation of such procedures, particularly continuous decent approach (CDA) requires the context (weather conditions, capacity, training and experience, aircraft capabilities, safety requirements, regulations, etc.) to be considered. - Low thrust, low flap o Possibility in light of new aircraft being introduced (less drag and therefore less thrust results in less noise). ▪ If done 4/5 miles out it would be less noisy (Worlds View/Hilton are) but would not have an effect on the local area ▪ Unclear if this is a feasible option – it will need to be investigated further by experts - Steep angle/reduce idle thrust approach – low drag/power approach o Real noise hotpots (in the local area) will not benefit from any changes, therefore not appropriate for PMB Airport o Possible restriction of reverse thrust auxiliary noise - therefore only idle thrust and reverse thrust in an emergency situation and within certain times of the day ▪ Although the current PMB Airport flight times already account for this o Aircraft can land without reverse thrust as they do not have to stop soon ▪ The proposed taxi way will also assist with this o All possible, safe and feasible options are already in place - **It was indicated that, where possible, the above procedures are in place. However, CAA does not have record of these procedures and therefore formalisation and submission to the relevant authority is required.**	Yes – what is possible, feasible and safe is already in place. Formalisation of existing procedures.
- Descent profiles	- The current decent angle is already fairly step	No
- Active noise reduction or abatement by using max thrust at a certain altitude (a flatter climb to get away from sensitive receptors that are highly impacted by aircraft noise)	- *Note : Noise abatement is already trying to be done* o *i.e. already try to depart with low thrust, cannot really go less* o *could try climb a bit steeper, but may pose a risk* - Option feasibility would be improved through measurement/testing of the difference of various options - Safe operations are the first priority and the pilot ultimately makes these decisions - May not be feasible as the reduced impact on the local area (i.e. Bisley) would not be significant enough to justify the risk	Already in place
- Use of flight departure and approach routings	- The routing options are limited by obstacles in the local area	Already in place

Noise Abatement Operational Procedures Mitigation Option	Applicability for PMB Airport	Viable Option
(Standards Instrument Departure (SID)/Std Terminal Arrival (STAR) procedures)		
- Ground-based operational procedures	- Limiting of the time that the aircraft engine runs which on the ground, particularly at times of the day when the noise impact is considered to be high for the local receiving environment - This includes maintained and servicing of aircraft, as well as taxiing time and distance ○ This may be improved the addition of the proposed parallel taxi-way	Yes

4. Operating Restrictions

- *"Operating restrictions may be necessary for some airports where noise mitigation is required, and other methods prove to be ineffective.*
  - *Any noise-related action that limits or reduces an aircraft's access to an airport*
    - *Can improve the noise climate by limiting or prohibiting movements of the noisiest aircraft at an airport. Enables the airport to shrink the noise contours around the airport*
    - *ICAO does not encourage operating restrictions to be applied as a first resort. Only after consideration of the benefits to be gained from the other 3 elements"* (ICAO Doc 9829, 2008)
- Note: Operations Restrictions should only be applied after in-depth consideration of the other three elements of a Balanced Noise Management Approach, therefore operations should only be restricted as a last resort. In addition, there should be no cost implication for the relevant airline.

Operating Restrictions Mitigation Option	Applicability for PMB Airport	Viable Option
- Airport curfews	- PMB Airport operating hours are restricted (for commercial, scheduled aircraft operation, unless special request) as there are no ground services outside the 06h00 – 22h00 time bracket - These restrictions apply to General Aviation	Already in place
- Night-time restrictions	- PMB Airport operating hours are restricted (for commercial, scheduled aircraft operation, unless special request) as there are no ground services outside the 06h00 – 22h00 time bracket - These restrictions apply to General Aviation	Already in place
- Aircraft-specific restrictions e.g. Phase-out of Chapter 2 aircraft	- Airlink has indicated that there will be a change in the type of aircraft used in the near future - Chapter 2 aircraft are being phased out	Already in place
- Flight times (06h00 to 22h00 bracket)	- Proposed additional flights will remain in this bracket - PMB Airport operating hours are restricted (for commercial, scheduled aircraft operation, unless special request)	Already in place

- Global restrictions (i.e. noise quotas/budget, none additional rules, curfew, movement caps) which is based on	- Restrictions are only imposed by regulations
	  ○ PMB Airport has no movement cap, possibility to place a movement cap to control future expansion and impacts
	  ○ Imposing restrictions must be measured against economic impact and viability
	- *The fleet operating at the airport is very small in comparison to other regional airports and it is anticipated that little can be done*
		No

Operating Restrictions Mitigation Option	Applicability for PMB Airport	Viable Option
the total fleet performance	*to restrict fleet performance*	
- Partial restrictions	- Possibly restrict aircraft movement to specific times of the day/week (**just for new flights!)** - Restrictions to certain runways is not applicable due to there only being one runway and the landing/take-off direction is weather dependent	Yes
- Progressive restrictions (including non-addition rules)	- The intention is to grow the operations of the airport in order to accommodate the increase in demand and improve its **sustainability**, and therefore restricting traffic or noise energy will likely hinder such growth. This includes assessing the: o Cost of flights o Sustainability of the airport (rate payers subsidizing airport operations) – pax/flight	No
- Nature of flights	- Implement partial restrictions to limit access to the airport, particularly for non-scheduled flights - *Caution must be placed as the airport does not want to deter GA operations*	No